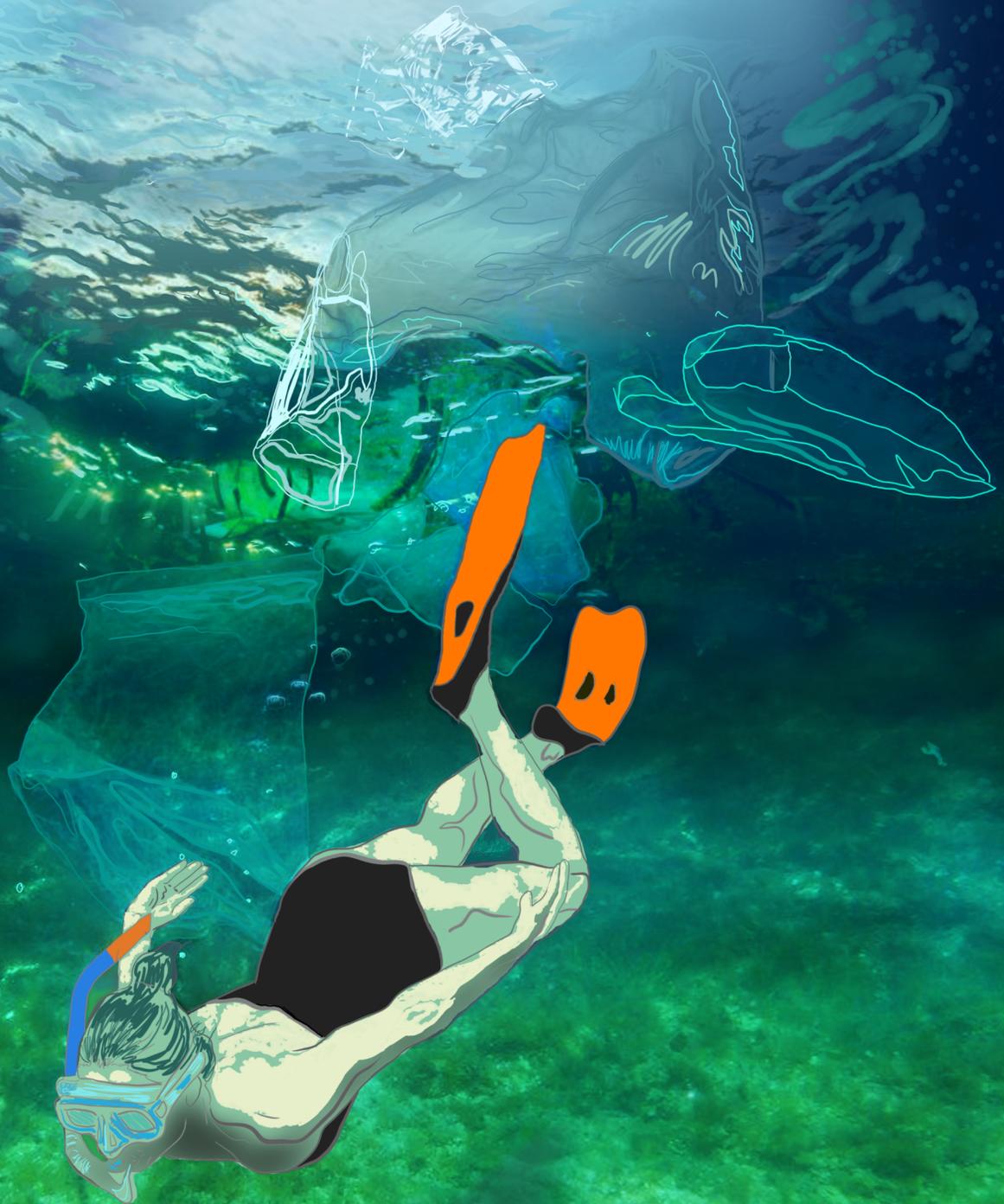


The Politics of Plastics

How a “circular” economy promises to solve
the globalization of plastic waste disposal



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“I just want to say one word to you, one word”
“Yes, sir”
“Are you listening?”
“Yes, I am”
“*Plastics*”
“Exactly how do you mean?”
“There is a great future in plastics, think about it”

Scene from *The Graduate* (1967)

List of Abbreviations

CBS = Centraal Bureau voor Statistiek (Central Bureau for Statistics)

CE = Circular Economy

CPB = Centraal Planbureau (Dutch Bureau for Economic Policy Analysis)

EC = European Commission

EPR = Extended Producer Responsibility

EU = European Union

EVOA = Europese Verordening Overbrenging Afvalstoffen (Dutch version of EWSR)

EWSR = European Waste Shipment Regulation

HD-PE = High-density polyethylene

ILT = Inspectie Leefomgeving en Transport

MT = Metric Tons (equals 1000 kilograms)

OECD = Organisation for Economic Cooperation and Development

PBL = Planbureau voor de Leefomgeving (Dutch Environmental Assessment Agency)

PET = Polyethylene terephthalate

PMD = collective term for plastics, metal packaging en drink cartons

PP = Polypropylene

PPWD = Packaging and Packaging Waste Directive

ROV = Raamovereenkomst Verpakkingen

SUP = Single Use Plastics

TFEU = Treaty of the Functioning of the European Union

UNEP = United Nations Environment Program

WFD = Waste Framework Directive

Abstract

Plastic is an essential element of modern life, making it safer and more convenient. However, as consumption increased, so did the mark that this indestructible material left on the earth. As a result, the concept of the circular economy popularized among scholars, businesses and policymakers to solve the throw-away-culture by closing the cycle, through which waste would become a regenerative source of energy. This thesis analyses how the concept of the global circular economy affected the global management of plastic on an international and supranational level and filtered through to the national practice of Dutch plastic waste management. By drawing upon the definitional ambiguity of the concept and its relation to the core principles of sustainable development, this thesis concludes that the values of economic, environmental and social proliferation need to be included in the policy development of the circular economy. Without it, the system will never become truly cyclical nor deliver its promised results. It will solely remain a cyclical movement of waste around the globe afflicting damage on its way.

Preface

The topic of this thesis was elicited by my curiosity about the journey of my plastic waste after I carefully sorted it and brought it to a recycling station. The research introduced me to a more complicated system than I could have ever imagined, which completely debauched the recycling myth for me. Writing a thesis during the convoluted times of corona, significantly increased the importance of external support. I want to thank my supervisor, dr. Paschalis Pechlivanis, for his (virtual) guidance, my sister for the amazing cover and lastly, of course, my parents for everything, but also for teaching me how to recycle - whether it has made a difference or not.

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Introduction

What happened to the foil cucumber wrapping that I carefully sorted in my plastic bin and brought to a recycling station? It would never end up choking turtles, being dumped in the ocean from a Thai beach or sustaining immoral work conditions in a faraway location – at least, that is what I was made to believe. I thought it was transformed into something beautiful, on its way to a second life; not thinking twice about it after I left it at my local recycling containers, resting assured that I was being a ‘good citizen’. I do not believe that I, or any other ‘recyclers’ are wrong to believe this; we are trying to do our best, contributing our part to combat plastic pollution. Unfortunately, the process of discarded waste is very different from the recycling-utopia that is often depicted by policymakers and the industry.

This thesis will tackle the politics of plastics; how one material, which forms such an intimate part of our daily lives, moves in the world after its disposal – polluting air, land, sea and organisms on its way. This analysis will focus on the international, supranational and national policy that governs plastic waste on different stages of its route from production, consumption to disposal. Specifically, the role of the ‘global circular economy’ will be analyzed. It became the magic word of scholars, policymakers and businesses to structure the solution to the plastic problem: one beautiful cycle in which no waste escapes, instead every material is endlessly reused and repurposed. This analysis shows how this proposed system is not without its conceptual or theoretical limitations, which causes an ambiguous solution to a problem that is spiraling out of control.

The historic growth of the production of plastic has surpassed almost all other man-made materials. From 1950 to 2015, the production of plastic has almost increased 200-fold. As of 2017, a cumulative total of 8.3 billion metric ton (MT) of plastic has been produced (Brooks et. al, 2018). Our plastic consumption has grown at a higher rate than waste infrastructures can handle. Plastic, as a non-biodegradable good, only has three ‘end of life’ options: recycling, incineration or landfill. Plastics left in the natural environment will never naturally decompose, instead they will slowly break down to microparticles of which the long-term effects in natural environments remain unknown. The durable material finds its way to every part of the world: plastic bags and candy wrappers have even been found in the extreme depths of the Mariana Trench, the deepest point of the ocean (Gibbens, 2019).

The explosive increase in production and chemical complexity of plastic caused a global waste infrastructure to develop in which significant flows were exported by developed to developing countries. China, for many years the fastest growing economy in the world, had a big hunger for raw materials, which caused it to open up its markets to excessive amounts of plastic. It became responsible for more than half of the global plastic waste import since 1992 (Brooks et al., 2018). However, the country suddenly but logically, announced a permanent import ban on the import of nonindustrial plastic waste in 2017 (Liu et al., 201). With China stepping out of the circular economy of waste, the global industry went into turmoil: where will it go now? Instead of using this opportunity to reshape the system, the waste crisis is shifting to bordering countries in Southeast Asia.

The ‘magic word’ of the circular economy has not lived up to its promised potential. This is partly caused by its blurry conceptual and definitional framework and its relation to the concept of sustainable development. In essence, the circular economy strives to be a sustainable method to deal with the world’s waste generation. However, the concept of sustainable development is based on the three pillars of environmental quality, social equity and long-term economic stability (Kirchherr et al., 2017; Millar et al., 2019; Geissdoerfer et al., 2017; Murray et al., 2017). The way the circular economy developed, and is developing, caused environmental injustice by not lining up its policy with the inclusion of these pillars. This put a disproportionate burden of global waste management on poor communities, with disastrous effects on both social equity and the environment (Qu et al., 2019; Ma & Hipel, 2016).

This thesis will analyze the development of the global circular economy of plastic waste by, on one hand, focusing on the theoretical shortcomings of the circular economy’s conceptual and definitional framework and on the other hand, distinguish the effects of the concept’s ambiguity in policy implementation. This research aims to track the concept of the circular economy in three different stages: the international scope of the problem, the supranational policy guidance by the EU and the national plastic waste management structure. The case study of Dutch plastic waste management will disclose the practical workings of circular economy policies on a national level. This research will address the question: how has the concept of the circular economy affected the global management of plastic on an international and supranational level and filtered through to the national practice of Dutch plastic waste management?

Methodological & Analytical Framework

The three chapters consecutively deal with the international, the supranational and the national dimension in order to distinguish the management of plastic waste and the role of the circular economy at different levels of governance. The main method is content analysis to distinguish the consistencies and inconsistencies in the scholarly literature on the circular economy of plastic waste. However, because every chapter deals with a specific level and topic, methodologies slightly differ.

The first chapter employs extensive literature research to analyze how the plastic industry, waste management and the international waste trade system developed from the ‘birth’ of plastics in the 1950s to its present large-scale use up until China’s plastic ban. An important focus is the definitional and conceptual framework surrounding the circular economy and its relation to sustainable development, which has been a cause for scholarly debate. The position of this thesis in the debate is the starting point of the research’s analytical framework.

The method of the second chapter is based on primary documents, namely the main policy documents from the European Commission (EC) that illustrate the development of the EU’s policy framework concerning plastics, such as press releases, communication documents and directives. This policy analysis is supplemented by newspaper articles from different EU countries to show the discrepancy between ambitious EU goals and the practical reality in member states.

The third chapter examines the plastic waste management system in the Netherlands. In this policy analysis is combined with open source and database investigation to discover as much public information as possible on the flows of Dutch waste streams. Additionally, the information obtained from literature, primary sources and open sources is complemented by interviews with Hugo Bellaart, a Dutch municipal councilor for VVD working on household waste and Amy Brooks, an American scholar who focuses on global waste flows and the effects of the Chinese plastic ban (see: [Appendix](#)).

This research developed a specific analytical framework that underlies the analysis of this thesis; to not only include the global, but also the macro and micro level effects of plastic waste management, which has never been employed before. This will reveal the far-reaching effects on multiple governance levels and disclose pitfalls in the political, policy and multilateral framework concerning plastic waste management. In short, the analytical framework includes the analysis of literature on the conceptual and definitional development of the circular economy to help explain

how the practical reality of the system is failing to generate sustainable development on three levels of governance. In this manner, attention is drawn to the conceptual imbalance that is inherent in the circular economy, arguing that without a distinguished conceptual, scientific and policy framework, the concept is reduced to a popular buzzword with the risk to collapse in a conceptual deadlock.

Structure & Societal Relevance

The research question is broken down into three sub-questions of which each will be answered in one of the three chapters. The first chapter will address: *How has the global circular economy been conceptualized and how did it practically develop in the case of plastic waste?* This chapter revolves around an analysis of the historic growth of plastic, the global development of a circular economy of plastic waste, and its implications on social equity. The second chapter aims to answer: *How does the European Union aim to (re)structure the EU's plastic waste management – and is it successful so far?* It concerns the development of a European policy framework on plastic waste, which recently culminated in the Plastics Strategy. The third chapter will address the question: *How have circular economy approaches affected the management of plastic waste streams in the Netherlands on a national level?* Its focus is on a case study, namely the role of the Netherlands within the international plastic waste system. The analysis of how a single EU country manages its waste, will shed light on how waste management is realistically conducted on a micro level.

The combination of critically analyzing the conceptual and scholarly framework of the circular economy and its relation to the concept of sustainable development will contribute to the literature framework that has neglected to form clear boundaries between these two concepts. The focus remains on the development of the policy framework, and not, for example, grassroot action, NGOs or civilian efforts. This focus is chosen from the belief that climate change will not be solved by ‘good citizens’; taking shorter showers, eating vegetarian or carrying linen grocery bags will ultimately not save the world. Because, “by insisting on individual responsibility, the true culprits are left off the hook” (Tielbeke, 2020). Therefore, this thesis will be an effort to collect, analyze and evaluate the limited, and often messy, information available on the efforts of the government and the industry to achieve a global circular economy of plastic waste.

The current corona crisis highlights the societal relevance and reveals the fragility of the global system of plastic waste disposal: oil prices are plummeting making new plastics cheaper

than recycled ones, waste sorters are shut down because of health and safety concerns, municipal waste pickers cannot do their job and international exports are kept at bay. This is paired with an increased plastic consumption in the healthcare system, with disposable masks and gloves, and among consumers who bulk-buy disposable plastics: water bottles, hand sanitizers, cleaning wipes and home delivery packaging. This thesis stresses how the current economic system enables this disposable way of living, but is unable to clean up the mess.

Chapter One The Global “Circular” Economy of Plastic Waste

“[T]he future of the earth will bear the marks of our present. While the manufacture of plastics destroys the archives of life on the earth, its waste will constitute the archives of the twentieth century and beyond.”

Bernadette Bensaude-Vincent (quoted in [Davis, 2015: 1](#))

The global economy used the equivalent of 1.5 earths in 2010 to provide needed resources and absorb generated waste. Two earths would be needed by 2030, and three earths by 2050, if humankind does not change its consumption or production patterns ([Bonviu, 2014](#)). A world that cannot keep up with our ever-increasing desire for perpetual growth and prosperity, manifests the sign of our times and characterizes our natural environment. As this realization dawned, the circular economy model is often proposed as a popular solution among scholars, businesses and policymakers. It would allow waste to become a regenerative source of energy. In the case of plastic waste, a global circular economy of some sorts has developed and served its actors in various ways. Developed countries saved costs by exporting waste to developing countries with weaker environmental regulation. Developing countries benefited from importing recyclable waste that was needed in their manufacturing industries. However, exported plastic was often polluted or mixed; only generating more pollution, increasing the great burden on the domestic waste infrastructure of importing countries. In this way, a circular but unequal system developed in which exporting countries “failed to incorporate true environmental costs” ([Liu et al., 2018: 22](#)). This chapter will consecutively tackle the development of plastic consumption, the conceptualization of the circular economy, the role of social inequality and the Chinese plastic ban, to answer the question: How has the global circular economy been conceptualized and how has this system practically developed in the case of plastic waste?

The historical development of plastic

Plastic forms an intimate part of our daily routine; it protects our foods, brushes our teeth and clothes us. Even though plastic is an indispensable element of modern life, the historical development of plastics only spans a relatively short period of time. Bakelite, the first synthetic

polymer, was invented in 1907 and patented by ‘the father of plastic’ Leo Baekeland. He boasted that his chemically synthetic plastic “rendered it permanently hard, infusible, and insoluble” (Meikle, 1995). It was invented during the surge of colonial resistance movements to fill consumer demand for items that were becoming increasingly scarce and expensive, like ivory and silk (Davis, 2015). However, before World War II, the use of plastics remained largely confined to the military. In the 1950s, the production of plastics went through a rapid and extraordinary growth, surpassing most other man-made materials, significantly changing the consumer landscape (Geyer et al., 2017). In 1950, ‘just’ 2 million metric tons (MT) of plastic was produced, compared to 322 million MT in 2015. As of 2017, a cumulative total of 8.3 billion MT of plastic has been produced (Brooks et al., 2018). Approximately 42 percent of plastics have been used for packaging (Geyer et al., 2017); plastics’ largest market that developed hand in hand with the global shift from reusable to single-use materials. Plastics made life safer and more convenient. Moreover, it is cheap to produce, versatile and durable. This caused a disposable way of living to evolve over decades of times (PBS Newshour, 2019: 11:00).

Unfortunately, our plastic consumption has grown at a higher rate than our waste infrastructures. All the reasons why we like and use the material, and why Baekeland boasted about its characteristics, are also the reasons why it is impossible to get rid of. As a non-biodegradable good, it either has to be recycled, incinerated or landfilled, it will never organically decompose. To add to this distress even more; even when plastic is recycled, it depends on the quality of the plastic whether it can be upcycled multiple times, or simply once. After which it again enters the polluting global waste stream with only two options to decay. Once it is in the environment, it can take hundreds of years to break down and even then only in microparticles, or microplastics. These miniscule parts of plastics, defined as “synthetic solid particles or polymeric matrix, with regular or irregular shape and with size ranging from 1 mm to 5 mm” (Frias & Nash, 2019: 146), are found everywhere: in the air, the earth, the oceans and the animals that inhabit them. Humans are no exemption: research estimates that between 39,000 to 52,000 microplastics particles are consumed annually (Cox et al., 2019). Ecologist Chelsea Rockman asserts that “Every bit of plastic that has ever been produced, is likely still here in some form” (PBS Newshour, 2019: 8:01). That adds up to more than 8.3 trillion kilograms of plastic that is currently floating the globe, a number that is only bound to increase. Thus, the scope of our plastic consumption and production, and the policies aimed to curb them, deserve our special attention.

Geyer et al. (2017) present the first global analysis of the production, use, and fate of all plastics ever made. Their analysis outlined the three fates for plastic waste, the most favorable one being recycling. Again, stressing, that “recycling delays, rather than avoids, final disposal” (2). In a PBS documentary, geologist Roland Geyer said: “The way we recycle plastic at the moment is not part of the solution. I’d even go as far as saying it is part of the problem” (PBS Newshour, 2019: 16:20). The fact that different polymer types are mixed and virgin plastics are polluted during consumption creates recycled plastics with low technical and economic value. The second option is incineration. There are state-of-the-art technologies that are able to distill valuable fuel from waste, however the vast majority of plastics has been thermally destructed. Incineration is an easy option for low quality plastics, but it is not without environmental or health risks; the severity depending on the technology and design of waste incinerators. Finally, the conventional approach for plastic waste is to discard it in either a managed landfill or dump it in places in the natural environment, albeit designated or not. The research on the environmental impacts of microplastics in water ecosystems has increased recently. However, little is known about the impacts of plastic waste on land environments, but this ignorance does not prevent excessive dumping from taking place. Geyer et al. (2017) estimated that in 2014, the world had average recycling, incineration and landfill rates similar to those of the United States: only 9 percent of global plastic waste is expected to be recycled; 12 percent to be incinerated and 79 percent to be landfilled. “The only way to reduce disposal is to make less plastic.” (Geyer in PBS Newshour, 2019: 16:30)

Plastic waste and microplastics have affected every aspect of the natural environment. Plastic has influenced our surroundings to such extent that it has been suggested as an indicator of the prospective Anthropocene era (Geyer et al., 2017), the era in which “extractivist logic and capitalist economics have drastically reshaped the chemical, geological, and biospheric conditions of the earth” (Davis, 2015: 2). Thus, the social, economic and political structure surrounding plastic waste represents an uncontrolled global experiment in which billions of kilograms of plastic are dumped in natural environments without knowing the long-term effects of these practices — all the while plastic production is still rapidly rising.

The development of a global circular economy of waste

The disposable way of living described in the previous section follows the path of a linear economy in which raw materials are extracted, products are made and used, and finally disposed of. This

trajectory is known as the linear or ‘take-make-dispose’ economy that was built around inducing economic growth (Huysman et al., 2017). Within the linear economy, sustainable development is unfeasible since the model is structured around continuous economic growth, which is achieved through severe environmental degradation and a general disregard of social equity. The linear economy stayed out of public scrutiny until *The Limits of Growth* (1972), a publication by a collective of concerned scientists named the Club of Rome and *Our Common Future* (1987) by the independent Brundtland Commission, appointed by the UN. The former argued that a linear, infinite increase in production and prosperity is simply not possible in a world with finite resources (Bonviu, 2014). The latter stressed the urgency to balance the environmental, social and economic dimensions of human activity in order to reach *sustainable development*, famously defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland et al., 1987: 37). Unfortunately, the report’s urgent call to decrease consumption clashed with neo-liberalism’s heydays. Most western governments started devising economic policies aimed at strengthening free market capitalism by increasing privatization, deregulation, globalization and free trade – only increasing production, consumption and waste generation (Murray et al., 2017).

The combination of the report’s findings and the industry failing to address these concerns, gave rise to the creation of multiple sustainable development models designed around the three intertwined aspects of sustainable development as proposed by Brundtland: environmental quality, social equity and long-term economic stability. These were further conceptualized in the UN’s seventeen Sustainable Development Goals. This gave rise to a growing incentive among policymakers, scholars and businesses to replace the ‘take-make-dispose’ economy with a new model based on the combination of economic prosperity with sustainable development in which the patterns of production and consumption have a negligible environmental impact (Millar et al., 2019).

The concept of the circular economy is not attributed to one specific scholar. The general idea stems from Boulding (1966) who argued that the world was a closed system with “limited assimilative capacity and as such the economy and environment must coexist in equilibrium” (Boulding 1966, quoted in Millar et al., 2019). This idea was further advanced by multiple disciplines to incorporate the idea of a closed-loop economy. In the 1990s, the concept of a circular economy was popularized in China when it was faced with economic growth and natural resource

limitations (Winans et al., 2017). The current circular model is based on product design that is “restorative and regenerative, where products are utilized at their highest value”. Its previous 3Rs, reduce, reuse, recycle, have been extended to the 6Rs: reuse, recycle, redesign, remanufacture, reduce, recover (Liu et al., 2018: 22). Unfortunately, this has not led to an all-encompassing universal definition. However, it has inspired many, such as the United States, China, Japan, Germany, United Kingdom and Canada to include the concept of circularity in their policy. However, the “diffuse terminology” of circularity (Brouwer et al., 2018) caused widely different applications across countries due to diverse cultural, social and political systems (Liu et al., 2018).

A popular buzzword caught in a conceptual deadlock

This convoluted understanding of the demarcation of the circular economy concept proves to be a source of discussion within the scholarly framework. Kirchherr et al. (2017) analyzed 114 definitions of the circular economy through an extensive coding system. Their research indicates that “the circular economy is most frequently depicted as a combination of reduce, reuse and recycle activities, whereas it is oftentimes *not highlighted that CE necessitates a systemic shift* [emphasis added]”. Moreover “the definitions show few explicit linkages of the circular economy concept to sustainable development” (221). 11 percent of the definitions explicitly include the concept of sustainable development and only 13 percent refer to its three dimensions. The literature review shows disagreement on whether the concept of a circular economy is in line with achieving sustainable development by encompassing its three principles of environmental, economic and social development. Some argue that the relation between the two concepts is “ambiguous”, suggesting the circular economy can be “undifferentiated from the linear economy in the sense that it could ultimately produce similar outcomes” (Millar et al., 2019). Others argue how “the circular economy agenda can [...] contribute to the Sustainable Development Goals and promote sustainable societies” (Schroeder et al., 2018). Without a consensus among scholars, policymakers and businesses on the concept of the circular economy and its inclusion of the aspects of sustainable development, how can a circular model truly be sustainable and provide a solution to the problems previously posed?

When zooming into the circularity of waste trade particularly, it starts with extracted raw materials from resource-rich countries that are shipped to manufacturing centers where products are made; finished products are exported, in general for consumption in developed countries. The

cycle finishes with post-consumer wastes that are transported for recycling and disposal, mostly in developing countries. However, this circularity did not so much develop from environmental concerns, but originated from economic motivations, as distinguished by [Qu et al. \(2019\)](#). Firstly, the sorting of mixed wastes is labor intensive, which is why it is generally done in developing countries where labor costs are low. Secondly, environmental regulations are stricter in developed countries, which makes it more profitable to ‘recycle’ waste materials with environmental harms in countries with loose regulations and enforcement measures. Thirdly, developing countries with low recycling costs are often also manufacturing centers where more convenient use can be made of recycled materials. Shipping companies feed into economic motivations, because they propose competitive prices for return trips to prevent empty return cargos, which stimulates the movement of waste from developed countries to developing countries ([Qu et al., 2019](#)).

Thus, the incorporation of the core concepts of sustainable development is not an explicit focus point in neither policy nor literature. Instead the driving force behind the development of a circular economy were mainly economic motivations that were disguised by eloquent terms and false promises. The blurry conceptual contours of the circular economy model and its relation to sustainable development diminish its worth in research and practice ([Geissdoerfer et al., 2017](#)). If the right adjustments are not made to the conceptual, scientific and policy framework concerning the circular economy, the concept will be reduced to a popular buzzword destined to collapse in a conceptual deadlock – instead of providing the tools for sustainable development. This causes this research to argue that a global “circular” economy exists, although it is more focused on circular global movement *patterns* than valuable waste extraction. This research will therefore not utilize one single definition of the circular economy because of the scattered and blurry nature of the variety of definitions. Instead, arguments will be based on the assumed agreement that the circular economy replaces the linear economy with a cyclical closed-loop system that aims to balance economic development with environmental protection. It flirts with the three pillars of sustainable development – but their introduction into either the definition nor resulting policy is sporadic and inconsistent.

Inherent inequality of the system

The research by [Kirchherr et al \(2017\)](#) shows that the definitional framework of the circular economy is primarily focused on economic prosperity, followed by environmental quality. However, impact on social equity and future generations is barely mentioned, whilst this was a

key focus in the Brundtland report. To achieve a functioning circular economy in a sustainable way, the advancement of social equity has to become its key element. Human rights and social justice are essential in order to achieve not only intra-generational equity between the developed and developing countries, but also inter-generational equity between the current and future generations (Millar et al., 2019). Without these, compassion and empathy are lacking from the circular system, which pushes certain actors to the periphery – to eventually opt out.

Jambeck et al. (2015) ranked the top twenty countries on the basis of their mismanagement of plastic waste. Sixteen of these twenty were classified as low or middle-income countries; these countries are likely to experience fast economic growth and are hungry for material, however they often lack a functioning waste management infrastructure. Contrastingly, high income countries have overwhelmingly been the principal exporters of plastic waste. As Brooks et al (2018) revealed, high income countries have contributed to 87% of all exports since 1988. Moreover, the entire top ten of countries exporting plastic waste is solely made up of high-income countries, except for Mexico. The nation members of the OECD contributed to 64 percent of all exports and, if taken collectively, the 28 member states of the European Union would form the top exporter. East Asia and Pacific countries have led the import of plastic waste, receiving 75 percent of all plastic waste imports since 1988. These findings from Brooks et al (2018) suggest that the trade of plastic waste may largely be occurring between OECD, albeit European, countries and East Asian countries. This is consistent with historical patterns of waste management in which richer countries, with generally well-functioning waste infrastructures, are exporting plastic waste to developing countries with weaker economies and less developed waste management infrastructures. Thus, the international trade flow of plastic follows a circular *pattern* to some extent. However, without the acknowledgement of environmental concerns nor the aim towards social equity, this circular *pattern* does not translate to a circular *economy*.

Domestically, developing countries are faced with fast changing consumption patterns within their own borders which will further contribute to the increase of plastic usage, especially packaging, and the leakage of plastic waste into the environment (Godfrey, 2019). In developing countries, flawed waste collection and recycling infrastructure are often paired with loose environmental regulations and enforcement. Faulty waste policy also affects the health protection for waste separators and those living near dumping sites or incinerators. Waste separation workers have to deal with toxic substances and residues that are often dumped without appropriate

treatment and without protective measures (Qu et al., 2019). Research has shown that women and children face higher risks as the result of poor waste management, including increased cancer mortality, greater dioxin levels in breast milk, and greater concentrations of harmful toxins. Additionally, female waste separators have greater accident rates, commonly suffer from gender discrimination and are more vulnerable in terms of income and adaptive capacity, because of low education levels and lack of capital (Ma & Hipel, 2016). In this way, environmental injustice is afflicted upon the most vulnerable in a society who generally do not benefit from the chemical industries or growth of western economies, but instead remain “out of sight of the markets of capital that rely on invisible labour in order to perpetuate this system” (Davis, 2015: 5).

If developing countries cannot accurately process their own waste, it is in no way sustainable to develop a circular economy in which more waste ends up in their infrastructure. “For the way the waste world is going, it makes more sense for waste management to become more localized,” says scholar Amy Brooks. “That said, one thing that I worry about and having seen on the ground in Southeast Asia, is that for some people, their entire livelihood depends on this material coming into their country so they can process it. Any kind of policy that we have in terms trading needs to be cognizant of that and the lives that depend on this system” (Interviews, Appendix B). However, the implementation of progressive environmental policies has been weak, “largely because of the top-down approach that has been taken, which lacks social and environmental indicators supporting market-based policy and public participation” (Brooks et al., 2018: 3). Many scholars envision the circular economy as “economic systems with primary benefits for the environment, and only implicit gains for social aspects” (Geissdoerfer et al., 2017: 764). The disregard of the social reality of waste exports is an example of ‘slow violence’; a violence that “occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all” (Nixon, 2011: 2). The analysis of the subsection urges this research to be in line with the findings of Millar et al (2019), Geissdoerfer et al (2017), Kirchherr et al (2017) and Murray et al (2017) in claiming that social equity is not separate from, but an essential element of the circular economy that cannot be sustainable without incorporating all three core concepts of sustainable development, based on environmental, economic *and* social proliferation.

The case of the Chinese plastic ban

The economic growth that China experienced in the 1990s gave rise to the need to profitably use materials; especially considering cargo could efficiently bring back materials that could be used to manufacture more products intended for export. This development was paired with loose environmental legislation that enabled a great flow of waste into China. The first environmental policy relating to waste imports was not enacted until 1996. Moreover, clear definitions and catalogues of restricted and forbidden wastes, albeit very limited, were not announced until the end of 2001 (Sun, 2019). Exporting countries saw China as an outlet for regulating plastic waste domestically. However, China's enthusiasm curbed around 2010 as exporting countries disregarded the incorporation of societal and environmental costs resulting from the excessive amounts of plastic waste. The received waste was often unrecyclable and of inferior quality compared to its domestic waste, ultimately generating more waste (Brooks et al., 2018; Liu et al., 2018). Moreover, manual dismantling and questionable recycling methods were left to the informal recycling sector; dangerous tasks that were performed by poor and marginalized social groups in China (Sun, 2019). As the aftermath became clear, increasingly more rigid waste import policies followed.

The first far-reaching import policy was China's Operation Green Fence that was implemented in February of 2013 and lasted for eight months. This campaign was intended to combat smuggling of illegal goods and to prevent waste importation that did not comply with regulations regarding concealment, false reporting or fake licenses. The operation revolved around enormous efforts by customs to stimulate the acceptable level of contamination in shipments of waste; to perform stricter inspections of all forms of imported waste; to reject shipments that failed to pass the required inspections and to exert aggressive efforts on the management of import licenses for solid waste (Sun, 2019). The global recycling trade plunged simultaneously since alternative infrastructure to manage the rejected waste was extremely limited. The significant deterrent effect of the Operation revealed the global economy's fragility of depending on one specific importer (Brooks et al., 2018).

However effective the Green Fence Operation proved; export rates quickly recovered after December 2013. In 2016, half of all plastic waste intended for recycling was exported. China imported 7.35 million MT from 43 different countries, more than 75 percent of which came from developed countries. Since it began reporting in 1992, China has imported a staggering 106 million

MT of plastic waste; an unimaginable amount of 106.000.000.000 kilos, the equivalent of 27 million elephants, 2280 Titanics and 320 Empire State buildings. China imported 45.1 percent of the cumulative amount. Moreover, China together with Hong Kong, which predominantly acts as another entry port to China, have imported 72.4 percent (Brooks et al., 2018). However, China's still developing solid waste management infrastructure is also anything but perfect: between 1.3 million to 3.5 million MT of plastic is estimated to enter the oceans from its shores – *annually* (Brooks et al., 2018). Moreover, it is important to note that the recycling and reuse of this enormous amount of plastic waste requires significant water consumption, generates harmful air pollutants and produces vast amounts of waste residues (Qu et al., 2019).

Two reasons roughly describe why the Chinese government decided to announce an import ban in 2017 of 24 categories of recyclables and solid waste, including plastics (Liu et al., 2018). Firstly, the country had gradually shifted its focus towards improving the quality of its economic development, moving towards a more sustainable society with a better environment. Secondly, China's demand for raw materials had slowed down after decades of rapid growth. Moreover, increasing rates of recyclable domestic waste proved to be sufficient to replace previously needed foreign wastes (Qu et al., 2019). With the ban, which came into effect January 1, 2018, China eliminated itself as a key actor of the global plastic waste trade.

The circular economy did not prove effective to bring its promised effects of sustainable development to China: it polluted its environment and hurt social equity. Brooks et al (2018) estimated that 111 million MT of plastic waste will be displaced with the new Chinese policy by 2030. With significant effects: the plastic ban will diminish the potential of valuable wastes, illegal flows of plastic waste are expected to increase, more waste will ultimately be landfilled and other Asian countries will step up and fill China's place (Brooks et al., 2018; Qu et al., 2019). The effect of the latter is already visible. Overwhelmed with their increase of plastic imports, Prime Minister Mahathir Mohamad of Malaysia announced in 2019 that the country would sent back more than 3000 tons of nonrecyclable plastic waste to western exporters, saying "it is grossly unfair for rich countries to send waste to poor countries simply because the poor countries have no choice" (Denyer, 2019). Thailand, Malaysia and Vietnam already followed China's footsteps announcing bans on the import of plastic waste, however enforcement is, according to Greenpeace, generally very bad (Kas, 2019).

In a deliberate effort, China is trying to move away from its cheap, labor intensive, manufacturing economy towards a developed, ecological society (Qu et al., 2019). Developing countries should feel encouraged by the circular economy to make this step, instead of thinking that this system is preventing them from doing so. This section showed how important the integration of environmental sustainability, social equity and economic development is in every policy aimed at reinforcing a circular economy. Without this, key actors of the circular economy chain will follow China's example and opt out because the trade system is off balance.

Concluding thoughts: A messy concept with huge implications

In many ways, plastics precluded the era of modernity, “the promise of sealed, perfected, clean, smooth abundance” (Davis, 2015: 3). However, as the consequences of our plastic abundance slowly revealed, the ‘circular economy’ became the buzzword to solve it all. This chapter revolved around the question: how has the global circular economy been conceptualized and how has this system practically developed in the case of plastic waste? The preceding analysis proposes that the conceptualization of the circular economy proved to be scattered across disciplines, uncoordinated, and overall messy. This ambiguous understanding of the demarcation of the concept echoed in the concept's practical implementation. This research stresses that the failure to equally integrate all three pillars of sustainable development –economic prosperity, environmental quality, social equity– in policies governing the circular economy, failed to make this system truly cyclical. One can argue that a global circular *pattern* of goods is in place, but without the integration of the principles of sustainable development, this cannot be considered a functioning circular *economy*. In the title of this thesis, the term “circular” is put in quotation marks to stress that this research disagrees with the fact that such a system is already in place. This chapter showed that plastic waste is a global problem that is inherently transboundary and cross-cultural: the most toxic and polluted kinds of waste keep finding their way to the weakest link of the chain, developing economies, which are poorly equipped to act as the global trash can.

This research will position itself as a critical analysis of our so-called circular economy and argue for the integration of social equity principles in policies aimed to structure a global circular economy of waste. It will act as a proposal for a revised way of looking at both the current circular economy and what it should strive to be: instead of being driven by economic gains and profit, the integration of the social dimension is essential. Inequality persists between actors if one

gets away with disregarding their waste in an easy and cheap manner, and the other is left with polluted materials, non-recyclable waste and toxic work conditions for its industry's employees. For the foreseeable future, global plastic production is expected to only increase, which entails that the quantity of discarded plastic waste in need of a final destination will only grow. Without a system in which the burdens are balanced among all actors, countries will opt out like China did, and the industry will further descend into turmoil. For which Amy Brooks warned: "We will have to be careful with how we start to change these globalized markets" (Interviews, [Appendix B](#)).

Chapter Two The European Policy Response to Plastic Waste

“We can’t export these plastics any more to China. The knee-jerk reaction is that we will have to burn or bury it here. Let’s use this opportunity to show we can also recycle it here.”

Frans Timmermans (quoted in [Boffey, 2018](#))

The European Union (EU) has profiled itself as the ‘global leader’ concerning the governance of climate change, motivated by its “lead by example” approach. This, however, has also received a substantial amount of (scholarly) criticism concerning not only its ability, but its desire to take up this role in the domain of international policy ([Jordan et al., 2012](#)). The previous chapter described a flawed international trade system concerning the circular *pattern* of waste from predominantly developed to developing countries. Over the years, the EU has eagerly participated in this transfer of responsibility collectively comprising the top exporter of plastic waste. A reality that is at odds with its “lead by example” approach and reveals an inherent paradoxical nature of its leadership. However, as criticism increased, the EU has made efforts to develop a policy framework regarding the circular economy and, correspondingly, the management of (plastic) waste. This chapter will ask: How does the European Union aim to (re)structure the EU’s plastic waste management – and is it successful so far? The first section will give a general overview of the Basel Convention to set the international framework managing the movement of hazardous waste, to which all EU member states are signatories. The second section will specify the development of a European policy framework concerning plastic waste and the circular economy. The third section will focus on the Plastics Strategy for Europe, an acclaimed policy document meant to intertwine plastic management within the EU’s circular economy. The last section places a critical note on the development of such a European policy framework and its level of success.

International policy framework of waste

In 1986, the *Khian Sea* ship left Philadelphia carrying 14 thousand tons of toxic incinerator ash. After being rejected entry at multiple ports, it dumped half of its contents on a beach in Haiti, after being sent away yet again. For many months, the ship sailed the globe trying to convince nations to accept its contents. After a long journey, sailing under various names, the ship docked in Singapore without cargo. “The captain of the ship insisted that no ash was dumped at sea” – even though all evidence pointed to the contrary ([Jaffe, 1995: 123](#)).

The Basel Convention

The Khian Sea incident is not a unique example. ‘Port hopping’ is a well-known phenomenon among exporters who choose to ship their waste via ports with weaker inspection regimes ([Zero Waste Europe, 2018](#)). The growing awareness concerning international waste transports gave rise to the development of an international waste management framework. In 1989 the Basel Convention, a UN policy initiative, opened for signatures and took effect in 1992, with currently 187 parties. The Convention aims to regulate the transboundary movement of hazardous waste or ‘waste requiring special consideration’, instead of enforcing a complete ban. Parties are required to minimize the production and transboundary movement of hazardous wastes; authorization is required from the importing nation; a document detailing the exported waste is to accompany the waste wherever it goes and hazardous wastes that are moved transboundary have to be managed in an environmentally sound manner ([Jaffe, 1995](#)).

The level of ambition of the original document is hurt by multiple factors. Firstly, it does not prohibit waste exports and only necessitates prior informed consent. Secondly, the notion of “environmentally sound management” is defined in the most general of terms ([Kummer, 1992](#)). Thirdly, waste traders “sought to exploit the good name of recycling” by justifying that all exports were transported to recycling destinations. Critics argued that a full ban was necessary to combat false ‘recycle’ claims. Lastly, many believed that the definition of hazardous waste that was adopted in the Basel Convention was too narrow ([Baofu, 2012: 182-183](#)).

The latter affects plastic waste, albeit polluted, which is not included in the Basel Convention, meaning that its export is not internationally regulated. However, during a recent Convention summit in 2019, Rolph Payet announced that “plastic waste is acknowledged as one of the world’s most pressing environmental issues”, pressured by the fact that close to 1 million people signed a petition urging Basel Convention Parties to take action ([Toloken, 2019](#)). After extensive international and grassroots pressure, the Basel Convention will be adjusted to include non-recyclable or ‘difficult to recycle’ plastic waste in the Convention’s category concerning ‘special consideration’ waste. Meaning the export of plastic will be subject to the Convention’s obligations, including prior consent from importing countries. This adjustment will come into effect January 1, 2021. Even though the waste trade to developing countries is interrupted, there are many loopholes. Waste that is currently shipped to the Philippines, Bangladesh or Nigeria, will

find its way to poorer countries in the OECD, like Turkey or Eastern European countries, places where waste infrastructure can be equally inadequate.

Thus, up until now, the international policy framework concerning the movement of plastic waste is limited and weak, even considering recent adjustments. Coincidentally, the same criticism applies to policies governing European exports, which has predominantly been left to national governments. This next section will take a closer look at the European road towards a circular economy that reveals an inherent paradox: on one hand, a tension between the demand that recycling should be operated by a free market and, on the other, the EU's commitment to "lead by example" on domains of social equity and environmental policies.

The development of a European circular economy

"Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development" reads Article 11 of the Treaty of the Functioning of the European Union (TFEU), one of two treaties forming the constitutional basis of the EU. Article 11 TFEU represents the environmental integration requirement and shows the EU's early commitment to environmental sustainability within its policy (Durán & Morgera, 2012). However, the European plastic industry that is made up of producers, converters, recyclers and manufacturers also forms a great contribution to the economy, with a total turnover of €360 billion, providing 1.6 million jobs in Europe and ranking seventh in industrial value added contribution (PlasticsEurope, 2019). This creates an inherent tension between the EU's environmental goals and its profitable industry. In an effort to reconcile both sides the concept of the circular economy has become a popular concept, promising to promote sustainability without hurting economic growth.

The EU ranks third in the global production of plastics, manufacturing 61 MT of plastics in 2019, a number that has been consistently increasing over the years (PlasticsEurope, 2019) and is expected to double by 2035 (Mrowiec, 2018). Increasing waste production is followed by more waste generation; 42 percent of collected plastic waste was recycled in 2019, 39.5 percent was incinerated and 18.5 percent was landfilled (PlasticsEurope, 2019). Even though these numbers sound relatively promising, they are the result of a slow progress. The development of the European recycling market was hindered by a low demand for recycled plastics, low commodity prices, uncertainties about market outlets, and a lack of investments, which have left the market

“underdeveloped and fragmented” (Filho et al., 2019: 551). In order to overcome these difficulties, the concept of a circular economy entered the highest ranks of the European Union.

“In a world with growing pressures on resources and the environment, the EU has no choice but to go for the transition to a resource-efficient and ultimately regenerative circular economy”, pledges the Manifesto for a Resource-Efficient Europe (EC, 2012) – the first attempt by the European Commission in detailing its position on the circular economy. Despite the EU’s early commitment to sustainable development, enshrined in its founding treaty, it took until 2008 (Directive 2008/98/EC) to elaborate the basic concepts and definitions related to waste management, and to only *define* the basic principles of waste, recycling, recovery (EC, 2008). The circular economy in the Manifesto was presented as a sustainable way to restructure Europe’s industry in its way out of the financial crisis. Even though the wide variety of definitions persists, as highlighted in chapter one, the European Commission defined the circular economy as a system in which “the value added to the products [has to be preserved] for as long as possible [which] virtually eliminates waste. The resources are retained within the economy when a product has reached the end of its life, so that they remain in productive use and create further value” (Memo 14/450 quoted in Bonviu, 2014). A value-oriented definition that lacks the inclusion of sustainable development.

Ultimately, the ideas from the Manifesto were incorporated in a range of policy measures known collectively as the Circular Economy Package, which invested over €650 million into the circular economy (Millar et al., 2019). Circularity as EU policy was further specified in a Commission Communication named *Towards a circular economy: A zero waste programme for Europe* (2014). The Communication includes specific proposals to amend waste legislation, improve waste management practices, focus on reducing, reusing and recycling of resources and limit the use of landfilling (Deselnicu et al., 2018). In 2015, the circular economy package was replaced by *Closing the Loop, An Action Plan for the Circular Economy*. The Action Plan aims to integrate and extend existing policies and legal instruments. It includes recycling targets, all related to waste streams, that are binding to member states: 65 percent of municipal waste and 75 percent of packaging waste should be recycled and no more than 10 percent of municipal waste should be landfilled by 2030. The Action Plan still lacks an explicit set of controlling indicators surrounding the circular economy. The need is stressed in the document, but refers to existing indicator sets and pledges to develop indicators in the future (McDowall et al., 2017). The Action Plan has a

strong focus on materials, and highlights plastics as a specific key priority, pledging to “address the sustainability challenges posed by this ubiquitous material” (EC, 2015).

Even though these policy documents set substantial targets, their influence is feared to be limited to empty pledges as collective action stays out. Except for the successful Plastic Bags Directive (2015), integrated policy across all member states is complicated because each finds itself on a very different level towards the development of a circular economy. The levels of recycling, energy recovery and landfilling of plastic waste varies in each member state. In 10 countries, the recycling and energy recovery as a sum exceeds 90 percent, in others the value is below 30 percent (Mrowiec, 2018). Even though a small selection of member states have presented resource efficiency strategies for the circular economy, Austria is the only one that set targets with an accompanied timeline (McDowall et al., 2017).

These various initiatives show how the EU is creating a framework for the development of a circular economy. Nevertheless, individual member states implement additional national legislation and programs that make it possible for them to hit EU targets, but also often further complicate the development towards a circular economy for poorer, less-developed EU member states, which gives rise to the idea of uncoordinated cooperation between member states. This analysis on the development of a European circular economy distinguishes discrepancies between three policy levels: conceptual, organizational and operational. First, a problem that was already identified in chapter one, there is a lack of conceptual understanding of key circular economy terminology. Second, overarching EU policies are poorly organized to fit the specific needs of member states and instead only provide general targets. Third, a lack of oversight and an indicator toolbox disregards the EU’s control over the development of the circular economy. The EU is an interesting, influential actor because scholars, businesses and policymakers look at it for guidance. The EU leads an ambitious policy framework, which is definitely more ambitious than other great polluters. However, its policy framework reveals a paradoxical nature in which “the EU seeks to lead by example but is itself a relatively leaderless system of governance” (Jordan et al., 2012: 44), that leaves the agency to achieve substantial change to the industry.

The Plastics Strategy

Whilst the EU was presenting these promising aforementioned initiatives, it still sent half of its plastic to China. The Chinese plastic ban was an external incentive to introduce even more

ambitious EU policy to form an answer to the question: where will European waste go now? It laid the fertile ground for the development of the recent and long awaited *Strategy for Plastics in a Circular Economy* (2018), which promises: “cross-sectoral cooperation at the highest level of the EC” (Penca, 2018). The implementation dates of the Chinese ban, January 1st, and the EU’s Plastics Strategy, January 16th, reveal the action-counteraction relation between the two policies. With its promise “to lay the foundations to a new plastics economy,” various stakeholders anxiously speculated on the level of ambition the European Commission would show in its efforts to tackle the “business-as-usual” approach of the plastics industry (Penca, 2018). This section will briefly discuss the goals of this policy and highlight specific concepts concerning Extensive Producer Responsibility, SUPs Directive and microplastics.

The targets that are set in the Plastics Strategy are that “By 2030, all plastics packaging placed on the EU market is either reusable or can be recycled in a cost-effective manner”; “By 2030, more than half of plastics waste generated in Europe is recycled”; “By 2030, sorting and recycling capacity has increased fourfold since 2015, leading to the creation of 200,000 new jobs, spread all across Europe” (EC, 2018: 9). Finally, the Strategy aims to appeal to relevant public and private actors by inviting them to submit voluntary pledges of support. In the case of microplastics and single use plastics (SUPs), restrictions and bans have been considered. The three Annexes sketch a more defined route; the first provides a list of “future EU measures to implement the strategy” (18), the second of “measures recommended to national authorities and the industry” (21), the last presents the conditions of the pledging campaign (EC, 2018). It is important to note that the Plastics Strategy is a Communication by the Commission, which makes it an instrument outlining tool guiding policy direction rather than providing legal commitment (Penca, 2018).

The Strategy focuses on economic incentives to push producers towards sustainable design choices; Extended Producers Responsibility (EPR) is used as one of the major policy instruments to implement a European circular economy of plastic waste. EPR is generally defined along the lines of an “environmental policy principle in which a producer’s responsibility is extended to the post-consumer stage of a product’s life including take-back, recycling and final disposal” (Lindhqvist, 2000 quoted in Filho et al., 2019), based on the principle that producers are best qualified to execute adjustments to minimise their products’ environmental impact. There are multiple ways to implement EPR schemes: the first distinction is between collective and individual producer responsibility. Additionally, simple financial responsibility requires a fee from producers

to set up waste management systems; as implemented by the UK or Belgium. Contrastingly other schemes implement partial responsibility schemes, usually involving municipalities that are responsible for waste collection for which they are reimbursed by producers, as implemented in the Czech Republic, France and the Netherlands. Others enforce full operational responsibility in which producers are directly responsible for take back schemes and waste processing as implemented in Austria and Denmark (Watkins et al., 2017). This variety of EPR implementations and definitions across the EU also reveals the scheme’s biggest weakness: it lacks coordination. The fact that EPR can be implemented as either collective or individual producer responsibility, with full financial responsibility or partial operational responsibility complicates EPR scope, goals, performance and costs across member states (Filho et al., 2019).

Since the implementation of the Strategy in January 2018, the Commission has started to extend its policy terrain. In 2019, the Parliament voted on a draft Directive on the reduction of the impact of the ten main SUPs responsible for the marine litter. As estimated by Jambeck et al (2015), plastic makes up 80–85 percent of the total number of marine litter items with SUPs forming about half of all marine plastic pollution (Foschi & Bonoli, 2019). This early draft outlines a preliminary ban on SUPs of products frequently found on the beaches, such as straws, cutlery, cotton buds, plates and stirrers (Karout, 2018). The vote by the Parliament enabled a ban on SUPs to come into force by 2021 in all member states (Rankin, 2019).



Fig. 1 (EC, 2008)

Weaknesses

The Plastics Strategy, or other policies preceding it, are not without their weaknesses. Firstly, as the Waste Framework Directive asserts “Waste legislation and policy of the EU Member States shall apply as a priority order the following waste management hierarchy” (EC, 2008) (see fig. 1), but this is not prioritized within the Strategy. The waste management hierarchy is organized according to the belief that policies targeting the top are more cost-effective than those at the bottom. However, no targets are included regarding waste prevention nor reuse, instead the vast focus of the Strategy is on recycling, without committing to a more sustainable alternative. It also reveals a concession to the industry, which would rather recycle than abiding to stricter regulation focused on prevention (Penca, 2018).

Secondly, plastics do not solely affect the economy or environment located within the EU's borders; its impacts are felt globally. Plastic value chains reach across entire continents. Even though the Strategy devotes a section to international plastic trade, called “Harnessing Global Action”, its language remains vague and ambiguous, pledging to engage in ‘policy dialogue’ (EC, 2018: 16; Penca, 2018). This is not enough to combat streams of plastic waste leaving the EU's borders and to mitigate the effects on social equity in foreign countries caused by EU waste. As shown in chapter one, stronger policy is needed in this domain to nourish the sustainable development of a circular economy.

Lastly, the Strategy's commitment to fighting microplastics, items smaller than 5 mm, is limited. Microplastics are one of the main causes of sea pollution: the oceans contain over 150 million tons of plastics or more than 5 trillion micro and macro plastic particles (Mrowiec, 2018). The Strategy distinguishes two types of microplastics: those that were intentionally and unintentionally added in products. Regarding the former, some products utilize microplastics for a certain function, such as exfoliating scrubs, shower gels or toothpastes. In the latter, microplastics are unintentionally created when larger plastics disintegrate. The Strategy aims to decrease, but not ban, the intentional usage of microplastics and label products that unintentionally lead to the creation of microplastics. However, by not pursuing a ban on intentionally used microplastics, whilst is fairly easy to implement, the Strategy gives way to tons of microplastics to still be released into the global ecosystem (Karout, 2018).

Thus, the Plastics Strategy relates to the EU's determination to “lead by example” on issues of global importance, as documented in its founding treaty. However, can it? On one hand, policy

proposals seem to fracture over member states' borders. On the other hand, it is important to recognize that the Strategy stands at the beginning of more targeted policies, hopefully with legal repercussions. As argued by Penca (2018: 200): "It is hoped that such reforms will deliver the ambition of the Plastics Strategy, rather than dilute it with cosmetic modifications of the current state". The Strategy acknowledges the decisive role of the private sector in combating waste and moving towards circularity, but it also transfers the responsibility for the level of innovation and ambition to the sector itself. The boundary in addressing plastic waste is not drawn between policymakers and the industry, but rather on the extent that ambitious waste policies are implemented and regulated in line with the waste hierarchy; implying a focus on reduction and reuse over recycling. One of the five paradoxical features of the EU's climate governance as identified by Jordan et al., is extremely relevant for the EU's plastic waste management: the desire for ambitious policy targets but a constrained set of implementing, coordinating instruments (Jordan et al., 2012). All things considered, the Plastics Strategy is an ambitious document that provides inspiration, guidance and direction for both the industry and national governments, but it will rise or fall with the scope of its consistent implementation.

The tension between EU targets and member states' reality

To further justify the previous made claim that the European policy framework concerning the circular economy has conceptual, organizational and operational flaws, a closer look at the mismanagement of waste on a member state level is needed. Collectively, the EU exported 150.000 tons of plastic scraps monthly at the beginning of 2019 (European Environment Agency, 2019). There is a lack of evidence on the 'end of life' process for these plastics at export destinations, despite EU regulations stating equivalent recycling conditions are required. Limited evidence suggests that most destinations are small family businesses that use low-tech equipment without any environmental protection controls (Zero Waste Europe, 2019). A few examples of failing national waste systems are analyzed.

Firstly, one of the fears that was discussed in chapter one; that more plastic waste would be exported to other developing countries with lacking domestic waste infrastructure, is proven by some European examples (see fig. 2). Until 2016, Belgium was exporting around 3000 tons of plastic to Turkey, in 2017 this number jumped to 70.000 tons – without any information on why or where this waste was exported. Moreover, Belgium ranked fourth in the top exporting countries,

partly explained by the re-export of Dutch, French, UK and German waste. A Belgium waste trader, anonymously quoted in [Lamote \(2019\)](#) asserted “The port of Antwerp is a crucial center for German and Dutch plastic waste. Often, low-quality plastic gets the label of high-quality plastic” – a switch that is easily made in Antwerp, which explains why Dutch waste is exported through this port instead of Rotterdam. According to the United Nation Development Program (UNDP), Turkey is the home to more than eighty illegal waste dumps, which diminishes the hope that exported European plastic is ultimately recycled ([Lamote, 2019](#)).

Secondly, the UK-based Environmental Agency set up a team of researchers tasked with investigating complaints that organized criminals and firms are abusing the UK plastic export system, falsely claiming to export plastic while leaving it to leak into the natural environment, illegally transporting it to Asia –through the Netherlands ([Paauwe, 2018](#))– or shipping unreported contaminated waste ([Laville, 2018](#)).

Thirdly, Germany, Europe’s largest producer, importer and exporter of plastics ([Filho et al., 2019](#)), is confronted with contrasting statistics on its recycling performance. In 2017, Germany was named the world’s best recycler. However, a report released in 2019 that used data from the plastics industry claimed that only 15.6 percent of post-consumer plastic waste actually gets recycled. Moreover, the German government, like many other member states, labels materials as “recycled” if they have been exported for that purpose. However, there is no oversight on the final fate of these products once they cross the border ([Dobush, 2019](#)).

Lastly, Poland serves as an example of how internal EU waste trade is not without its flaws. After the Chinese plastic ban, Poland experienced an increase of plastic imports originating from western Europe. In 2018, more than seventy fires took place at dumps in Poland, explained by officials to have been deliberately started to destroy illegal waste brought into Poland from other countries. A popular tactic employed by Poland’s so called ‘waste mafia’ is to not open a dump but a ‘recycling station’ for which limited paperwork is needed. Moreover, there is no control on whether the accumulated waste is recycled; a practice that can continue for years until the dump is set on fire and the ‘entrepreneurs’ walk away with huge profits ([Overbeek, 2018](#)). Poland is an example of how intra-EU, the issue of social equity also persists across the East-West divide. The EU’s wealthier member states have exported to the east for years, increasingly after China’s ban, where waste is increasingly accumulating. Within ten years, waste imports to Bulgaria grew twentyfold, without providing the necessary recycling capacity: in Romania, Bulgaria, and other

eastern European countries, recycling rates often do not pass 10 percent. Large quantities are incinerated in cement factories without filters: polluting the air and causing health risks. “The garbage crisis also has a symbolic dimension in that many Eastern Europeans feel like second-class citizens on the continent”, left with the waste of the West (Ditchev, 2020). It is important to note that the aforementioned examples of faulty waste management are simply a selection from a vast array of worrying messages (see also fig. 2). A reality that is far removed from the organized system often described in the EU’s policy framework.

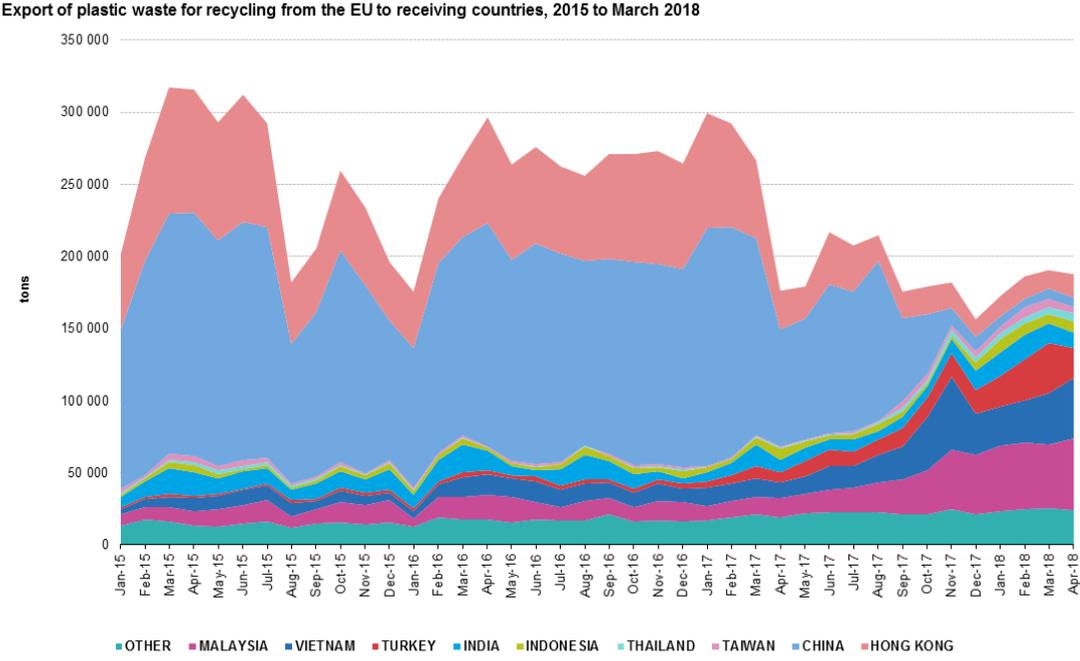


Fig. 2 (Eurostat, 2018) shows how plastic export to China and Hong Kong has been substituted by i.e. Malaysia, Vietnam, and Turkey.

Concluding thoughts: A circular economy between divided national systems

Chapter one stressed that the problems posed by plastic consumption and production are inherently transboundary and cross-sectoral. This chapter dealt with the question: How does the European Union aim to (re)structure the EU’s plastic waste management – and is it successful so far?

The first part of the question has a threefold answer. Firstly, the European Union has approached the (re)structuring of complex waste management policies in a very unilateral,

detached, and even a naive manner. European policies set ambitious targets but fail to coordinate implementation. In this manner, targets are translated to narrow national measures, such as household waste revenue models or plastic bag-regulations. These measures might be useful at the sector or local level, but fail to tackle disrupting and far-reaching effects of plastic on the global natural environment (Penca, 2018). Secondly, EU regulation concerning plastics within a circular economy framework has intensified over the years, but in no way along similar paths among member states. Differentiation exists in the same areas as distinguished by Durán & Morgera regarding environmental legislation: the attention paid to environmental protection in the relationship between member states and third countries; the choice of standards for environmental cooperation; and the institutional mechanisms underlying such cooperation (2012: 285). Thirdly, considering plastics' non-biodegradable characteristic, the main focus should be on the reduction of plastic production in line with the waste hierarchy, and limit or change the fixed patterns of our extensive waste generation. Instead, EU policies extensively focus on recycling, a concession to the industry, and leave policy implementation to the industry – another example of the transfer of responsibility.

Regarding the question's second part, whether the EU's policy framework has proven successful, a tentative yes is in place with regards to policy formation and ambitious targets. However, when considering the actual results of policy outcomes, the answer is vague. As mentioned by Jordan et al, it comes down to what one understands as successful governance: the active steering of society or the realization of results? "The most charitable thing that can be deduced is that the EU has successfully established a highly sophisticated governance framework" (Jordan et al., 2012: 62). A system that is focused on "leading by example" without the systematic results to prove its effectiveness.

Like cited in Bonviu (2014: 86), the saying that a chain is as strong as its weakest link is easily applied to the circular economy. There is no option for it to be partial: it can only work if every actor is fully committed, without illegal plastic burning fires in Poland or sneaky shipments to Turkish waste dumps.

Chapter Three

The Complex Reality of Dutch Plastic Waste Management

“The men [in Indonesia] throw one after the other bag in the fire, the plastic melts away in a couple of minutes. Most only contain shreds, but sometimes it is recognizable. A bag of frozen shrimps from India, a package of M&M’s, a bag of ‘amazing’ dried plums from the United States. *Please recycle*, it says on the back.” (Kas, 2019)

The previous chapter showed the clean side of policy making with its beautiful targets, impressive statements and good intentions. This chapter will zoom into the messy reality of plastic waste management on a national level in order to answer the question: how have circular economy approaches affected the management of plastic waste streams in the Netherlands on a national level?

The policy framework that governs Dutch plastic

There does not seem to be a consensus on the percentage of plastic waste that is actually recycled in the Netherlands. In 2017, 1.900.000 tons of plastic was introduced on the Dutch market. An amount that grows annually: between 2013 and 2017 the quantity of plastic used for packaging increased by 10 percent. That same year, 1.600.000 tons of used plastics entered the waste stream. Thus, the amount of plastic that is annually introduced on the market is larger than the amount of processed waste, increasing the total amount of plastic that is ‘in use’, but is destined to become waste at some point (CE Delft, 2019). From the discarded plastic packaging, 40 percent of all plastic waste, half is expected to be recycled. The other half is destined for incineration, together with non-packaging plastics that are routinely incinerated. ‘Algemene Rekenkamer’, the National Dutch audit authority, estimates that about 60 percent of all plastic waste is incinerated and 15 percent is recycled – import and export are left out of their calculation. Bear in mind that this is one estimation and the exact number ranges per publication. The fate of the remaining 25 percent is unsure: the plastics are either still in use or discarded in nature (Algemene Rekenkamer, 2019). The previous chapter showed that EU regulation on plastic waste is fragmented among member states and limited to setting targets. This section will focus on how the Netherlands has translated EU regulations into national policies that govern the management of plastic waste. Three policy examples are analyzed.

Firstly, the Dutch government announced in 2016 its ambition to be a 100% circular operating economy by 2050, accompanied by the slogan ‘waste as the new resource’. At the beginning of 2017, the first step was made with an agreement between the government and relevant partners. The partners have to set up transition agendas concerning five supply chains: biomass and food, building sector, consumption goods, production industry and plastics (Rijksoverheid, 2019). On paper, plastics take a prominent place in the transition to circularity, but not much progress has practically been made. The Netherlands Environmental Assessment Agency (PBL) has analyzed all 85,000 Dutch business activities that focused on resource efficiency and the circular economy. PBL concluded that only 1500 are truly innovative and that of these, a majority focusses on recycling instead on reducing or reusing activities (Planbureau voor de Leefomgeving, 2019). The government’s preference for recycling also shows in its preliminary budget for the circular economy: 10 of the 22,5 million euros that was budgeted is destined for recycling and 7,5 million euros for ‘climate neutral’ government spending – implying, buying recycled products (Hofs, 2019). Thus, the Netherlands is committed to reform towards a circular economy, in theory. The problem with its approach is that the circular economy is elevated to a goal, a claim to reach full circularity by 2050, instead of a means to an end, sustainable development and mitigation of plastic pollution.

The second example is the recently agreed-upon Plastics Pact of February 2019 which is part of the Dutch commitment to a circular economy and was initiated on a European level. The pact sets four targets: in 2025, 100 percent of plastic packaging and products will be recyclable; consumption will be reduced by 20 percent; 70 percent of SUPs will be recycled; and these products will contain at least 35 percent recycled plastic (RIVM, 2020). However, pledges to participate are made voluntarily and there are no financial sanctions if targets are not met. In a public letter, signed by 34 professors and environmentalists, the Plastic Pact was attacked in a Dutch newspaper. The group criticized the government’s “weak” stance towards Shell, which has not signed the Pact and is building a new factory in Pennsylvania, where the company will produce 1,5 billion kilos of plastic annually through fracking. An amount that is almost *seven* times the total amount of plastic packaging that is collected in the Netherlands annually. Peter Rem, professor in Resources & Recycling, asserts “Shell is a company, and a company wants to make profit within the boundaries set by the government [...] Recycling can become cheaper than new

plastics, but Shell is not doing it for you. As a government, you have to enforce it” (van Mensbergen, 2020; Algemeen Dagblad, 2020).

Lastly, the most influential and far-reaching; ‘Raamovereenkomst Verpakkingen, 2012-2022’ (ROV), roughly translated to the Packaging Agreement, was the result of a collaboration between the Ministry of Infrastructure and Water Management, municipalities and the packaging industry to set targets regarding recycling and list the different responsibilities of the three actors. Municipalities are responsible for the collection and management of packaging. For every ton of plastic that goes to a recycling company, the municipality is financially compensated by ‘Afvalfonds Verpakkingen’ (Waste Fund Packaging), a fund that was set up in 2012 to enforce ROV. Nedvang controls municipalities on their recycling-achievements and provides Afvalfonds with specific payment advice for every municipality (Verbraeken, 2017). Note that Nedvang’s board is made up of representatives from the packaging industry, not the public sector. Afvalfonds is financed by plastic producers who pay a fee that is based on the weight and the material of the packaging they introduce on the market. With the proceeds of this fee, Afvalfonds pays the compensation for municipalities (CE Delft, 2019). ROV set the target to recycle 52 percent of all plastic packaging by 2022; a rate that has already been achieved. ROV is approaching its expiration date, which provides the opportunity for a more ambitious follow up. However, current plans include sidelining municipalities and giving more power to Afvalfonds and thus the industry’s polluters.

The combination of these approaches forms a limited policy framework that guides the actions of an extensive industry. Moreover, the control on complying with measures is limited. ILT, a governmental agency, is tasked with executing inspections and responsible for assigning EVOA notifications (certificates legitimizing exports of waste). Control reports from ILT are not made public, nor is known how often they conduct these inspections among recyclers and sorters – instead responsibility is left to producers. In the value chain, EPR is applied to the Dutch household waste scheme as the packaging industry indirectly pays for waste collection. The packaging industry pays municipalities around €120 million annually, to conform to ‘the polluter pays’ principle. However, the compensations for municipalities have decreased over the last three years: from 756 euros per ton in 2017 to 712 euros in 2018 and 656 euros in 2019, expected to only further decrease (AfvalOnline, 2019).

The new ROV, implemented from 2023, is rumored to alter the current status quo. “They came up with a whole new policy outlook: PMD is now considered to become the starting point. Everything can be collected together, even chips bags [one of the hardest packaging red.]”, says Hugo Bellaart, city councilor and sustainability spokesman. “The municipal capacity is limited to collection [in the new ROV], everything else will become the responsibility of Afvalfonds, and thus the industry.” Bellaart expects municipal compensation to decrease to 261 euros per ton (Interview, [Appendix A](#)). This regulation will cause household waste to be increasingly sorted which decreases the amount of general waste, but this does not automatically translate to increased recycling: “Essentially, we will simply be moving general waste to a different bag” (Bellaart, 2019). Moreover, this compensation-based system is only put in place for plastic household packaging which, in practice, translates to a system in which good recyclable non-packaging or non-household plastic is intercepted during the recycling process and sent straight to the incinerator ([Algemene Rekenkamer, 2019](#)). Ultimately, the producer will calculate the costs of the EPR scheme in the price of its products, through which the principle changes from ‘polluter pays’ to ‘consumer pays’ ([Verbraeken, 2017](#)).

Thus, waste management policies are executed by parties outside of the government, by Afvalfonds, Nedvang and municipalities, who all either present the industry’s interests or depend on compensation from them. Nedvang monitors and registers the collection and recycling data of plastic packaging. Afvalfonds drafts annual reports based on this data. These are, in their turn, checked by ILT on accuracy. However, based on these reports, the responsible minister can only judge whether recycling targets are met. The information in these reports is too limited to be able to judge whether current policy is the most effective possible, which is especially important in light of the “100 %” circular aim for 2050 that has to be reached with the current waste management strategy ([Algemene Rekenkamer, 2019](#)). The audit authority (2019: 39) concludes that the minister “is reluctant to use laws and regulations to enforce more ambitious objectives”. Additionally, they warn that Dutch public support can wither if “civilians realize that from the plastic they separately collect, only the plastic packaging is recycled whilst the rest ends up being incinerated” ([Algemene Rekenkamer, 2019: 39](#)). There is an extremely complex recycling system in place, which is controlled by the industry, only covers packaging waste coming from households and is incomprehensible to any involved citizen. In this way, current policies only tackle a limited part of the plastic supply chain. The target should be on all plastics, not just packaging; on

reduction and reuse, instead of recycling; and on prevention, instead of dealing with the aftermath. The extensive criticism shows: to achieve a “100 %” circular economy in which no new plastics are produced, ambitious policy is essential.

The journey of discarded plastic

This section will return to the cucumber foil wrapping mentioned in the beginning. What happened to it after its disposal? When you separately throw away your carefully collected plastic waste at a recycling station, it is often paired with the belief that this was the hardest part of the job. The contents of your trash bag will automatically transform into something valuable. Unfortunately, this is anything but true, but for civilians this is often the image that is painted to them by authorities: if you recycle, we will make sure it ends up all right. This section will chronologically describe the route of an imaginary cucumber foil wrapping to show the realistic fate of plastic waste in the Netherlands.

First, the foil will hopefully be recycled by consumers and end up in a trash bag destined for ‘PMD’, in which plastics, drinking cartons and tin cans are collected. The respective municipality is responsible for the collection of this waste, either by on-the-curb pick up service or through proximate recycling stations. This is true for every municipality in the Netherlands, except from Amsterdam and Rotterdam, where household waste is separated after collection. The foil will end up in a transportation truck, a service that is organized and paid for by the municipality. In total, 190 million kilos of packaging were collected separately by households in 2017 ([Afvalfonds Verpakkingen, 2018](#)).

The second step of the process is the sorting of the (already sorted) plastic waste. 70 percent of Dutch household PMD waste ends up at Suez in Rotterdam. Suez is a market leader in waste sorting and divides the total amount of plastic waste in different sub-streams depending on plastic type. Of the 190 million kilos packaging, 77 million kilos are ‘lost’ in the sorting process, because these packages are, for one reason or another, not considered for recycling. Ultimately, 113 million kilos are registered as ‘recycled’ because it is offered to different recyclers ([CE Delft, 2019](#)). If our foil is not ‘lost’ in the process and incinerated, it will end up in the *mixed plastics* waste stream making up 30 percent of all collected plastic. Because there is no recycling capacity for *mixed plastics* in the Netherlands, the stream is destined for Cabka in Weira, Germany. Other streams

like PET, PP or HD-PE are sent to different recyclers in the Netherlands (*Bijlage bij beantwoording technische vragen GAD, 2019*).

After our cucumber foil leaves Rotterdam, the trail gets messy. Once the plastic waste is transported with the intention to recycle, the complete batch is labelled as ‘recycled’ – even though it is not yet actually recycled. In its statistics, neither Suez nor Afvalfonds consider whether the recycling station was able to recycle the full batch, nor is it legally required to do this. Needless to say, ‘offered for recycling’ is not the same as the product actually being recycled, because there is a small chance Cabka is able to use the full batch of *mixed plastics*, there is always residue. Moreover, there is little transparency at ILT how these recycling companies function, how much they earn and what actually happens to the waste, and the question remains whether even ILT knows. Except for a few outdated documents that have been made public through Freedom of Information requests, there is little information publicly available on the frequency or content of ILT supervision. According to Bellaart, ILT only checks the front door of Cabka, and not the back door because it does not fall under its responsibilities (Interview, [Appendix A](#)). Is leftover waste at recyclers incinerated? Exported? Hard to say.

Thus, in the Netherlands, a foil cucumber wrapping goes through a complex network of collection methods, sorting centers with various sub-waste streams, transporters and recyclers. Household waste is regulated to some extent, but, once it is labelled as ‘recycled’, is lost out of sight. Tracking industrial waste proves to be an even more difficult task. After China’s import ban, less packaging was ‘recycled’ by the industry, instead it ended up in the industry’s general waste bag. There is no processing-compensation, so recycling packaging in this sector is even less profitable (*CE Delft, 2019*). It is important to note that this section only analyses one specific part of the Dutch plastic waste supply chain, which only underlines the complexity of the whole system.

Exporting the problem abroad

Surprisingly, neither the visuals in the report by CE Delft, the waste scheme by [Brouwer et al. \(2018\)](#) or the study by [Gradus et al. \(2017\)](#) include export numbers in their research on the Dutch post-consumer plastic recycling network. Dutch export should not be overlooked since it highlights the Dutch role as a western polluter that sends their waste to the other side of the world. The Netherlands Bureau for Economic Policy Analysis (CPB) warned in a 2019 report that numerous environmental gains are neglected in the Dutch recycling system, especially with regards to the

export of plastic waste (Verrips et al., 2019). In 2010, the Netherlands exported 405 thousand tons of plastic waste, of which almost half (195 thousand tons) was destined for China and Hong Kong. After the Chinese ban, the Dutch recycling industry was forced to adapt to a new market. In 2018, the Netherlands exported 361 thousand tons of plastic waste, 86 thousand ton of which was destined outside of Europe. Export numbers of that year reveal a scramble for new importers after China opted out: export to Indonesia increased from 0 ton in 2010 to 25 thousand tons in 2018, the export to Turkey from 1 to 16 thousand tons, and to Vietnam from 1 to 14 thousand tons (CBS, 2019; see figure 3).

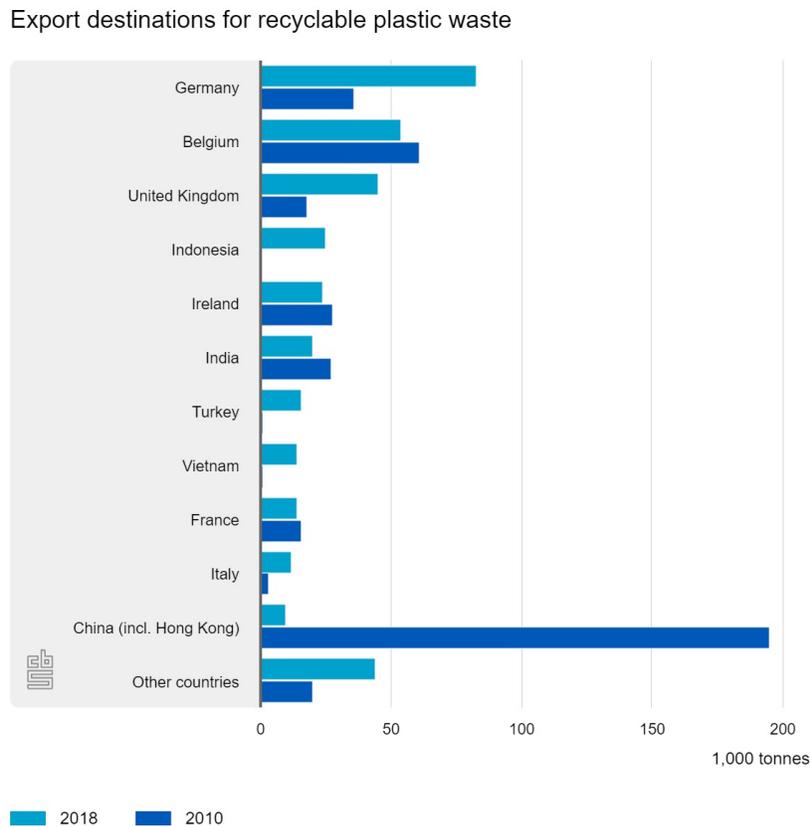


Figure 3, (CBS, 2019) top export locations for plastic waste from the Netherlands, numbers from 2010 and 2018 compared.

According to a report by Ocean Conservancy (2017), 55 to 60 percent of the total plastic waste ‘leakage’ enters the oceans from the coast of just five countries in Southeast Asia: China, Indonesia, Philippines, Thailand and Vietnam. The question remains how much these countries willingly import, since there are a lot of tricks in which plastic is sneaked into the country. For example, containers meant for paper export are filled up to, sometimes, 60 percent with other waste

because Indonesian law does not require control for paper import (Kas, 2019). Through its export, failing oversight and weak legislation regarding industrial waste, the Netherlands directly contributes to environmental and health risks in importing countries, showing a disregard to recycling methods and social equity principles. The CPB proposes an export tax or ban to countries where excessive amounts of plastic waste are dumped together with an increased focus on the quality of waste (Verrips et al., 2019). However, no concrete policy moves have been made in the direction of a tax or ban.

The Dutch export of waste is managed by three EU regulations. Firstly, the European Waste Shipments Regulation (EWSR). In the EU, household waste is categorized as non-hazardous and is therefore ‘green-listed’. This means it can be exported outside of the EU, but it is prohibited to export to a non-OECD country if the waste is destined for incineration, energy recovery or landfilling. The regulation states that exported waste has to be accompanied by a contract document and that recycling conditions should be the same as EU standards when exported outside the EU. However, there is not a working system in place to ensure equivalent recycling standards are applied. The other two policies, the Waste Framework Directive (WFD) and the Packaging and Packaging Waste Directive (PPWD) focus on ensuring equivalent recycling. The latter states that exported packaging waste can only count towards recycling targets “if there is sound evidence that the recovery and/or recycling operation took place under conditions that are broadly equivalent to those prescribed by the EU”. Both regulations are still in development and do not actively control exports (Zero Waste Europe, 2018). Thus, the regulations through which the EU manages its member states’ plastic waste export is quite limited and still a work in progress.

Many actors in the recycling industry claim that Dutch *household* waste is never exported to Southeast Asia, only industrial waste. However, there is no way this can promise is held: the Dutch national environmental protection law (Milieuwet) indicates that the difference between household and industrial waste is lost after sorting, after which industrial and household waste streams are combined and labels are gone, which makes it impossible to prevent household waste from leaving the EU. Ironically, the national news broadcast of 19 May showed a package of cat food on a Indonesian beach with the Dutch heading ‘Dubbel zo Lekker’ – double as good (Gradus, 2019). Thus, the export of Dutch waste both outside and inside the EU is an overlooked issue in national policy. In exporting waste to Southeast Asia and other non-OECD countries, the

Netherlands fails to guarantee equivalent recycling conditions and disregards social equity. In exporting waste to other EU member states, oversight of the complete plastic supply chain is lost and its supposed fate in a circular economy cannot be guaranteed.

Concluding thoughts: failing through complexity

This chapter focused on how circular economy approaches affect the management of plastic waste streams in the Netherlands. In theory, the Netherlands is a role model within Europe: national recycling targets are met well in time and the country ranks at the top among member states with regards to waste management. However, this chapter also focused on the practical side of its waste management practices, which reveals a complicated, convoluted system: the industry is in control of household waste management; there is a sole focus on packaging; export is left out of policy debate; policy is weak in general with limited control mechanisms in place; industrial waste has limited governing policies and there is a general lack of publicly available data. In general, the framework seems to be a convoluted collaboration between Afvalfonds, ILT, transporters, sorters, recyclers, registers and compensation fees in which every concerned citizen would lose track, which makes it susceptible to fraud.

As became clear in previous chapters, governmental policy should aim to realize *less* plastic production instead of more recycling, fewer different types of plastic, ambitious policy to achieve circularity targets and a strong governmental control to safeguard social equity and environmental principles in importing nations – instead of registration and compensation rhetorics. In this regard, the Dutch policy framework fails to move towards a circular economy that it so greatly desires to be. It has never been researched whether the current recycling targets aim for the maximal result or target the development of a circular economy by 2050. Present results do not indicate progress towards circularity nor are there policy proposals to increase waste management targets (Algemene Rekenkamer, 2019). Again, circularity proves to be “the perfect political gem because of its association with ‘progress’, ‘sustainability’ and ‘innovation’ without being controversial” (Hofs, 2019), and without delivering desired results.

It is important to stress that this chapter only analyzed one country’s waste management practices, which revealed an anything but ideal reality. If the Netherlands is seen as forerunner in Europe and is ranking third in the best recycling rate for plastic packaging in Europe (PlasticsEurope, 2019), it sketches a rather dire view of the situation in the rest of Europe.

Conclusion

One thing that became clear is that my carefully recycled plastic cucumber wrapping is not automatically transformed into a magnificent new product. This thesis highlighted that the current economic system enables a disposable way of living, but is unable to clean up the mess. The analysis focused on the policy answer to it all, the circular economy, and asked: how has the concept of the circular economy affected the global management of plastic on an international and supranational level and filtered through to the national practice of Dutch plastic waste management? Arguably, there is no such thing as a global circular economy in place; plastic waste management operates in a circular *pattern* of transported goods but not a cyclical movement in which virgin inputs or emission outputs are eliminated. Instead, there is a globalization of plastic waste disposal that is accompanied by the transfer of responsibility; both exporting waste and the attached environmental and social principles abroad. The latter was underlined extensively because social justice is often forgotten in the debate on the circular economy whilst a disproportionate burden of global waste management is left to poor communities by locating waste management and dumping sites in their proximity (Ma & Hipel, 2016).

These three chapters led to three conclusions on the establishment of a circular economy of plastic waste on the global, macro and micro level. The first chapter presented the international scope of the problem and its transboundary and cross-cultural nature, the disruption of the Chinese plastic ban and how the circular economy became the buzzword to solve it all. The concept of the circular economy originates from the belief that sustainability entails meeting the needs of the present “without compromising on the ability of future generations to meet their own needs” (Brundtland et al., 1987: 37). However, the relation between the concept of the circular economy and sustainable development appeared to be scattered, uncoordinated and messy. This theoretical vagueness translated to practical ambiguity – embodied by China opting out of the trade system. This research stresses that the failure to equally integrate all three pillars of sustainable development – economic prosperity, environmental quality and social equity – in circular economy policy, failed to make this system truly cyclical.

The second chapter analyzed the European policy response to the international waste crisis, to which member states are responsible contributors. In the last decade, the EU showed an

intensification of policy formation and of ambitious targets, but failed to devise a policy framework that enabled systematic change. Instead, member states draw their own conclusions of EU policy and, without legal mechanisms in place, continue old habits. The EU's words follow its "lead by example" principle, but its actions fail to deliver supranational leadership on the coordination among member states.

The third chapter assessed the waste management system on a national level. With respect to plastic waste, the Netherlands is seen as a role model within the EU, but the analysis revealed an anything but ideal system: only household waste is regulated, and of that only plastic packaging. Moreover, this regulation is, through an EPR scheme, in the hands of the industry. Within the complicated national system of compensations, municipalities, sorters and recyclers – any concerned citizen would lose track. Especially considering the limited transparency that is provided by producers, ILT and Afvalfonds.

Scholarly analysis seems to move slower than enthusiastic practitioners in the business, which caused specific parts of the circular economy to be neglected in the literature framework. Specifically, EPR and the two hats it has been wearing in the circular economy. In essence, EPR is promising because it extends the producer's responsibility to the post-consumer stage of a product's life. However, in chapter three, it became clear that this in practice often translates to a transfer of responsibility to the industry on a national level. The negative side-effects of implementing an EPR scheme deserve more attention in the academic literature and provide an opportunity for future research.

Overall, a discrepancy became clear in the comparison between the national reality versus the supranational ambition. Even though the problem is inherently transboundary and cross-cultural in nature, resulting policy actions are simplistic, one-sided and fragmentary. For the circular economy to deliver its promises of sustainable development, social equity has to be integrated within the conceptual and the practical concept of the circular economy. A circular economy is like "traffic rules, everybody has to drive by the same rules at the same time in order to secure a fluid traffic without any accidents" (Bonviu, 2014: 86). This might seem to refer to utopian reality, but with strong policy, it should be possible: the strongest links need to be held accountable for their actions, whilst the weakest links need to make sure that their waste infrastructure catches up.

Providing a comprehensive definition is a challenging task and is beyond the scope of this thesis. To me, it is however clear that the definition of the circular economy should be based on the very thing this concept strives towards: sustainability, to balance our needs with the capacity of the earth we inhabit, for our generation and those beyond. This implies including the three pillars of sustainable development with a commitment to equally balance the desire for economic profits with the earth's capacity and the people who inhabit it. Even though this thesis focused on revealing the vagueness of the concept, this hopefully, contrastingly, contributed to more clearness on its limitations and possibilities. A sustainable circular economy can only develop if scholars, businesses and policymakers commit to *all* aspects of the circular economy, not just the profitable ones, whatever the costs. Without the acknowledgement of environmental concerns nor the aim towards social equity, this circular *pattern* of plastic waste around the globe will not translate to a circular *economy*.

Bibliography

Primary sources

Afvalfonds Verpakkingen (2018). Monitoring Verpakkingen. Resultaten inzameling en recycling 2017. In collaboration with Nedvang.

<<https://www.nedvang.nl/wp-content/uploads/2019/02/Monitoring-Verpakkingen-Resultaten-inzameling-en-recycling-2017.pdf>>

Algemene Rekenkamer. (2019). Resultaten verantwoordingsonderzoek 2018 Ministerie van Infrastructuur en Waterstaat (XII).

<<https://www.rekenkamer.nl/publicaties/rapporten/2019/05/15/resultaten-verantwoordingsonderzoek-2018-ministerie-van-infrastructuur-en-waterstaat>>

Bijlage bij beantwoording technische vragen GAD. (2019, April 12). Bestuur Gooise Meren.

<https://bestuur.gooisemeren.nl/fileadmin/news_import/190423_VVD_-_Bijlage_bij_beantwoording_technische_vragen_GAD.pdf>

Brundtland, G. H., Khalid, M., Agnelli, S., Al-Athel, S., & Chidzero, B. (1987). Our common future. *New York*, 8.

CE Delft. (2019). Plasticgebruik en verwerking van Plastic afval in Nederland.

Centraal Bureau voor Statistiek. (2019, March 13). Steeds minder recyclebaar plastic afval naar China.

<<https://www.cbs.nl/nl-nl/nieuws/2019/11/steeds-minder-recyclebaar-plastic-afval-naar-china>>

European Commission. (2008). Directive 2008/98/EC (Waste Framework Directive).

<<https://ec.europa.eu/environment/waste/framework/>>

European Commission. (2012). Manifesto for a Resource-Efficient Europe.

<https://ec.europa.eu/commission/presscorner/detail/en/MEMO_12_989>

European Commission. (2015). Circular Economy Action Plan, for a cleaner and more competitive Europe.

<https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf>

European Commission. (2018). A European Strategy for Plastics in a Circular Economy.

<<https://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy-brochure.pdf>>

European Environment Agency. (2019). The plastic waste trade in the circular economy. Briefing. <<https://www.eea.europa.eu/themes/waste/resource-efficiency/the-plastic-waste-trade-in>>

Eurostat. (2018). *Recycling - secondary material price indicator*. Eurostat Statistics Explained. <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Recycling_%E2%80%93_secondary_material_price_indicator&oldid=422150>

Ocean Conservancy. (2017). *Stemming the Tide: Land-based strategies for a plastic-free ocean*. McKinsey Center for Business and Environment. <<https://oceanconservancy.org/wp-content/uploads/2017/04/full-report-stemming-the.pdf>>

Planbureau voor de Leefomgeving. (2019) *Circulaire economie in kaart*. Den Haag: Planbureau voor de leefomgeving. <https://www.pbl.nl/sites/default/files/downloads/pbl-2019-circulaire-economie-in-kaart-3401_0.pdf>

PlasticsEurope. (2019). *Plastics—the Facts 2019*. An analysis of European plastics production, demand and waste data. <https://www.plasticseurope.org/application/files/9715/7129/9584/FINAL_web_version_Plastics_the_facts2019_14102019.pdf>

RIVM. (2020). *Plastic Pact Nederland: de Monitor Nulmeting (2017-2018)*. Rijksinstituut voor Volksgezondheid en Milieu. <<https://www.rivm.nl/publicaties/plastic-pact-nederland-monitor-nulmeting-2017-2018>>

Rijksoverheid. (2019). *Uitvoeringsprogramma Circulaire Economie 2019-2023*. Het ministerie van Infrastructuur en Waterstaat. <<https://www.rijksoverheid.nl/onderwerpen/circulaire-economie/documenten/rapporten/2019/02/08/uitvoeringsprogramma-2019-2023>>

Verrips, A., Wal, E. van der, Tijm, J., Mot, E. (2019). *Meer milieuwinst met recycling #hoedan? Centraal Planbureau Policy Brief*. <<https://www.cpb.nl/sites/default/files/omnidownload/CPB-Policy-Brief-2019-12-Meer-milieuwinst-met-recycling-hoe-dan.pdf>>

Zero Waste Europe. (2018). *Changing trends in plastic waste trade. Plastic Waste shipments report*.

Secondary sources

Algemeen Dagblad. (2020, March 7). Pak de producenten van plastic aan, te beginnen bij Shell. *Algemeen Dagblad*.

<https://www.ad.nl/opinie/pak-de-producenten-van-plastic-aan-te-beginnen-bij-shell-br-br~a34f1d7c/?_ga=2.157729146.1784948022.1589012687-1209639311.1537990052>

AfvalOnline. (2019, September 9). Nieuwe afspraken Raamovereenkomst Verpakkingen op tafel. <<https://afvalonline.nl/bericht?id=29642>>

Baofu, P. (2012). *The future of post-human waste: Towards a new theory of uselessness and usefulness*. Cambridge Scholars Publishing.

Bellaart, H. (2019). Een extra kliko voor plastic: meer scheiden is niet beter. *NRC*. <<https://www.nrc.nl/nieuws/2019/11/25/een-extra-kliko-voor-plastic-meer-scheiden-is-niet-beter-a3981557>>

Boffey, D. (2018, January 16). EU declares war on plastic waste. *The Guardian*. <<https://www.theguardian.com/environment/2018/jan/16/eu-declares-war-on-plastic-waste-2030>>

Bonviu, F. (2014). The European economy: from a linear to a circular economy. *Romanian J. Eur. Aff.*, 14, 78.

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).

Brouwer, M. T., van Velzen, E. U. T., Augustinus, A., Soethoudt, H., De Meester, S., & Ragaert, K. (2018). Predictive model for the Dutch post-consumer plastic packaging recycling system and implications for the circular economy. *Waste management*, 71, 62-85.

Cox, K. D., Covernton, G. A., Davies, H. L., Dower, J. F., Juanes, F., & Dudas, S. E. (2019). Human consumption of microplastics. *Environmental science & technology*, 53(12), 7068-7074.

Davis, H. (2015). Life & death in the Anthropocene: A short history of plastic. *Art in the anthropocene: Encounters among aesthetics, politics, environments and epistemologies*, 347-358.

Denyer, S. (2019, May 30). Malaysia's Mahathir tells rich nations to take back their plastic garbage. *The Washington Post*.

<https://www.washingtonpost.com/world/asia_pacific/malaysias-mahathir-tells-rich-nations-to-stop-dumping-their-plastic-on-poor-countries/2019/05/30/29b99a32-82b5-11e9-95a9-e2c830afe24f_story.html>

Deselnicu, D. C., Milităru, G., Deselnicu, V., Zăinescu, G., & Albu, L. (2018). Towards a Circular Economy—A Zero Waste Programme for Europe. In: *International Conference on Advanced Materials and Systems (ICAMS)* (pp. 563-568). The National Research & Development Institute for Textiles and Leather-INCDTP.

Ditchev, I. (2020, February 22). My Europe: Illegal garbage dumps reflect EU's east-west divide. *DW*.

<<https://www.dw.com/en/my-europe-illegal-garbage-dumps-reflect-eus-east-west-divide/a-52480168>>

Dobush, G. (2019, July 19). The Brutal Reality Of Being The World's 'Best' Recycler. *Huffington Post*.

Durán, G. M., & Morgera, E. (2012). *Environmental Integration in the EU's External Relations: Beyond multilateral dimensions*. Bloomsbury Publishing.

Filho, W. L., Saari, U., Fedoruk, M., Iital, A., Moora, H., Klöga, M., & Voronova, V. (2019). An overview of the problems posed by plastic products and the role of extended producer responsibility in Europe. *Journal of cleaner production*, 214, 550-558.

Foschi, E., & Bonoli, A. (2019). The commitment of packaging industry in the framework of the European strategy for plastics in a circular economy. *Administrative Sciences*, 9(1), 18.

Frias, J. P. G. L., & Nash, R. (2019). Microplastics: finding a consensus on the definition. *Marine pollution bulletin*, 138, 145-147.

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy—A new sustainability paradigm?. *Journal of cleaner production*, 143, 757-768.

Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science advances*, 3(7), e1700782.

Gibbens, S. (2019, May 13). Plastic proliferates at the bottom of world's deepest ocean trench. *National Geographic*.

<<https://www.nationalgeographic.com/news/2018/05/plastic-bag-mariana-trench-pollution-science-spd/>>

Godfrey, L. (2019). Waste plastic, the challenge facing developing countries—ban it, change it, collect it?. *Recycling*, 4(1), 3.

Gradus, R. (2019, July 15). Gescheiden inzameling van plastic schaadt het milieu. *Trouw*.
<<https://www.trouw.nl/opinie/gescheiden-inzameling-van-plastic-schaadt-het-milieu~bb5e8de5/>>

Hofs, Y. (2019, January 11). Wat de overheid moet veranderen om de Nederlandse economie in 2050 volledig ‘circulair’ te maken. *De Volkskrant*.
<<https://www.volkskrant.nl/nieuws-achtergrond/wat-de-overheid-moet-veranderen-om-de-nederlandse-economie-in-2050-volledig-circulair-te-maken~b1abaaa2/>>

Huysman, S., De Schaepmeester, J., Ragaert, K., Dewulf, J., & De Meester, S. (2017). Performance indicators for a circular economy: A case study on post-industrial plastic waste. *Resources, Conservation and Recycling*, 120, 46-54.

Jaffe, D. (1995). The International Effort to Control the Transboundary Movement of Hazardous Waste: The Basel and Bamako Conventions. *ILSA J. Int'l & Comp. L.*, 2, 123.

Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., ... & Law, K. L. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768-771.

Jordan, A., van Asselt, H., Berkhout, F., Huitema, D., & Rayner, T. (2012). Understanding the paradoxes of multilevel governing: climate change policy in the European Union. *Global Environmental Politics*, 12(2), 43-66.

Kas, A. (2019, June 26). Kodri in Indonesië is heel blij met westerse plastic verpakkingen. *NRC*.
<<https://www.nrc.nl/nieuws/2019/06/26/kodri-in-indonesie-is-heel-blij-met-westerse-plastic-verpakkingen-a3965201>>

Karout, K. (2018, March 27). Proposals for a more effective European Plastics Strategy. *Futurelab Europe*.
<<https://futurelabeurope.eu/2018/03/27/proposals-for-a-more-effective-european-plastics-strategy>>

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, 127, 221-232.

Kummer, K. (1992). The international regulation of transboundary traffic in hazardous wastes: The 1989 Basel Convention. *International & Comparative Law Quarterly*, 41(3), 530-562.

Lamote, S. (2019, October 23). België overspoelt Turkije met plastic afval. *Knack*. <<https://www.knack.be/nieuws/belgie/vervuiling-uitbuiting-en-smokkel-belgie-overspoelt-turkije-met-plastic-afval/article-longread-1523275.html>>

Laville, S. (2018, October, 19). UK plastics recycling industry under investigation for fraud and corruption. *The Guardian*. <<https://www.theguardian.com/environment/2018/oct/18/uk-recycling-industry-under-investigation-for-and-corruption>>

Liboiron, M. (2013). Plasticizers: A twenty-first-century miasma. In *Accumulation* (pp. 148-163). Routledge.

Liu, Z., Adams, M., & Walker, T. R. (2018). Are exports of recyclables from developed to developing countries waste pollution transfer or part of the global circular economy?. *Resources, Conservation and Recycling*, 136, 22-23.

Ma, J., & Hipel, K. W. (2016). Exploring social dimensions of municipal solid waste management around the globe—A systematic literature review. *Waste Management*, 56, 3-12.

McDowall, W., Geng, Y., Huang, B., Barteková, E., Bleischwitz, R., Türkeli, S., ... & Doménech, T. (2017). Circular economy policies in China and Europe. *Journal of Industrial Ecology*, 21(3), 651-661.

Meikle, J. L. (1995). *American plastic: a cultural history*. Rutgers University Press.

Mensbergen, C. van. (2020, March 7). Shell bouwt enorme plasticfabriek in de VS: ‘Verschrikkelijk, we komen al om in plastic’. *Algemeen Dagblad*. <<https://www.ad.nl/economie/shell-bouwt-enorme-plasticfabriek-in-de-vs-verschrikkelijk-we-komen-al-om-in-plastic~a39bc772/?referrer=https://www.google.com/>>

Millar, N., McLaughlin, E., & Börger, T. (2019). The circular economy: swings and roundabouts?. *Ecological economics*, 158, 11-19.

Mrowiec, B. (2018). Plastics in the circular economy (CE). *Environmental Protection and Natural Resources; The Journal of Institute of Environmental Protection-National Research Institute.*, 29(4), 16-19.

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.

Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Harvard University Press.

Overbeek, E. (2018, June 8). Recyclen op zijn Pools: de fik erin. *Trouw*.
<<https://www.trouw.nl/duurzaamheid-natuur/recyclen-op-zijn-pools-de-fik-erin~bd2935fc7/?referer=https%3A%2F%2Fwww.google.com%2F>>

Paauwe, C. (2018, October 19). Onderzoek naar illegale Britse afvalexport, deels via Nederland. *NRC*.
<<https://www.nrc.nl/nieuws/2018/10/19/onderzoek-naar-illegale-britse-afvalexport-deels-via-nederland-a2666641>>

PBS Newshour. (2019). *The Plastic Problem*. A Newshour Documentary.
<<https://www.pbs.org/video/the-plastic-problem-7kdvzo/>>

Penca, J. (2018). European plastics strategy: What promise for global marine litter?. *Marine Policy*, 97, 197-201.

Qu, S., Guo, Y., Ma, Z., Chen, W. Q., Liu, J., Liu, G., ... & Xu, M. (2019). Implications of China's foreign waste ban on the global circular economy. *Resources, Conservation and Recycling*, 144, 252-255.

Rankin, J. (2019, March 27). European parliament votes to ban single-use plastics. *The Guardian*.
<<https://www.theguardian.com/environment/2019/mar/27/the-last-straw-european-parliament-votes-to-ban-single-use-plastics>>

Schroeder, P., Dewick, P., Kusi-Sarpong, S., & Hofstetter, J. S. (2018). Circular economy and power relations in global value chains: tensions and trade-offs for lower income countries. *Resources, Conservation and Recycling*, 136, 77-78.

Sun, M. (2019). The effect of border controls on waste imports: Evidence from China's Green Fence campaign. *China Economic Review*, 54, 457-472.

Tielbeke, J. (2020, June 4). Je linnen boodschappentas gaat de wereld niet redden. *De Volkskrant*.
<<https://www.volkskrant.nl/columns-opinie/je-linnen-boodschappentas-gaat-de-wereld-niet-redden~bcdb0ab2/>>

Toloken, S. (2019, May 10). UN adopts global treaty limiting plastic waste trade. *Plastics News*.

<<https://www.plasticsnews.com/article/20190510/NEWS/190519991/un-adopts-global-treaty-limiting-plastic-waste-trade>>

Watkins, E., Gionfra, S., Schweitzer, J. P., Pantzar, M., Janssens, C., & ten Brink, P. (2017). EPR in the EU Plastics Strategy and the Circular Economy: A focus on plastic packaging. *Institute for European Environmental Policy (IEEP)*.

Winans, K., Kendall, A., & Deng, H. (2017). The history and current applications of the circular economy concept. *Renewable and Sustainable Energy Reviews*, 68, 825-833.

Verbraeken, H. (2017, January 10). De Plastic Route: van haring-cellofaantje tot bermpaaltje. *Het Financieele Dagblad*.

<<https://fd.nl/ondernemen/1181806/de-plastic-route-van-haring-cellofaantje-tot-bermpaaltje>>

Appendix A

Interview via telephone with Hugo Bellaart, city councilor for the VVD in the municipality of Gooische Meren who aims to reform Dutch waste policy (*translated from Dutch*).

Laura “How did you become involved with waste policy?”

Hugo “Because of the Chinese plastic ban, my interest was sparked because waste collection is a municipal task. I looked into the monitoring reports of Afvalfonds. Firstly, their numbers did not correspond with each other and secondly, there is no control. Municipalities are only checked once every five years. The system is fraudulent and very complex. It seemed to be quite troubled.

I have contacts in waste processing. In an op-ed for *NRC*, I wrote what we should be doing: use less plastic and decrease the different types of plastic that are circulating in Europe. We have to stop with the nonsense of registration and compensation rhetoric. Moreover, the way our household waste is collected is a very polluting process.”

Laura “In your op-ed, you mention that is ridiculous to claim that Dutch household waste is never exported. Could you expand on that?”

Hugo “In reactions by officials it always seemed as if plastic is never exported to Asia. So, I verified the different transport streams. Our plastic goes to Suez who is the market leader in this field and receives 70 percent of Dutch household waste and separates it in different fractions. I found out that a big part of the waste is characterized as ‘mixed’, only six percent of PMD is PET. Only a small fraction is considered to be well recyclable, which is very little compared to the great effort we ask of civilians to recycle well. 30 percent of PMD is mixed plastics, 30 percent is considered to be residue, and is separated immediately. Keep in mind that this happens to a category of waste that is collected separately. The mixed plastics are registered as recycled for which municipalities receive compensation. Mixed plastics are exported by car from Rotterdam to Cabka in Leipzig (Germany) that states that they make roadside marker posts from the plastic waste. We know that Germany exports to Asia. Moreover, after waste is sorted at Suez, the distinction between household and industrial waste disappears. ILT is responsible for controlling this export to Cabka, but they do not inspect the back door because it is not their responsibility.

Laura How has the system evolved into this?

Hugo Former minister Kramer decided in 2005 that plastic should be part of a broad collection of waste. She chose to broaden the collection, which meant that all plastics could be thrown into one bag which evolved into PMD. At some point, the VNG policy was made up that included objectives that were designed to fit the circularity framework. It focussed on increasingly sorting waste and thereby

decreasing the amount of residue waste. VNG-policies were presented through congresses, trainings and seminars to municipalities, with the help of a lot of money. Municipalities accepted VNG-policy with jubilant press releases. Why is decreasing residue waste something that should be celebrated? Good waste policy should focus on reusing materials and not on generating the least amount of residue waste. I am convinced that environmental damage is caused through this policy.

Laura What has changed to the new Raamovereenkomst?

Hugo After increasing criticism on the management of plastic waste, negotiations started between Afvalfonds (the packaging industry), VNG (managed by NVRD) and the government to design the new 'Raamovereenkomst Verpakkingen'. They came up with a whole new policy outlook: PMD is now considered to be the starting point of everything. Everything can be collected together, even chips bags. The new compensation for the municipality is 261 euro per ton. In november 2019, a motion against this proposal was announced. The municipal capacity is limited to the collection, everything else will become the responsibility of Afvalfonds, and thus the industry. The compensation system for waste is extremely varried: for glass it is 50 euros per ton and for plastic it is 650 euros per ton. Why? Alarm bells should go off: the business of plastic is way bigger. To clean it up, a lot of money is needed, which makes the system fraudulent. If you can get rid of some plastic, the financial reward is high.

The system is convoluted. Producer responsibility is in place for the collection of plastic. From this money, the whole industry is paid: 200 million per year to finance shredders, granulators, processors. Our plastic waste industry ranks seventh worldwide. We import a lot from England because we have good incinerators. In the meantime, our waste charges increase while it was promised that they would decrease because recycling rates are up. That is not happening, so I fear something else is going on.

Appendix B

Interview via Facetime with Amy L. Brooks, a researcher at the New Materials Institute at the University of Georgia, who was a co-author on the research “The Chinese import ban and its impact on global plastic waste trade” (2018).

Laura Do you think the plastic ban came as a surprise to the US or the EU or was it something they could have seen coming?

Amy Firstly, China has implemented some policies in the past. They had the Green Fence back in 2013 where they had very strict contamination requirements. That was a temporary policy. The most recent import ban, the announcement was made some about six months before it was put into place. I don't know if that's a lot of time for the recycling industry to really react, but it has been very effective. I think it's causing countries and communities that have depended on exporting waste to start think more about what exactly they're doing with the waste.

Laura When the plastic would arrive in China, what would happen to it? Is it mostly landfilled, burned, or recycled?

Amy That is one of the more complicated parts about this. We don't really know what happens to waste when it does cross into another country. However, China has a formal solid waste management system, but also a pretty significant informal waste system. There's no telling whether the waste that they are importing is being managed by the proper systems or being managed in the informal sectors.

Laura What would the informal sector imply?

Amy These are usually smaller family run businesses that don't have a lot of formal organisation. So, they do not necessarily have safety or environmental regulations. It would be a little more, what we call in the US, mom and pop businesses. That may not have the same type of regulations that a big facility would have elsewhere. That may be feeding why it is less expensive to send it abroad than it is to manage it domestically.

Laura There is a recycling initiative in Rotterdam in the Netherlands, that exports most of their plastic to Germany. However, when it arrives in Germany nobody knows what happens to it. It is extremely difficult to track it and people are very secretive about it.

Amy For brands that have plastic products, it is pretty bad press having their materials reaching other countries and may or may not be managed there. One thing that we call for in this paper, is that companies who are producing these items may be held a little bit more accountable about how they are

managed once it is exported. There are opportunities early on in the design process when companies are thinking about how their products are designed or packaged where they can think about how it will be managed. If they know if it's going to be exported, what does it mean when it does go there? I think there are some ways that companies can play a bigger role in the management of some of these single use items.

Laura Do you also mean the kind of plastics their materials are made from? Some forms of plastic, as I understand, not recyclable at all.

Amy Some plastics are inherently more valuable. PET plastic, which is used in plastic bottles, they have better uptake and there are actually some really innovative deposit schemes.

Laura In the Netherlands, the data shows that we export and import plastic at the same time. Which seems counter-intuitive?

Amy There are still some markets in the US, The Netherlands and Germany for plastic waste. Whatever they import, and whatever crosses the country they have to report. But that waste may still end up going to China. The ability to track where these items are going, makes it really hard to know exactly how it's moving across the world. Just in terms of numbers, the amount that the US and The Netherlands are importing is very small compared to what China and Hong Kong were importing. Netherlands took like 2.6 percent in 2016 compared to the 45 percent that China was taking.

Laura Are you more an advocate of supporting the abolishment of the export of plastic in which it is only handled locally, or is that actually something that is not beneficial?

Amy The way the waste world is going, it makes more sense for waste management to become more localized. That said, one thing that I worry about and having kind of seen on the ground in SouthEast Asia, is that for some people, their entire livelihood depends on this material coming into their country so they can process it. Any kind of policy that we have in terms trading needs to be cognizant of that and the lives that depend on this system. We'll have to be careful with how we start to change these globalized markets

Laura What are your personal worries about the recycling industry and where it is heading in the future or the coming years?

Amy There are a lot of things I worry about, and there are a lot of things I feel hopeful for. As we're introducing new products, design schemes and new materials even, it has the potential to make this system even more confusing to consumers, who, at the end of the day, are the ones who are buying and

potentially recycling or landfilling the items they use at home. That's one hope and a concern at the same time. I hope we can figure out products, and product delivery systems that efficiently use plastics if we have to. But once all these other alternatives are brought in, consumers are potentially going to be very confused. And it is already pretty confusing now. I think that's kind of how we got here. People don't really know how to recycle. And it feels good to recycle so sometimes they overdo it or recycle the wrong things. That is one of the challenges is engaging consumers and making sure they also understand the process.