

Reducing Plastic Pollution in the Netherlands and Germany

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Executive summary

Plastic is one of the most popular materials used in products, but it also leaves the earth to deal with a major environmental issue, namely plastic pollution. The oceans in particular are filled with plastic waste, which harms biodiversity and ecosystems. It also negatively impacts countries and their economy, therefore, this research aims to determine how the Netherlands and Germany can contribute to the reduction of plastic pollution. Specifically, it focuses on the approach the European Union took towards the transition to a circular economy, as well as on how the Netherlands and Germany are working towards a circular economy. It also compares the two countries and finds out similarities and differences. In this context, a circular economy is defined as an economy where everything that otherwise would be considered waste, is reused and repaired. Additionally, it helps separate the economic activity from the use of finite resources.

To answer the research question, more information about the plastic problem in Europe, the Netherlands and Germany was needed. Therefore, semi-structured interviews were conducted with three experts. Moreover, the results showed that Germany and the Netherlands are quite different in their approach. The European Union and the Netherlands implemented many policies and other initiatives to combat plastic pollution. However, while Germany is doing well in combatting plastic pollution, it introduced less plans and initiatives than the Netherlands.

Therefore, the overall outcome of the research is that the Netherlands and Germany can reduce plastic pollution by transitioning to a circular economy. However, it is advisable to create coherent and binding initiatives between all Member States. Additionally, Germany and the Netherlands should further extend their Deposit Return Schemes, as well as increase their recycling capacity. Moreover, it is important that the transition to a circular economy is financially supported.

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Preface

This dissertation was written for my Bachelor of European Studies at the Hague University of Applied Sciences. From the long list of issues that the planet is currently coping with, I chose plastic pollution as my topic. This dissertation contains information about plastic pollution, Germany, the Netherlands and what they both do to reduce it.

It always bothered me when I found plastic or other types of waste in the environment. However, after doing more research and listening to the interviewees, it became clear that the issue is even worse than I initially thought. I discovered that there are big plastic garbage patches floating in the ocean and even in the Mariana trench plastic has been discovered. In addition, every day there are copious amounts of tiny plastic particles that enter the environment, even including nature reserves. Both the Netherlands and Germany have their fair share of plastic pollution. As such, I wanted to find out what the Netherlands and Germany could do to reduce plastic pollution and what they could learn from each other's approach. Plastic pollution does not stop at the border and cooperation is needed to put an end to the issue.

This is also relevant for the process of writing a dissertation. Even though, it is something that I did on my own, I could not have handed in this dissertation without help. First and foremost, I want to thank my supervisor Dr. Martijn Lak. I am forever grateful that he made the time to let me ask all my questions, which were a lot. Without his help and knowledge this dissertation would certainly have been of different quality. Secondly, I want to thank Sjoerd Zoete, Robert Möhring and the anonymous interviewee for letting me interview them. They have given me so much useful information, that helped me enormously during my research. Lastly, I want to thank my parents, who supported me and listened to me talk about my dissertation for months on end, even though they did not understand much of what I was doing. Thanks to them I can say that I am proud of what I learned and wrote.

List of abbreviations

DRS	Deposit Return Scheme
EC	European Commission
EPR	Extended Producer Responsibility
EU	European Union
GDP	Gross Domestic Product
HDPE	High-Density Polyethylene
LDPE	Low-Density Polyethylene
MMT	Million Metric Tons
PET	Polyethylene Terephthalate
PP	Polypropylene
PS	Polystyrene or Styrofoam
PVC-U	Polyvinyl Chloride
SUP	Single-Use Plastic
IenW	The Ministry of Infrastructure and Water Management

1. Introduction

People ingest a bottle cap per week. This may sound strange, but every week about five grams of microscopic plastic particles can be consumed when drinking water, tea or coffee (JSTOR Daily, 2020, para. 1-2). Even in the placentas of unborn babies, dozens of plastic particles were found, coming from packaging, paints, cosmetics and other personal care products (Carrington, 2020, para. 1, 4). While plastic and the products that are created from it are very useful, it is detrimental for people's health and for the environment.

The reason why plastic is so popular, is because it is lightweight, cheap, resilient, durable and a good insulator (Sigler, 2014, p. 1). With plastic many products were created or improved, such as microchips, instruments used in the hospital, cars, lenses, glasses, as well as solar panels. Plastic is also indispensable for the generation and storage of sustainable energy and plastic insulation material reduces energy consumption and waste tremendously (van Everdingen, van Donk, Poolen, & Buiters, 2019, pp. 25-31). In the 1900s, it was created from raw fossil materials, such as petroleum, coal and natural gas. Macromolecules are extracted from these materials after heating them through a process called 'polymerization'. Then they are moulded and shaped in different polymers (van Everdingen, et al., 2019, p. 9). Plastic production increased tremendously since then, producing 359 million metric tons of plastic in 2018, increasing every year with 10-15 million metric tons, as stated by European Academies Science Advisory Council (EASAC) (2020, p. 9) and Foschi and Bonoli (2019, p. 1).

There are so many different types of plastics, which can be further changed into different sizes, colours and products. This makes plastic difficult to recycle, according to InfoNu (2018, para. 6-12) and European Commission (2018-a, p. 7). There are three types of plastics that define the size of the plastic. Firstly, there are macroplastics; these are the biggest plastic particles that are more than 5 millimetres in diameter. Secondly, there are microplastics that are smaller than 5 millimetres. Lastly, nano plastics are the smallest plastic particles and are smaller than 1000 micrometer (Napper & Thompson, 2020, pp. 2-3).

A large part of plastic is present in the environment, which is dreadful, because plastics do not biodegrade naturally. They only become smaller and smaller over time and release carbon dioxide and toxic chemicals in the environment (Napper & Thompson, 2020, p. 3). Most plastic particles end up in rivers, shorelines and at the bottom of the oceans. A large part also gets trapped in ocean gyres; the biggest called 'The Great Pacific Ocean Garbage Patch' (Sigler, 2014, p. 2). From the waste

found on beaches, about 90% is plastic waste, ranging from nets, rope to plastic bags and packaging (van Everdingen, et al., 2019, p. 40).

As a result of plastic waste, the world's biodiversity and ecosystems are negatively impacted. Globally, plastic debris affects at least 66% of marine mammal species, 50% of seabird species, and almost all sea turtle species (Rochman, Cook, & Koelmans, 2016, p. 1619). Plastic waste can entangle animals, which often results in strangulation and drowning. Many animals also ingest plastic, because it looks similar to the food they eat. Ingested plastic debris reduces stomach capacity, hinders growth, causes internal injuries, and creates intestinal blockage, as stated by Sigler (2014, pp. 2-3) and Ritchie and Roser (2018, section 15). In addition, the chemicals that are often added to plastic can leak and accumulate in animals due to a process called 'bio-accumulation'. This also affects humans by a process called 'trophic transfer' of micro plastics. When one animal eats another, the micro plastics will move from animal to animal, further up the food chain and people could potentially ingest these toxic chemicals (Plastic Soup Foundation, n.d., para. 1-2).

Moreover, while plastic is very beneficial for the economy, the damages plastic pollution causes cost at least 8-13 billion dollars per year globally. Beaches full of plastic will reduce tourism revenues and the cost of beach cleaning is high. Furthermore, plastic pollution also negatively influences shipping, energy production, fishing and aquaculture resources. Therefore, plastic pollution has huge external effects on society and has a large international component, for which collaboration between countries is needed, according to EASAC (2020, pp. 9-10) and Xanthos and Walker (2017, pp. 17-18).

Germany and the Netherlands are both very important stakeholders in this issue. In Europe, Germany is the largest producer, exporter and importer of plastics and the Netherlands is one of the main importers of German plastics (Filho, et al., 2019, p. 551). Furthermore, plastic is widely used in both the Netherlands and Germany, and both countries deal with their own issues concerning plastic pollution. This caused both the environmental impact of (micro-)plastics, as well as the environmental impact of everyday products made of plastic to become the main concerns, as maintained by European Commission (2019-b, p. 2; See also European Commission, 2019-c, p. 2). Furthermore, the Netherlands are currently working on extending their Deposit Return Scheme. In the next couple of years, it will include cans, as well as bottles of less than 1L (Seas at Risk, 2020, para. 25).

Therefore, the question was raised: **How can the Netherlands and Germany contribute to the reduction of plastic pollution?** To be able to find the answer, the following questions are answered:

- What is the European Union's approach to a circular economy?;

- How is the Netherlands working towards a circular economy?;
- How is Germany working towards a circular economy?;
- What are the differences and similarities between Germany and the Netherlands?

This dissertation is divided into seven chapters. First, comes the literature review and conceptual framework. Secondly, the methodology is described. Thirdly, the results are presented, answering the questions mentioned before, thereafter, an analysis is made. Lastly, conclusions and hypothetical recommendations for Germany and the Netherlands are given.

2. Literature review

Along with the rest of the world, Germany and the Netherlands also face problems with plastic. A writer for the newspaper of Brabant, gives the Biesbosch as an example, where the water levels rose so high that when it subsided, a huge amount of (plastic) waste was left behind (Blommers 2020, para. 2-4). Many recent studies focus on the problem that plastic pollution causes, such as plastic soup in the ocean. The question of what causes the plastic pollution problem seems to have an obvious answer; there is (too much) plastic. When it comes to this question, the existing literature also mentions other causes. Therefore, this literature review focuses on the causes of the pollution that plastic waste leads to. In addition, there is a specific focus on the Netherlands and Germany.

2.1 What are the causes of plastic pollution?

2.1.1 Recycling

According to independent researcher Penca (2018, p. 1), a popular opinion held by authors is that a major cause of plastic pollution comes from the issues within the recycling process and inadequate management of waste. The European Academies Science Advisory Council (EASAC) (2020, p. 37) states that most EU Member States export their plastic waste to other countries like China for recycling. It offers the lowest short-term costs, but the treatment of this exported waste is not legal nor environmentally friendly. However, since July 2017, China imposed a ban on certain kinds of solid waste, including plastics. Since then, other countries have also imposed bans (Penca, 2018, pp. 197-198).

EASAC (2020, p. 9) continues that these bans were the start of fundamental structural problems in the recycling process in Europe. In 2018, European countries collected around 29.1 million tonnes of plastic waste. However, Europe was and still is not prepared for the amount of plastics it should recycle. Only approximately 30% of plastic waste collected is destined for recycling, 31% goes to

landfill and 39% goes to incineration. As stated by the authors of the 'Sustainability and Innovation, working paper', Gandenberger, Orzanna, Klingenuß, and Sartorius (2014, p. 2), this is a problem because when plastic waste is left at landfill sites, the material and the energy contained in plastic waste will not be recovered, as well as potentially leading to methane emissions and the contamination of soil, groundwater and surface water.

Furthermore, plastic itself is a fundamental problem. Plastic can be made into different shapes, colours, textures, which makes it difficult to recycle. It also mixes materials that are hard to take apart and recycle properly. For example, a bag of crisps is equipped with plastic and a thin layer of aluminum (European Commission, 2018-a, p. 7). There are alternatives available, such as glass, metals, paper and bio(-based) plastics. The latter being "a plastic material is defined as a bioplastic if it is either bio-based, biodegradable, or features both properties" (European Bioplastics, n.d., para. 1). Bio-based products are made from raw materials, such as corn starch. This does not make them biodegradable, but some can degrade with the help of micro-organisms in a specific environment after a certain time (van Everdingen, et al., 2019, p. 69). There are also biodegradable plastics, which are supposed to mineralize into water, carbon dioxide, and biomass, but only in certain environments (Haider, Völker, Kramm, Landfester, & Wurm, 2018, p. 51). However, plastic remains the better option, since the alternatives are not as lightweight, cheap, flexible and easy to use. In addition, the environmental impacts on water, solid waste, nutrient emissions and effects on the ozone layer were lower for plastics than for any other material (EASAC, 2020, p. 41).

2.1.2 Consumer behaviour

Another reason why authors argue that plastic pollution became a problem is because of consumer behaviour. Through purchase decisions, consumers influence the market by choosing which products to buy. People should be aware that when they purchase or accept any plastic good, this involves a share of the responsibility for avoiding plastic pollution (EASAC, 2020, p. 24).

Secondly, as stated by members of the Wageningen university and research department, post-use behaviour is as important in avoiding plastic pollution, since about half of the plastics that people buy is thrown away after a single use. Consumers are in charge of the disposing of these 'single-use plastics' (van Everdingen, et al., 2019, pp. 45-47). Lewis (2012, para. 1) claims we live in a 'throwaway culture', where convenience and temporary solutions are preferred. With this mindset, people tend to ignore that their actions have impact, not only on a personal level, but also on a global level. Brooke (2017, para. 11), editor of the European Plastic Product Manufacturer, states that the cause of plastic pollution is human failure: there is a consumption problem, but people also do not have the patience to dispose of their waste correctly. For example, in the Netherlands, billions of plastic

bottles are sold, but only 1 out of 4 plastic bottles ends up in the recycling process (van Everdingen, et al., 2019, p. 7).

2.1.3 Industry

In 2018, Europe produced around 62 million tonnes of plastic. As such, it does not come as a surprise that the plastic industry is an important part of the European economy. In the same year the turnover of the plastic industry was €360 billion (EASAC, 2020, p. 9). EASAC (2020, p. 9) explains this rapid growth by pointing at the growing population and a growing consumer demand, which goes beyond what the earth can sustainably offer. The increasing consumption of products results in an increasing amount of waste, of which a large part is plastic waste. However, the cause of the plastic pollution issue lies not only with consumers.

EASAC (2020, p. 45) points out that another cause of plastic waste is that products are thrown away instead of being reused. Recycled material is less often used, because due to low oil and gas prices, it is cheaper to produce new plastics instead of using recycled plastics. As these 'new' plastics are preferred, it is becoming even more difficult and expensive to replace new plastic products with recycled plastic products.

Napper and Thompson (2020, p. 5) of the Global Challenges magazine, add that things often go wrong at the design stage. Most plastics are inherently recyclable, but the ones most often used, such as single-use plastics, are not currently designed for the recycling process. In most cases, the recyclability was compromised in order to have a certain design. As such, some polymers are not able to be used again for new packaging, such as polyethylene (PE) and polypropylene (PP). They are either not cleanable or too fragile to be moulded in another product (van Everdingen, et al., 2019, p. 66).

The lack of consideration for the environment is because producers only look at the life cycle of plastics before it is bought. After a consumer has bought their product, the producers do not see it as their responsibility anymore and avoid post-closure costs. Their product could leak methane in nature or pollute oceans, in economic terms this is called 'externalities' (EASAC, 2020, p. 45). The industry adds even more to this problem, since it will only invest in the high-quality recycling of plastics, if it is guaranteed that the producers will do something with their recycle (van Everdingen, et al., 2019, p. 67).

Moreover, as maintained by the Plastic Soup Foundation (2020, para. 6) and Ashton, Holmes and Turner (2010, p. 2050) of the Marine Pollution Bulletin, the industry also contributes to plastic pollution by dropping pre-production pellets during loading and transportation at plastic moulding

factories. Pellets are the small, generally 2–5 millimetres in diameter, raw materials from which plastics are moulded. Even without ever becoming a product, they already pollute the earth and are easily swallowed by animals. Around 8 trillion pellets end up in nature every year, or 22 billion a day.

2.1.4 Policy

Lastly, incorrect implementation or lack of legislation can also increase plastic pollution. According to Paziienza and De Lucia (2020, p. 2) of the economics department of the University of Foggia, an innovative legal framework at national and local levels is needed alongside the global and European initiatives. For example, governments can stimulate the recycling process by introducing a deposit scheme or by banning certain products all together (van Everdingen, et al., 2019, p. 47). However, this stimulation is currently lacking. After gathering new knowledge, the information needs to be shared and policy tools should be updated accordingly. Moreover, market-based tools and policies which are proven to work in other countries should be implemented, such as taxes, subsidies, fees, and Extended Producer Responsibility (EPR) schemes. To make the management of plastics in the EU more efficient, all relevant policy tools need to be the same in every Member State (Paziienza & De Lucia, 2020, pp. 2, 4, 8).

2.2 What is the situation in the Netherlands?

2.2.1 Industry

As Ashton, et al. (2010, p. 2050) observe that the industry is one of the main causes of plastic pollution. The Plastic Soup Foundation (2020, para. 1, 4, 6, 8) finds this to coincide with the Netherlands, arguing that Dutch factories are contributing to plastic pollution in the Netherlands. During loading and shipping, factories in Limburg and Rotterdam release many pre-production pellets into the environment, even in protected Natura 2000-areas.

Nusselder and Snijder of Committed to the Environment Delft (2019, pp. 46-47), also point at the industry, but highlight the lack of proper post-production plastic waste processing instead. According to Gradus, Nilesen, Dijkgraaf, and van Koppen (2017, p. 23), the corresponding authors of the Ecological Economics journal, Dutch municipalities are compensated to collect and sort household waste by a so-called “green dot” company, or “afvalfonds”. However, this statutory regulation does not exist for industrial waste. This in turn leads to industrial plastic waste not being recycled properly, which is problematic because the recycling of industrial plastic is included in the goals that Europe has set for the Netherlands (van Everdingen, et al., 2019, p. 67). These goals will become even stricter post-2020, as mentioned by European Commission (2019-a, pp. 9-10).

2.2.2 Recycling

EASAC (2020, p. 37) states that the Netherlands as a whole, rather than just its industries, have issues with their recycling process, since their cumulative exports reports show that for the period of 1988–2016, the Netherlands had to export 7.71 million metric tons of plastic waste to other countries, like China. In the domestic recycling process in the Netherlands, the Deposit Return Scheme (DRS) plays a large role. According to news website RTL Nieuws (2020, para. 5), studies show that the Deposit Return Scheme helps prevent 20 Olympic swimming pools of cans from entering the environment. This explains why 260 Dutch municipalities are very positive about the system (European Commission, 2019-a, p. 10).

However, as claimed by Schleicher (2020, para. 9), a writer of Packaging Insights, the DRS is currently not as productive as it should be, since it only accepts plastic bottles. As stated by news agency ANP (2018, para. 1, 4-7) and Buurman (2019, para. 3), writer for the Dutch “Algemeen Dagblad” newspaper, this is because of Dutch supermarket chains. Since as far back as 2001, supermarkets have been lobbying against extensions of the DRS, for example to include beverage cans. Currently, around 1 billion packages collected each year by deposit machines in supermarkets. After an extension for more types of packages, this would increase to about 2.7 to 2.9 billion packages annually. In most cases however, supermarkets have no space nor money to invest in new deposit machines and extra personnel costs.

Nevertheless, the DRS will be extended to bottles of less than 1L in 2021, including a 90% separate collection target for PET bottles. Cans will also be included in the deposit scheme in 2022, which goes beyond the requirements of the European directive. Nonetheless, NGO Seas at Risk wants the Dutch Government to do more, such as banning other common disposable plastic products, implementing producer responsibility measures as soon as possible and introducing stronger labelling requirements (Seas at Risk, 2020, para. 25).

2.2.3 Consumer Behaviour

Consumer behaviour is also a cause of plastic pollution that the literature points at. The Dutch Government has tried to prevent consumers from littering by prohibiting businesses from giving out free plastic bags (Rijksoverheid, n.d.-a, para. 6). About €0.25 per bag is mentioned in the official guideline mandated by the state (Surfrider Foundation Europe, 2018, p. 18). Mansveld (2015, pp. 1-3) argues that customers are perfectly capable in refusing plastic bags and bringing their own reusable ones. He states that a communication approach needs to be added alongside the ban, arguing that it benefits people’s sustainable behaviour to know why they no longer receive a free bag. The Netherlands Institute for Sustainable Packaging was running a successful pilot program called “Mag

het een tasje minder zijn?” of which the results showed a reduction of 77% in plastic bags bought when the reason for the plastic tax was well communicated; which proves Mansveld’s point. Good communication can encourage consumers to use reusable bags, as well as help them to properly dispose of their plastic bags in order for them to be recycled.

2.2.4 Policy

While there is a lot of information available about the Dutch initiatives against plastic pollution, not much is written about the effectiveness of them. One of the initiatives is the Plastic Pact project from the Ministry of Infrastructure and Water Management (IenW). In collaboration with businesses, supermarkets, producers and other organisations, it focuses on the reduction of plastic waste production and expansion of reuse and recycling in 2025 for single-use plastics and packaging (Rijksoverheid, n.d.-a, para. 4). However, van Everdingen, et al. (2019, p. 46-47) state that despite the ambitious targets of the Plastic Pact, the production of plastic will not change and will still continue to grow 10% the next 10 years in the Netherlands.

Nonetheless, the Dutch Organisation for Economic Cooperation and Development (OECD) (n.d., p. 1-2) is very positive about the agreements made in the Netherlands, arguing that the flexibility and investment possibilities are attractive for companies. They argue that environmental agreements will work best with the policy mix of regulation/licensing and economic instruments.

2.3 What is the situation in Germany?

2.3.1 Recycling and Industry

Germany takes a number of measures to ensure proper recycling, which makes it one of the best at recycling among European countries (Hervey, 2018, para. 10). At the same time however, Germany exported 17.6 million metric tons of plastic waste to other countries between 1988 and 2016 in order to have it recycled there, as stated by EASAC (2020, p. 37). Germany introduced a five-point plan to reduce plastic waste, of which one point focuses on recycling. With this point, the German Government wants to change plastic recycling targets from 36% to 63% of total waste by 2022. Germany invested about 50 million euros in technology that removes plastic waste from oceans as well. Nevertheless, Germany's BDE federation for waste disposal, water and raw material businesses still called for more measures. The BDE Federation finds that the German Packaging Act is not enough to stimulate the reuse of the recycled plastics and to realize a circular economy (Deutsche Welle, 2018, para. 6, 10).

Moreover, Germany is known for its successful execution of the Deposit Return Scheme. EASAC (2020, p. 28) and Groth (2008, p. 15), writer for the Working Paper Series in Economics, both acknowledge that the system has proven to be useful in collecting waste that would otherwise be in the environment. However, after its implementation it received criticism for not doing what it was supposed to do, like banning environmentally harmful packaging and not promoting refillable bottles. Groth (2008, p. 15) argued that the DRS was flawed, mainly because in 2008, after only eleven years, the market share of refillable bottles already fell below the benchmark of 72%, and the DSD was, thus, unable to meet its most important target. EASAC (2020, p. 28) continues that the DRS currently covers materials such as plastic and aluminium, and that glass containers for water, beer and soft drinks bottles are covered as well, with PET bottles having a return rate of 99%. This is good news, but EASAC notes that the items that are not included in the system still cause environmental issues. Other issues occur when deposit fees are not collected and stay with the retailer. In addition, some stores have tried to limit returns to items purchased there, which is inconvenient for customers. Nonetheless, Stracke (2017, p. 29) of the London School of Economics and Political Science, notes that deposit schemes bring benefits that extend beyond environmental ones too, such as providing people of low-income with additional income by collecting and depositing containers and bottles.

2.3.2 Policy

While there are a lot of policies in place to combat single-use plastic packaging, most authors question the usefulness of these policies. Most plastic bags are seen as single-use items (BBC, 2019, para. 3). According to Xanthos and Walker (2017, p. 17), authors for the Marine Pollution Bulletin, in order to reduce the damage caused by single-use plastic bags, Germany adopted legislation that put a tax or a levy on plastic bags in 1991. Furthermore, the German Government made a voluntary agreement with 350 retailers to further limit the use of plastic bags. The size of the bag determines how much customers have to pay, which is between €0.05 and €0.50 per bag. An additional recycling tax must be paid by retailers providing plastic bags (Surfrider Foundation Europe, 2018, p. 16). The German media outlet Deutsche Welle (2019, para. 13-14), states that as of now, the German Government plans to ban single-use plastic carrier bags. However, Seas at Risk (2020, para. 27-28), wants the ban to include even more disposable plastics, such as cups and food containers. Additionally, the difference between disposable and reusable products needs to be explained to consumers and the latter needs to be promoted more. Moreover, stronger measures for producers are called for, to whom now only voluntary measures apply. Therefore, mandatory schemes need to be introduced in Germany, to make the producers pay the costs for cleaning up plastic waste.

2.3.3 Consumer behaviour

The German Federal Minister for the Environment, Nature Conservation and Nuclear Safety, Svenja Schulze, states that too much plastic is produced and used in the 'throwaway society'. Therefore, she encourages cleaning trash in the oceans and making plastic products more sustainable (Deutsche Welle, 2018, para. 5-6). Germany implemented some measures to combat its throwaway society. First, as mentioned by the Dutch Broadcasting Foundation NOS (2020, para. 6), Germany banned plastic cotton buds, straws, cutlery, plates, balloon sticks and food containers. Another measure came from the five-point plan, which encouraged people to separate their trash better to prevent plastic from mixing with organic waste (Deutsche Welle, 2018, para. 6). On the other hand, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2020, P. 10-11) states that from the beginning, people should opt for better quality products which can be repaired and are durable, rather than advocating for measures. People, organizations, and companies should inform themselves about the benefits of effective waste prevention and how they can reduce their waste. They argue that in a throwaway, society everyone needs to participate in the waste prevention process.

3. Conceptual framework

The research looks at the Netherlands and Germany, which are part of the European Union. As such, these Member States are subject to European law, which influences the policies in those countries. In order to answer the research question, it is important to know more about European policies on the topic of plastic, which is explained in this conceptual framework. The Packaging and Packaging Waste Directive, as well as the Waste Framework Directive are closely connected to a circular economy and are thus explained here.

3.1 Circular Economy

An important concept in combatting plastic pollution is that of a circular economy. As opposed to the linear model of 'take-make-waste', a circular economy refers to eliminating waste by designing a system where waste will be reused, as well as separating economic activity from the consumption of finite resources. It is based on three principles: designing out waste and pollution, reusing products and materials, and regenerating natural systems. This means that plastics do have a place in a circular economy, but only if they can be reused, for example. A circular economy strengthens economic, natural, and social capital, according to the Ellen MacArthur Foundation (n.d.-a, para. 1; See also Ellen MacArthur Foundation, n.d.-b, section 3,4), which focuses on inspiring and educating people about a circular economy.

3.2 Packaging and Packaging Waste Directive

Another impactful directive of the EU is the Packaging and Packaging Waste Directive (94/62/EC), which aims to harmonise national measures on the management of packaging and packaging waste. It also aims to prevent and reduce packaging and packaging waste in the environment, which the most recent amendment further promotes by reusing, recycling and recovering packaging waste. Through this directive, EU countries must increase reusable packaging on the market through systems such as deposit-return schemes, targets, incentives, and market requirements. The overall EU target has been set to at least 70% of packaging waste having to be recycled by 2030. For plastics, the target is set at 55%, also by 2030. Packaging present in EU countries must follow requirements, such as limiting the volume and weight of packaging, reducing the hazardous materials used for packaging and redesigning packaging to make it more reusable. In addition, Member States should provide and improve their disposable return systems for used packaging, as well as their recycling systems. Lastly, Extended Producer Responsibility schemes should be established by the end of 2024 for all packaging. This should promote the design of reusable and recyclable packaging, as well as minimise the environmental impact of packaging waste as mentioned by the European Parliament and Council (1994, pp. 12-15; See also European Parliament and Council, 2020, para. 1-14).

The Packaging and Packaging Waste Directive was amended in Directive 2015/720 to add specific measures on the consumption of plastic carrier bags, including information about biodegradable and compostable plastic bags. Member States shall reduce the consumption of lightweight plastic carrier bags with targets, economic instruments or marketing restrictions (European Parliament and Council, 2015, pp. 11-12).

3.3 Waste Framework Directive

The Directive 2008/98/EC on waste and repealing certain Directives lays down measures for waste management, for which the prevention and reduction of waste and its impacts on the environment and human health are key. These measures include:

- Improving resource use in order to make the transition to a European circular economy
- Extended producer responsibility on reuse, recycling and disposal
- Preventing waste by promoting sustainable production and consumption

The Directive also included new recycling and recovery targets, which aimed at preparing 50% of household waste materials and 70% of construction and demolition waste materials for recycling by 2020 (European Parliament and Council, 2008).

This Directive was amended in 2018 by Directive 2018/851 of the European Parliament and the Council. This amendment increases the 2020 targets and introduces new articles, which include general minimum requirements for extended producer responsibility schemes. It also increases previous measures on prevention, recovery, and disposal of waste (European Parliament and Council, 2018, pp. 124-128).

4. Methodology

This research analyses how the Netherlands and Germany can contribute to the reduction of plastic pollution. The dissertation consists of the following sub-questions: What is the European Union's approach to a circular economy? What is the Netherlands's approach to a circular economy? What is Germany's approach to a circular economy? What are the differences and similarities between Germany and the Netherlands?

4.1 Desk Research

Different types of data were needed to be able to answer these questions. Firstly, desk research in the form of primary and secondary data was done to answer these questions. The information gathered from the desk research is the basis of this dissertation. The primary data were acquired at the European Union, mainly by the European Commission, whose reports were used to help further explain the policies, directives and strategies created for a circular economy and plastic pollution.

The secondary data came from many different sources. Institutional sources came from EUR-Lex, such as press releases of the European Commission about their plastic waste and circular economy strategies. Information about the German Packaging Act and Circular economy Act came from the Federal Ministry of Ministry of Justice and Consumer Protection. In addition, the Dutch Central Government offered a letter of government about rules on plastic bags, as well as information about their circular economy programme.

Furthermore, web-based sources, such as news articles and websites of NGOs, were used. They are less reliable than the academic sources, but give great additional information. The websites of the Plastic Soup Foundation and the Seas at Risk organisation gave information about the decisions made against plastic pollution and about what the EU Member States are doing to help, for example. Additionally, journalistic sources were used from BBC, Deutsche Welle (DW), Packaging Insights and NOS, for example. Their articles discussed topics like the plastic ban in Europe and a circular economy.

However, academic sources were most often used for this research and were found in data bases. For this dissertation, articles and journals were sought that focused on anything plastic related, like waste, pollution, recycling, environment, as well as articles about the European Union, Germany and the Netherlands. On the databases of Wiley Online Library, Emeralds Insight and EBSCOhost, useful sources were found ranging from topics, such as biodegradable polymers and the new German Packaging law. On PiCarta, sources were available about plastic debris in the marine environment and relevant policies. Moreover, the Google Scholar database had many useful sources about European and German plastic and circular economy strategies. On SpringerLink a source discussed the effects of plastic pollution on animals. ScienceDirect had many journals, such as the Marine Pollution Bulletin, the Journal of Cleaner Production, Ecological Economics, Water Management and Resources, Conservation and Recycling. The articles from these journals focussed on plastic pollution, the recycling process of plastic, and policies and strategies. Furthermore, sources on Research Gate and the University of Wageningen focussed on the positives and negatives of plastic.

4.2 Field Research

Secondly, field research was included in the research and qualitative methods were chosen. Interviews with experts gave extended in-depth information about the current plastic problem and the strategies and laws that surround it. The information came directly from the source itself and are therefore primary data or 'raw data'. The reason that qualitative methods instead of quantitative methods were chosen, is because a survey collecting general information would not add anything to this research. Most people answering a survey would not have enough knowledge about this topic.

Possible interviewees were sought at certain organisations, companies and NGOs that focus on plastic pollution. Frans Timmermans, Svenja Schulze, and Stientje van Veldhoven were approached, but these options were too ambitious. Other possible interviewees were quickly sought at the EUregio Meuse-Rhine, Greenpeace, the OceanCleanup, Recycling netwerk, Surfrider Foundation. Furthermore, German organisations were contacted for a German perspective, like the Greenpeace Politische Vertretung, the Green Bauhaus Foundation and the Heinrich Böll Stiftung. The latter was chosen, because it specialises in the political side of the problem, of which more information was needed.

Most of the people and organisations mentioned above did not respond or were not available for an interview. In the end, three interviews were conducted in the first week of November. Firstly, Sjoerd Zoete, an employee of the EUregio Rijn-Waal was interviewed. He was chosen to distinguish the differences and similarities between the Netherlands and Germany. Secondly, a project manager of Circular Economy for Deutsche Umwelthilfe e.V. (*Environmental Action Germany*) was interviewed,

to get more information about plastic pollution and the circular economy in Germany. The last interviewee was Robert Möhring, a project manager of the World Clean Up day for the Plastic Soup Foundation. He gave more information on the current plastic issue and what the Netherlands is doing to reduce it.

A week before the interview, the interviewees received the informed consent form and the list with questions that are included in the appendices. During the interview extra questions were asked, as such it remained semi-structured. The interviews were conducted via Teams and lasted approximately 35-50 minutes. All interviewees were recorded with consent and afterwards the records were used for the transcriptions. The first interview was translated from Dutch to English.

4.3 Motivations and Limitations

The research includes circular economy strategies and relevant policies to combat plastic pollution of the EU, Germany and the Netherlands. The reason to focus on a circular economy was because a circular economy makes it possible to reduce and eventually eliminate plastic waste and pollution (Ellen MacArthur Foundation, n.d.-b, para. 4). The research compares and gives information about the circular economy strategies and other plastic related policies of the European Union, Germany and the Netherlands. In addition, other comparative research was done about Germany and the Netherlands and these countries were chosen for a few reasons. Within Europe, Germany is the largest producer, exporter and importer of plastics and the Netherlands is one of the main importers of German plastics (Filho, et al., 2019, p. 551). This makes both countries important stakeholders in overall plastic pollution reduction in Europe. Additionally, plastic waste does not stop at the border of one country, but can travel to other countries via rivers, for example. Therefore, when choosing Germany as part of this research, it was beneficial for the research to choose a country next to it. Thus, the Netherlands was chosen, because they not only share a border, but are also connected through rivers.

This dissertation sought to limit external factors as much as possible in order to have an objective conclusion from the comparative research conducted. However, both countries are Member States of the European Union and are, therefore, influenced by the European Union, which cannot be excluded from the research. The research compared the Netherlands and Germany as countries and on their circular economy approach. The disadvantage of this comparative research is that it is difficult to compare everything evenly. When comparing two countries there will always be a difference in size, population, GDP or political situation. Germany and the Netherlands are not of the same size geographically and the size of population also differs extremely. Therefore, when comparing the two, the amount of plastic produced, used and thrown away differs. Also, the budget

for a circular economy approach or plastic pollution strategies can influence the situation in both countries.

Moreover, during the research of this dissertation more limitations arose. Firstly, most of the sources that were found, were in English and in Dutch, which was not an issue. However, when focusing on Germany and its laws and regulations, German sources came up. This posed as a limitation to the research, because the researcher is unable to read German. Therefore, translated works were used, which could contain some translation mistakes or prejudices. Also, more international sources about Germany were sought to make up for the limitation caused by the language barrier. Secondly, there was not much information available about the heterogeneous differences between Germany and the Netherlands. Most often the sources compared Germany and the US or Sweden. Additionally, they focused on political, cultural or economic differences instead of focussing on a difference between dealing with plastic pollution. Therefore, the information about both countries was found separately in different sources. Additionally, there was also a limitation in the information available about the Dutch circular economy programme. Most information came from the Dutch Government itself and this could have given a biased view on the circular economy process and plans in the Netherlands.

5. Results

5.1 What is the European Union's approach to a circular economy?

The European Union has multiple policies covering the topic of plastic, for example on waste management and packaging (Penca, 2018, pp. 197-198). When it comes to plastic pollution, the solution is mainly found in their circular economy approach. The priority of the European Parliament is to minimise waste and increase the use of already consumed materials and resources (EASAC, 2020, p. 39). Therefore, it implemented the following major initiatives.

5.1.1 Closing the loop - An EU Action Plan for the Circular Economy

In 2015, the European Commission introduced 'Closing the loop - An EU Action Plan for the Circular Economy'. The goal of this action plan is to create legislative steps that Member States can implement which will eventually help convert the EU economy into a circular economy. It includes 54 actions that minimise waste and increase the value of products, resources and materials. Additionally, it also mentions plastic as a priority area, as well as its challenges that need to be solved in order to create an EU circular economy (Kerscher, 2019, pp. 50-51). The focus is on the entire economic life cycle, from production, consumption, repair and remanufacturing, to waste management and starting again with secondary raw materials. Moreover, the European Union presented four legislative proposals on waste with targets for 2030 and 2035 for landfill, reuse, and

recycling (Ellen MacArthur Foundation, 2020, pp. 2, 4). Furthermore, it presented the 'Directive to reduce the consumption of lightweight plastic bags', which made sure that plastic bags were not to be provided free of charge (Didelle & Haut, 2020, pp. 3-4).

5.1.2 The European Strategy for Plastics in a Circular Economy

In 2018, the Commission approved the 'European Strategy for Plastics in a Circular Economy'. It focuses on reducing plastic pollution by changing the way products are designed, produced, used and recycled, according to Simon et al. (2018, p. 16). The main goal of the strategy is to reduce the use of single-use plastics and microplastics in the packaging industry. It sets targets for all plastic packaging present on the EU market to be recyclable and to recycle more than half of plastics waste in Europe by 2030. Furthermore, 200.000 new jobs will be created as a result of increasing sorting and recycling capacity, as well as increasing growth of the secondary plastic market (Foschi & Bonoli, 2019, pp. 2-3).

The strategy will first change the packaging design to make it easier for plastic to be recycled. A standardised system for waste collecting and sorting will be developed by improving recycling facilities. Secondly, Member States need to raise awareness about reducing plastic waste, particularly on single-use plastics. In addition, labelling of biodegradable and compostable plastics will be established (European Commission, 2018-b, pp. 1-2). Thirdly, marine litter will be tackled by managing waste generated on ships on land rather than leaving it at sea (Simon et al., 2018, p. 16). Fourthly, Member States and businesses receive help from the Commission on how to minimise plastic waste at its source. Innovations to make the recycling and sorting process easier are supported financially with 100 million euros (European Commission, 2018-b, pp. 1-2). Lastly, the EU wants to be a role model for the world and works alongside other partners to find more solutions to reduce plastic pollution (Penca, 2018, p. 198).

5.1.3 Single-use Plastics Ban

In 2019, the EU implemented the 'Directive on the reduction of the impact of certain plastic products on the environment'. It introduced a Single-use Plastics Ban, for cutlery; plates; straws; cotton bud sticks; beverage stirrers; sticks to be attached to and to support balloons; food containers made of expanded polystyrene and products made from oxo-degradable plastic. The plan also includes consumption reductions on single-use plastics when there are no alternatives available. Furthermore, there is a collection target of 90% recycling for plastic bottles by 2029, with the requirement they should contain at least 25% recycled plastics by 2025. The directive incorporates the "polluter pays" principle for producers. As such, they have to pay for waste management clean-up, data-gathering and awareness raising on certain products, according to European Parliament and Council (2019-a,

pp. 8, 10-19; See also European Parliament and Council, 2019-b, para. 1-10). Interviewee Robert Möhring (Personal communication, 5 November 2020, appendix 7) continues that this principle will start from 2024 onwards, yet he wonders why it does not start in 2021. Lastly, Member States must raise consumer awareness of reusable alternatives and the impact of inappropriate disposal of waste, as mentioned by European Parliament and Council (2019-a, pp. 8, 10-19; See also European Parliament and Council, 2019-b, para. 1-10).

5.1.4 A new Circular Economy Action Plan

In 2020, one of the most recent plans of the European Commission was introduced, the 'Circular Economy Action Plan'. Together with economic actors, consumers, citizens and civil society organisations, it plans to establish a product policy framework that prioritises sustainable products, services and business models and aims to transform consumption patterns resulting in no waste being produced in the first place. Furthermore, there will be a focus on reducing waste and ensuring that the EU has a well-functioning internal market for high quality secondary raw materials. The EU will take more responsibility for its waste capacity, while minimising burdens on people and businesses (European Commission, 2020, pp. 2-3).

Within the Action Plan, topics such as waste export and plastic are highlighted. For waste export, action will be taken to stop the EU from exporting its waste to Third World countries. For plastics, it will introduce mandatory requirements for recycling and waste reduction measures for products, such as packaging and construction materials. Additionally, it will restrict added microplastics and tackle pellets by introducing a number of measures on the release and capturing of them (European Commission, 2020, pp. 8-10, 14, 15). However, as stated by the anonymous interviewee, the action plan does miss some concrete numbers, timelines and targets. This is crucial to the success of the plan, because without it every Member State could interpret this in many different ways (Personal communication, 4 November 2020, appendix 5).

5.2 How is the Netherlands working towards a circular economy?

In Europe, the Netherlands is 12th from all Member States in the circular economy ranking. Around 5.2 million euros are invested in innovation of circular economy sectors (Hervey, 2018, para. 8, 13). The Netherlands introduced many programs, agendas and agreements for the transition to a circular economy. It started with the 'Circular Dutch Economy by 2050' programme, which in turn resulted in the creation of the 'Raw Materials Agreement'. This agreement developed itself into 'five transition agendas', with the latest addition being the 'Implementation' programme (Rijksoverheid, n.d.-b, para. 3-6). However, the focus will be on the 'Circular Dutch Economy by 2050' programme, because

it can be considered as the base of all future programmes and plans mentioned before. In addition, it explains the general idea of how the Dutch Government wants to achieve a circular economy.

5.2.1 A Circular Dutch Economy by 2050?

In 2016, the switch to a circular economy officially started with the government-wide programme for a Circular Dutch Economy by 2050 (*Nederland circulair in 2050*). It connects goals of some smaller programmes of the Netherlands, such as the 'From waste to resource' programme, that focuses on the sustainable use of raw materials and on the transition of using biomass as a resource instead of fossil fuels. In addition, the Netherlands implemented this programme to adhere to the European policy agenda about a circular economy (Rijksoverheid, 2016, pp. 8-9). The main goal is to become a waste-free, circular economy in 2050. Before this can happen, there is another goal in 2030 that states that there has to be a 50% reduction in raw materials consumption (Rijksoverheid, 2016, p. 15). However, at the moment, the Netherlands is only at 24,5%, according to the Circularity Gap Report of the Circle Economy (2020, p. 6). As such, Brunt (2020, para. 17-22) states that a circular economy can help reduce CO2 emissions and expand the Dutch economy. However, the goals of the programme are very ambitious and many circular economy plans are not thoroughly discussed.

As claimed by the Dutch Government, the Dutch economy can be depicted as a reuse economy, in which many residual materials are recycled, repaired or reused, but waste is still present. Most waste is reused and the demand for raw materials is decreasing, but it is difficult to truly remove waste from the process. However, the Netherlands is still far away from a true circular economy, in which raw materials will continuously be reused and there will be no more waste. Therefore, this programme focuses on the conservation of natural capital, while using reusable or sustainably extracted resources and raw materials (Rijksoverheid, 2016, pp. 15, 17).

5.2.2 Strategic goals of the programme

As stated by Rijksoverheid (2016, pp. 15, 17, 19), three strategic goals are highlighted to accelerate the circular economy in the Netherlands. Firstly, make sure that within the production process, raw materials are used more efficiently to ensure fewer are needed. Secondly, when new raw materials are needed, sustainable renewable and available raw materials replace fossil fuels. This preserves the Dutch natural capital and make the Netherlands less dependent on fossil fuel resources. Lastly, develop new production methods and redesign products for a circular economy and make them reusable, such as packaging. Changing the Dutch economy will require the economic structure and the material flows to be altered by technical, social and system innovations. However, some

obstacles are present, such as current regulations not being made for the transition or a lack of knowledge, for example.

5.2.3 Interventions

Therefore, five interventions were introduced by the Dutch Government to eliminate the before mentioned obstacles, as well as to influence the transition. Firstly, stimulating legislation and regulations. The current regulations are still based on existing technology or on a linear economy; these will be removed, and new legal frameworks will be implemented that stimulate innovation, dynamism and investments, as mentioned by Brunt (2020, para. 16) and Rijksoverheid (2016, p. 25).

Another intervention is smart market incentives. It tackles market imperfections and stimulates the transition to a circular economy by targeted price incentives and regulations. The Environmental Investment Deduction and the Random Depreciation Environmental Investments have tax schemes that empower investments of environmentally friendly products and companies, for example. Furthermore, it aims to promote the demand for recyclates and bio-based materials, as well as to stimulate circular innovations and business models. This establishes the market for these types of raw materials. In addition, every subsidy that exists will be investigated to find out whether or not it aids a circular economy, according to Brunt (2020, para. 16) and Rijksoverheid (2016, p. 29).

Thirdly, financing is also an important intervention, because investing in circular products and services is different than investing in linear products. Also, knowledge about circular business models is lacking, so this demand needs to be fulfilled. In addition, more insight into a broader social cost-benefit distribution is needed (Rijksoverheid, 2016, p. 32). Moreover, another intervention promotes the exchange of knowledge and innovation. Therefore, all the collected information that aid the transition is made available. Additionally, future innovation is closely connected to the three strategic goals of the programme. While this programme helps create new jobs in the labour market, others might also disappear (Rijksoverheid, 2016, p. 33).

Lastly, international cooperation is necessary for the creation of a circular economy in the Netherlands. The world has to cope with growing population, climate change, as well as the growing scarcity of raw materials and food, for example. To manage this, a change in global production and consumption patterns is required. Therefore, international cooperation is critical, because raw material chains and waste flows do not limit themselves solely to the Netherlands. As such, for this intervention, three goals are key: Firstly, to create international conditions for a circular economy, such as legal and economic preconditions. Secondly, to strategically operate Dutch innovations and knowledge to gain a leadership position internationally. Lastly, to make knowledge and experience

about a circular economy available for other countries, as stated by the Dutch government (Rijksoverheid, 2016, pp. 38, 40).

5.2.4 Priority areas

Furthermore, the programme included five priority areas that require a change in approach for the transition. It includes biomass and food, plastics, manufacturing industry, construction and consumer goods (Circle Economy, 2020, p. 27). To apply this change approach in the future, strategic goals were created. Firstly, products need to be redesigned in order to become reusable and better recyclable. Secondly, plastic materials need to be used in an efficient way in order to reduce the need for raw materials and pollution. Lastly, plastic recycle and bio-based plastics need to be used as much as possible or otherwise biodegradable plastics. After the transition to a circular economy is complete, CO₂-emissions and plastic waste will be reduced to a minimum (Rijksoverheid, 2016, p. 53).

5.3 How is Germany working towards a circular economy?

In Europe, Germany is number one when it comes to a circular economy. It has a good recycling system and invests 28.7 million euros in innovation of circular economy sectors (Hervey, 2018, para. 8, 9, 13). Nonetheless, Germany still lacks an overarching, national circular economy strategy (Circular Economy Initiative Deutschland, n.d., para. 2-3). Therefore, the focus will be on the Packaging Act and the Circular Economy Act.

5.3.1 Packaging Act

In 2019, the 'Packaging Act' (*VerpackG*) came into effect and replaced the 'Packaging Ordinance' (*Verpackungsverordnung*) of 1991. The act made some definitions clearer and tightened some obligations (*Verpackungsgesetz*, n.d., para. 1, 5). Its goal is to reduce the impact of packaging waste on the environment (Bundesministerium der Justiz und für Verbraucherschutz und Bundesamt für Justiz [BMJV und BfJ], 2020-a, p. 1).

Firstly, this is done by regulating the parties involved in order to mainly avoid packaging waste, or otherwise prepare it for recycling or reuse. Beverage packing proved to be a large part of packaging waste, and therefore, the act aims to increase the share of beverages filled in reusable beverage packaging by setting a target at a returnable quota of 70%, as mentioned by BMJV und BfJ (2020-a, p. 1) and *Verpackungsgesetz* (n.d., para. 12). However, as stated by the anonymous interviewee (Personal communication, 4 November 2020, appendix 5) the quota for reusable bottles is currently stuck at 42%.

Secondly, BMJV und BfJ (2020-a, p. 4) add that the Packaging Act set a number of requirements for manufacturing and distributing packaging, which most importantly include:

- Minimising the environmental impact of reuse, recycling, other recovery and other forms of waste disposal;
- Minimising harmful substances and dangerous materials when disposing of packaging;
- Increasing the usability of packaging to a technically and economically achievable level.

Thirdly, a new single national authority was introduced called 'Zentrale Stelle', to which it is obligatory for packaging manufacturers to register. It creates more transparency and aids authorities with establishing a national packaging waste disposal system that is sustainable and eliminates competitive distortion, according to BMJV und BfJ (2020-a, pp. 5-7) and Verpackungsgesetz (n.d., para. 4, 6).

Fourthly, the waste recovery systems need to give priority to preparation for reuse or recycling of the collected packaging. If the waste is not recycled, it must be left to the responsible public waste disposal authority. It also sets higher recycling targets, obliging the waste recovery systems to prepare at least 65% of plastics for material recycling, starting in 2022 (BMJV und BfJ, 2020-a, p. 10).

Lastly, the Deposit Return Scheme (DRS) needs to be enforced. As EASAC (2020, p. 28) mentioned before the DRS covers most materials. The single-use containers have a deposit of 0.25 cents and the multiple-use containers have a lower deposit. However, juices and nectars, milk containers, as well as liquor and wine bottles are not included in the DRS system (Anonymous, personal communication, 4 November 2020, appendix 5). This will change since the mandatory deposit for beverage packaging has been extended and the system will include carbonated fruit and vegetable nectars as well as beverages with a milk product content of over 50% (Verpackungsgesetz, n.d., para. 12). While this deposit will ensure that beverage packaging will be returned, replacing single-use plastic products by other single-use products is not the option. Rather, the single-use products and throw-away mentality needs to be replaced by reuse (Anonymous, personal communication, 4 November 2020, appendix 5).

5.3.2 Circular Economy Act

In 2012, the 'Act Reorganizing the Law on Closed Cycle Management and Waste' or 'Circular Economy Act' (*Kreislaufwirtschaftsgesetz*) was transposed into German Law after the implementation EU Waste Directive of 2008 (Holland Circular Hotspot, n.d., para. 9). It replaced the 'Closed Substance Cycle and Waste Management Act' (*Kreislaufwirtschafts- und Abfallgesetz (KrW-*

/AbfG) of 1996 (Weber & Stuchtey, 2019, p. 21). It aims to prevent waste from damaging the environment and human health (BMJV und BfJ, 2020-b, p. 5).

Firstly, for waste management a five-tier waste hierarchy is important. The priority lies with preventing the creation of waste. If waste is created it needs to be prepared for re-use, recycling and energy recovery. Only after these steps comes the disposal of waste materials, according to BMJV und BfJ (2020-b, p. 11) and Nelles, Grünes and Morscheck (2016, p. 8). However, while the priority should start with prevention, German legislation only has targets for recycling. There are no waste prevention targets nor binding reuse targets (Anonymous, personal communication, 4 November 2020, appendix 5).

Secondly, BMJV und BfJ (2020-b, pp. 13-14) states that the act empowers the Federal Government to fulfil the requirements for a circular economy, which mainly includes:

- placing restrictions or banning wastes bound in or remaining in products;
- mandating requirements related to the separation, the transport, the storage and the mixing of waste;
- mandating requirements related to waste provision, gathering and collection.

Thirdly, developers, manufacturers, producers and retailers must follow the product responsibility principle. This requires them to design their products in a way that reduces waste, ensures waste recovery and makes it able to reuse them. Additionally, waste producers need to recover their waste and must follow the waste hierarchy and must prioritise recovery over disposal, as stated by BMJV und BfJ (2020-b, pp. 12, 21-22) and Ogunmakinde (2019, p. 6).

Lastly, the national waste prevention programme was extended to make the waste prevention policies available to the public in an understandable way. It gives information on waste prevention goals and current waste prevention measures. It was created by the Federation and the Federal States. If a Federal State does not wish to join, it has to create its own waste management plans, according to BMJV und BfJ (2020-b, pp. 27-31) and Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2020, p. 6).

5.4 What are the differences and similarities between Germany and the Netherlands?

5.4.1 Demographics

Germany and the Netherlands differ in demographics, such as in population size and language. Firstly, the German population consists of about 83.7 million people with a population density of 240 people per km² (Worldometer, 2020-a, para. 2, 7). In 2019, Germany had a GDP per capita of \$47,628

(Trading Economics, n.d.-a, para. 1). The Netherlands, on the other hand, has a population of about 17 million people with a population density of 507 people per km² (Worldometer, 2020-b, para. 2, 7). In 2019, the GDP per capita was \$55,690 (Trading Economics, n.d.-b, para. 1). Secondly, both countries speak a different language. In Germany, the official language is German, whereas in the Netherlands, the official and main language is Dutch, as mentioned by Rijksoverheid (n.d.-d, para. 1, 2) and Cultural Atlas (n.d.-b, para. 2). However, interviewee Sjoerd Zoete (Personal communication, November 3, 2020, appendix 3), states that most people that live near the border can still understand each other when speaking in dialect.

5.4.2 Government

Another difference between the two countries, is their form of government. Germany is a democratic, federal parliamentary republic that is governed under the constitution, the Basic law. The power is divided between the legislature, the judiciary and the executive branches. There is also a vertical division of power between the state as a whole (Federation) and the sixteen federal states (Länder). Through the Bundesrat the federal states participate in decisions taken by the Federation. It corresponds the interests of the federal states to the Federation and incorporates their political and administrative experience in the Federation's legislation and administration, according to the Bundesrat (n.d.-a, para. 1, 3, 8, 20) and Deutscher Bundestag (n.d., para. 1-6). The federal states are in charge of their own legislation when it comes to certain areas (Bundesrat, n.d.-b, para. 2). As such, they can define their own circular economy priorities. As a result, the developments and priorities of a circular economy differ in each federal state (Holland Circular Hotspot, n.d., para. 10).

The Netherlands is a constitutional monarchy, parliamentary democracy. The power is also divided between the legislative branch, the judicial branch and the executive branch. The legislative branch is fulfilled through the government and the States General. The government consists of the king and the ministers, as mentioned by Rijksoverheid (n.d.-c, para. 1-3) and Nwanazia (2018, para. 6, 7). The most important tasks of the States General or parliament are to make laws together with the government and to control the government when it executes laws. The parliament also represents the voters, as stated by Rijksoverheid (n.d.-c, para. 1-3) and Prodemos (n.d., para. 1, 3, 4, 11). The Netherlands is also a decentralised unitary state with three levels of government: national, provincial and municipal, as mentioned by Nwanazia (2018, para. 7) and Misachi (2017, para. 2).

5.4.3 Culture

Culturally both countries are very similar. Firstly, both countries have an individualist society, as such people focus more on themselves than on the collective (Hofstede Insights, n.d.-a, para. 5-6; See also Hofstede Insights, n.d.-b, para. 6). However, Germans are more considerate of the community in

regard to the structure and laws of society. Rules are important to ensure that order remains, and everything goes according to plan, as with recycling, for example (Expatrio, n.d., para. 4-5). Secondly, the two countries are both 'uncertainty avoidant': planning and preparing for uncertain situations is favoured, as claimed by Hofstede Insights (n.d.-a, para. 11; See also Hofstede Insights, n.d.-b, para. 10-11). For Germans, planning is crucial for success and for avoiding uncertainty. Everything gets analysed and goes according to protocol to ensure the best outcome (Cultural Atlas, n.d.-a, para. 2). Zoete (Personal communication, November 3, 2020, appendix 3) states that on the other hand, the Dutch will work first and plan later. This could lead to a standstill in the Netherlands, while in Germany the plan would be finished and implemented. Lastly, long term orientation involves whether a society holds on to the past or if the society is prominent to change when dealing with new challenges. Both countries are very pragmatic countries. As such, they are able to adapt itself to new situations (Hofstede Insights, n.d.-a, para. 12-13; See also Hofstede Insights, n.d.-b, para. 13).

5.4.4 Plastic

The Netherlands and Germany are both working to reduce plastic pollution and create a circular economy. Both countries are part of the European Union, as such they 'download' EU directives, regulations and institutional structures to a national level through a process called 'Europeanisation' (Howell, 2004, p. 1). The Dutch government-wide programme for a Circular Dutch Economy by 2050 downloaded this programme from European circular economy plans, for example (Rijksoverheid, 2016, pp. 8-9). Furthermore, the EU Waste Framework Directive, as well as the EU Packaging and Packaging Waste Directive were downloaded into German law, as well as the Circular Economy Act and the German Packaging Law, according to Holland Circular Hotspot (n.d., para. 9) and Bundesministerium der Justiz und für Verbraucherschutz und Bundesamt für Justiz (2020-a, p. 1).

It also works the other way around, in the form of Member States uploading to the EU (Howell, 2004, pp. 1, 6). Germany played a significant role in devising the EU Circular Economy Action Plan, and thus helped shape the narrative at an EU level, for example (Weber & Stuchtey, 2019, p. 163). However, there is a difference in the way they downloaded these EU initiatives. While the Netherlands introduced many programs, agendas and agreements over the years, Germany still lacks an overarching, national circular economy strategy, as mentioned by Circular Economy Initiative Deutschland (n.d., para. 2-3) and Rijksoverheid (n.d.-b, para. 3-6).

Nonetheless, both countries, more specifically the Euregions, have also cooperated to reduce plastic pollution, mostly focussing on the Rhine for the LIVES project; ten project partners of the Euregio Meuse-Rhine collaborate and analyse the current waste situation of the Rhine. They introduce and install new measures to reduce waste, such as awareness campaigns and plastic catchers.

Additionally, institutional arrangements are made to ensure the sustainability of the project (Interreg Euregio Maas-Rijn, n.d., para. 1).

6. Analysis

This dissertation seeks to answer the question of how the Netherlands and Germany can contribute to the reduction of plastic pollution. It discusses a circular economy to answer this question, because due to time constraints no other factor could be included in the research. This research is an addition to existing literature, but more research should be done to find a broader answer to the main research question, because if other factors were researched the outcome could differ. Therefore, the analysis is solely based on a circular economy.

The EU introduced applicable guidelines for a circular economy, as well as a single-use plastic ban for every Member State to follow. However, the results show that Germany and the Netherlands have a different implementation of those guidelines and make different choices to get a circular economy. Therefore, associated with these results some questions were raised.

6.1 The Netherlands and Germany

The first question is why the circular economy approach differs so much between the Netherlands and Germany. A possible explanation is that their form of government could have led to the difference in their circular economy approach. As stated by Bundesrat (n.d.-b, para 2) and Holland Circular Hotspot (n.d., para. 10), the German Federal States are in charge of their own circular economy legislation and prioritise different things. As such, packaging and waste are at the forefront of their legislation, for example. The Netherlands does not have the same system and therefore, can implement plans, legislation and initiatives for the entire country. As a result, a Circular Dutch Economy by 2050 needs to be implemented throughout the country in the same manner, as stated by Misachi (2017, para. 2) and Rijksoverheid (2016, pp. 8-9). Another explanation is that the newest Circular Economy Action Plan of the EU is perhaps too vague. As mentioned by the anonymous interviewee, concrete legislative suggestions, numbers, timelines and targets are missing. This means that the Netherlands and Germany could interpret this plan in different ways and end up with a different approach to put this plan into practice (Personal communication, 4 November 2020, appendix 5).

Moreover, the choices that Germany made concerning their approach to create a circular economy have led to Germany having the highest ranking of a circular economy in the European Union (Hervey, 2018, para. 8). This raised the question what caused the difference between Germany and the Netherlands in the ranking. Some possible explanations are: Firstly, Germany is a bigger country

with a bigger economy than the Netherlands (Trading Economics, n.d.-a, para. 1; See also Trading Economics, n.d.-b, para. 1). This made it possible for Germany to invest 28.7 million euros in innovation of circular economy sectors. The Netherlands invests 5.2 million euros, but also lacks the knowledge about circular business models, as mentioned by Hervey (2018, para. 8, 12) and Rijksoverheid (2016, p. 32).

Secondly, Germany has a proper recycling system with plastic recycling targets that will be expand in the future from 36% to 63% (Deutsche Welle, 2018, para. 6). The Netherlands on the other hand is still working on their recycling system, but has issues especially with plastic recycling (Rijksoverheid, 2016, pp. 53-54). In addition, this is also intertwined with a cultural explanation. While the Netherlands and Germany are both individualistic countries, the community is important in Germany in regard to the structure and laws of society. Recycling is one of the areas in which the community works together well to ensure order (Expatrio, n.d., para. 4-5).

Thirdly, another cause of the difference in ranking is explained by interviewee Sjoerd Zoete (Personal communication, 3 November 2020, appendix 3). He argues that the environment and climate are more important in Germany than in the Netherlands. This could be explained due to the fact that Germany has more rural landscape than the Netherlands and therefore, Germans would have more contact with their environment and nature. As such, they would be more conscious about the consequences of throwing something in the environment, for example. In the Netherlands, people find their money more important than the environment and would perhaps be less conscious of better options that would be more expensive, but better for the environment.

6.2 The Netherlands

The Netherlands implemented many programs, agendas and agreements to transition to a circular economy. The first official programme was the 'Circular Dutch Economy by 2050' programme that followed EU guidelines, according to the Dutch Government, Rijksoverheid (2016, pp. 8-9; See also Rijksoverheid, n.d.-b, para. 3-6). Nonetheless, with all these initiatives in place the Netherlands ended up 12th from all Member States in the circular economy ranking (Hervey, 2018, para. 8). Additionally, the transition to a circular economy is only completed for 24,5% in the Netherlands (Circle Economy, 2020, p. 6). As such, the question of why the Netherlands is behind with its circular economy despite all their initiatives was asked.

Firstly, this could be explained by their economy. Currently, the Dutch regulations are still based on existing technologies and a linear economy. In addition, the lack of knowledge makes that the regulations are not made for the transition to a circular economy. As also mentioned before, the

reason for the Netherlands being behind in the ranking could also have to do with their investment in innovation in circular economy areas. They invest 5.2 million euros, but perhaps more is needed and more knowledge about circular business models is also required, according to Hervey (2018, para. 8, 13) and Rijksoverheid (2016, p. 25, 32).

Secondly, cultural factors do play a part in this, as further elaborated by Zoete (Personal communication, November 3, 2020, appendix 3). Transitioning to a circular economy needs to be done collectively, as such it could be more difficult for an individualist society. Additionally, the Dutch are uncertainty avoidant, but they will start with work first and leave the plan for a later stadium. This causes them to eventually stop working and still having no plan. However, an issue like this needs to be planned out well and needs to be worked on continuously, as mentioned by Hofstede Insights (n.d.-a, para. 6, 11; See also Hofstede Insights, n.d.-b, para. 6, 11).

Thirdly, the Netherlands has issues with their recycling system as mentioned by Möhring (Personal communication, 5 November 2020, appendix 7). It is difficult to remove waste from the process and create a true circular economy. The recycling of plastics is difficult since there are many different types of plastic and recyclable plastic is still in development. Möhring emphasises that it will take a long time for the Netherlands to have a circular economy. Currently, there is no capacity for recycling, that is the reason for the years of exporting waste to other countries, such as China, Malaysia and Turkey.

Lastly, the reason that the Netherlands could be behind is because the implementation process is too slow and ineffective. Interviewee Robert Möhring (Personal communication, 5 November 2020, appendix 7) wonders why the 'extended producer responsibility' mentioned in the Single-Use Plastic Directive from the European Union will start from 2024. The Netherlands should start holding the producers responsible right now instead of waiting three more years. Moreover, the Dutch Deposit Return Scheme now only accepts plastic bottles. Since, 2001 there has been a continuous debate between supermarkets and the Dutch Government whether or not to include beverage cans. Now, there is a plan to include more items in the DRS in the future (Buurman, 2019, para. 2, 3). However, this will be implemented too late, because up until the time they will be included, they will still end up in the environment. According to the interviewee cans and bottles are the two most often found items during the Clean Rivers Project and World clean-up day (Robert Möhring, personal communication, 5 November 2020, appendix 7).

6.3 Germany

As was said before, Germany does not have an overarching, national circular economy plan (Circular Economy Initiative Deutschland, n.d.-b, para. 2). Therefore, in the results the German Packaging Act and Act Reorganizing the Law on Closed Cycle Management and Waste were examined. Germany's BDE federation for waste disposal, water and raw material businesses find that the German Packaging Act is not enough to reuse the recycled plastics and get a circular economy (Deutsche Welle, 2018, para. 10). As such, the question why Germany has not yet created an overarching, national circular economy plan came up. The possible explanations are:

Firstly, Germany focuses too much on recycling. In a circular economy, the five-tier waste hierarchy is important in waste recovery systems. They need to give priority to preventing the creation of waste and after that comes the preparation for reuse or recycling (Bundesministerium der Justiz und für Verbraucherschutz und Bundesamt für Justiz, 2020-b, p. 11). However, German legislation, as well as the EU legislation only has targets for recycling. There are no waste prevention targets nor binding reuse targets, which is what we need to create a circular economy. There is a reuse quota for beverage packaging of 70%, but it is not obligatory for any market operators and this leads to the quota not being fulfilled (Anonymous, personal communication, 4 November 2020, appendix 5).

Secondly, the Federation's legislation is influenced by the German Federal States. As such, if an overarching, national circular economy plan was in the works then the interests of the Federal States need to be taken into account. In addition, the Federal States are in charge of their own legislation for their own state. As a result, the implementation of such a national plan could be difficult, especially when certain Federal States do not agree or prioritise different things, as mentioned by Bundesrat (n.d.-b, para. 2) and Holland Circular Hotspot (n.d., para. 10). Moreover, the national waste prevention programme was created by the Federation and the Federal States. Nonetheless, the possibility of a Federal State not wanting to join this programme is possible and then different waste management plans still exist (Bundesministerium der Justiz und für Verbraucherschutz und Bundesamt für Justiz, 2020-b, p. 27-31).

Thirdly, the anonymous interviewee (Personal communication, 4 November 2020, appendix 5) also adds that the industry is misleading and postponing effective legislation. The industry, including plastic producers and retailers have introduced voluntary initiatives to reduce plastic waste, for example. However, what these initiatives do, is they mislead policy makers and consumers into thinking that the industry is doing something, which they are not.

Furthermore, in a five-point plan against plastic pollution, the German Environment Minister was going to have a round table with retailing industry to discuss voluntary ways prevention measures. However, nothing was published from this meeting and nothing came out of it, such as an agreement to reduce waste. In the opinion of the anonymous interviewee, this is what happens when you do voluntary agreements with the industry. It is more convenient and cheaper to continue doing the same things as before instead of changing to a different circular approach (Personal communication, 4 November 2020, appendix 5).

6.4 Deposit Return Scheme

The Netherlands and Germany both have a deposit return scheme. In Germany it covers items, like plastic, aluminium, as well as glass containers for water, beer and soft drinks. In the future, this will include carbonated fruit and vegetable nectars as well as beverages with a milk product content of over 50%, as stated in EASAC (2020, p. 28) and Verpackungsgesetz (n.d., para. 12). In the Netherlands, only plastic bottles are accepted, but in the coming years cans and bottles of less than 1L will also be included (Seas at Risk, 2020, para. 25). This raised the question to what extent it would contribute to the creation of a circular economy.

A circular economy is about eliminating waste by designing a system where it will be reused. In addition, economic activity needs to be separated from the consumption of finite resources (Ellen MacArthur Foundation, n.d.-a, para. 1). The Deposit Return Scheme can aid this process by collecting products and packaging in order for them to be reused or recycled. The domestic recycling process will be stimulated, and waste will be collected that could otherwise pollute the environment (RTL Nieuws, 2020, para 5). The anonymous interviewee (Personal communication, 4 November 2020, appendix 5) mentioned that while there is litter in Germany it is more so caused by items outside of the collecting system than the ones that are collected by the DRS. For example, the deposit machines would collect 2.7 to 2.9 billion packages annually instead of 1 billion packages (Buurman, 2019, para. 3). Furthermore, the Deposit Return Scheme, along with targets, incentives, and market requirements, makes it possible to increase the use of reusable packaging, which is indispensable in a circular economy (European Parliament and Council, 2020, para. 1-6).

7. Conclusion

This dissertation sought to find an answer for the question: **'How can the Netherlands and Germany contribute to the reduction of plastic pollution?'** To answer this question desk research was done and three interviews with experts were conducted. Based on this specific research the answer to the

central research question and thus, the best solution is that the Netherlands and Germany can contribute to the reduction of plastic pollution through the implementation of a circular economy.

This is the most suitable answer, because the implementation of a circular economy is able to improve and solve the four main causes of plastic pollution. The causes were found in recycling, consumer behaviour, industry and policy. To summarise, the European Union introduced the following four initiatives: 'An EU Action Plan for the Circular Economy', 'A European Strategy for Plastics in a Circular Economy', 'Single-use Plastics Ban' and 'A Circular Economy Action Plan', respectively. The Netherlands implemented multiple programmes, agendas and agreements, but the most important one remains the programme for 'a Circular Dutch Economy by 2050'. In Germany, the 'Packaging Act' and the 'Circular Economy Act' were important for the transition to a circular economy. In addition, in both countries the Deposit Return Scheme was executed. Furthermore, both countries differ in demographics, government and circular economy approach, they are similar in their culture and their interest in reducing plastic pollution.

With these initiatives of the EU, of the Netherlands and Germany, their recycling process will improve, and packaging and items will be redesigned to make them reusable. These initiatives will also aid consumers in changing their consumption patterns, for instance by making it harder to buy certain single-use products and using incentives to make them return used items. For the industry, they have to take more responsibility for their products and have to make sure their products are correctly disposed of. Additionally, the use of single-use plastics and microplastics are limited for the industry. Policy-wise, the EU action plan helps create legislative steps for Member States in order for them to convert into a circular economy. The Single-Use Plastic ban was also introduced, and the deposit return scheme will be extended in the Netherlands and Germany.

8. Recommendations

Based on the conclusion, the Netherlands and Germany and also the European Union should consider various things to aid the transition to a circular economy. Firstly, it is recommended to create more coherence in the EU and between all the Member States. To avoid difference in ambition and priorities, the EU should harmonize the policies and measures that Member States take. To increase the success of current targets, binding measures are preferred instead of voluntary agreements. Additionally, it is advisable that the national governments are involved more and work together.

Secondly, the Netherlands and Germany are recommended to increase their recycling capacity and to extend their Deposit Return Scheme. The waste hierarchy is important in a circular economy, as such the prevention of waste should be the priority. In addition, it is important to redesign products and packaging in order to increase the reusability and recyclability of a product. If more products are able to be recycled, then it is useful to have more recycling capacity, as well as high-quality recycling.

Lastly, it is advisable to have more financial support ready for the circular economy, so that the right systems and infrastructures can be established to create a reuse society. Financial incentives could be introduced, such as levies or taxes. In addition, a high tax on the use of new raw materials for the creation of plastic could increase the use of recycled plastic.

Furthermore, this research was relatively limited due to a lack of time and words. It is possible that other results could come out of this question if other factors were considered. As such, more research should be done on this topic and other solutions should be considered. Instead of researching the circular economy it could also focus on the plastic industry or alternatives of plastic, for example.

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10. Appendices

Appendix 1: European Studies Student Ethics Form

Your name: Meija Verkleij

Supervisor: Martijn Lak

Instructions/checklist

Before completing this form you should read the APA Ethics Code

(<http://www.apa.org/ethics/code/index.aspx>). If you are planning research with human subjects you should also look at the sample consent form available in the Final Project and Dissertation Guide.

- a. Read section 2 that your Supervisor will have to sign. Make sure that you cover all these issues in section 1.
- b. Complete sections 1 and, if you are using human subjects, section 2, of this form, and sign it.
- c. Ask your project Supervisor to read these sections (and the draft consent form if you have one) and sign the form.
- d. Always append this signed form as an appendix to your dissertation. This is a knock-out criterion; if not included the Final Project/Dissertation is awarded an NVD.

Section 1. Project Outline (to be completed by student)

- (i) **Title of Project:** Plastic Pollution Reduction in the Netherlands and Germany
- (ii) **Aims of project:** This research project aims to find out what Germany and the Netherlands can contribute to the reduction of plastic pollution. This includes finding out what the European Union does to reduce plastic pollution, comparing Germany and the Netherlands and mentioning problems that arise and offering new possible solutions.
- (iii) **Will you involve other people in your project – e.g. via formal or informal interviews, group discussions, questionnaires, internet surveys etc. (Note: if you are using data that has already been collected by another researcher – e.g. recordings or transcripts of conversations given to you by your Supervisor, you should answer ‘NO’ to this question.)**

YES

If no: you should now sign the statement below and return the form to your Supervisor. You have completed this form.

This project is not designed to include research with human subjects. I understand that I do not have ethical clearance to interview people (formally or informally) about the topic of my research, to carry out internet research (e.g. on chat rooms or discussion boards) or in any other way to use people as subjects in my research.

If yes: you should complete section 2 of this form.

Section 2 Complete this section only if you answered YES to question (iii) above.

- (i) **What will the participants have to do? (v. brief outline of procedure):**
Participants in this research project will have to answer questions for the interview. They will have to go online for the interview and will, if accepted, be recorded.
- (ii) **What sort of people will the participants be and how will they be recruited?**
The participants consist out of experts concerning plastic, the Netherlands and Germany. They will be recruited by searching organisations, companies or other entities that concern themselves with plastic, regulations concerning plastic in the Netherlands and Germany or the relationship between the two countries when discussing the pollution of plastic. On their websites contact will be sought-after with people interested and legitimate for an interview.
- (iii) **What sort stimuli or materials will your participants be exposed to, tick the appropriate boxes and then state what they are in the space below?**

Questionnaires[]; Pictures[]; Sounds []; Words[x]; Other[].
- (iv) **Consent:** Informed consent must be obtained for all participants before they take part in your project. By means of an informed consent form you should state what participants will be doing, drawing attention to anything they could conceivably object to subsequently. You should also state how they can withdraw from the study at any time and the measures you are taking to ensure the confidentiality of data. A standard informed consent form is available in the Dissertation Manual.
- (v) **What procedures will you follow in order to guarantee the confidentiality of participants' data?**
The data of the participants will not be shared with anyone else. The names in the transcript and in the dissertation, will be altered to anonymous, interviewee or another name, for example.

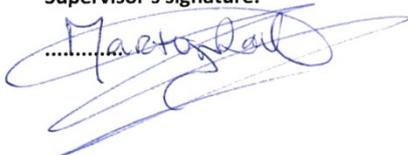
Student's signature:

date: 8-10-2020



Supervisor's signature:

date: 08-01-2021



Appendix 2: Informed Consent Form Interview 1



Informed Consent Form

Informed Consent Form

- 1) Research Project Title: Plastic Pollution Reduction in the Netherlands and Germany
- 2) Project Description (1 paragraph)

One of the most used materials for consumer products is plastic, because it is durable, lightweight, and inexpensive. In 2015, the world produced around 381 million tonnes of plastic. One third being single-use plastics, such as coffee cup lids, stirrers, or straws, as mentioned by Sigler (2014). Plastic is detrimental to the environment, because it will not biodegrade in nature, but will only become smaller and smaller (Sigler, 2014). Plastic can cause collisions, obstructions or abrasions and it can wrap around animals and trap them. In addition to that, it has entered the food chain, as seen with fish, turtles, cetaceans and birds. This will eventually show up in our food as well according to the Plastic Soup Foundation (n.d.) and Ritchie & Roser (2018).

Therefore, it is important to find out how the Netherlands and Germany can contribute to the reduction of plastic pollution. This dissertation will answer this by focusing on the European Union and its regulation. It will also focus on Germany and the Netherlands and their similarities and differences, as well as their problems. In addition to that, possible solutions will be given.

If you agree to take part in this study please read the following statement and sign this form.

I am 16 years of age or older.

I can confirm that I have read and understood the description and aims of this research. The researcher has answered all the questions that I had to my satisfaction.

I agree to the audio recording of my interview with the researcher.

I understand that the researcher offers me the following guarantees:

All information will be treated in the strictest confidence. My name will not be used in the study unless I give permission for it.

Recordings will be accessible only by the researcher. Unless otherwise agreed, anonymity will be ensured at all times. Pseudonyms will be used in the transcriptions.

I can ask for the recording to be stopped at any time and anything to be deleted from it.

I consent to take part in the research on the basis of the guarantees outlined above.

Name: Sjoerd Zoete

Signature:

Date: 03-11-2020

Appendix 3: Transcript Interview 1**I-1: Meija Verkleij****R-1: Sjoerd Zoete**

I-1: Could you please introduce yourself?

R-1: Yes, so my name is Sjoerd Zoete. I am a program manager at Interreg Netherlands-Germany. I do this through the organization EUregio Rhine-Waal, where I am appointed. For me, this primarily means that I am involved in the management and implementation of the Interreg subsidy program, in which Dutch and German organizations that work together can receive a cooperation subsidy from the EU.

I-1: Could you tell me more about the EUregio Rhine-Waal? What it does exactly?

R-1: The EUregio Rhine-Waal has existed for almost 50 years. It's mainly a partnership of approximately 60 Dutch and German municipalities. On the axis Düsseldorf, Duisburg, Arnhem, Nijmegen, Wageningen and there are also four EUregions along the Dutch-German border.

I-1: And the purpose of those EUregions is really about cooperation between those two countries?

R-1: No, it is not about cooperation between two countries. It's about cooperation between the municipalities, which, of course, come from two countries. It is primarily about the cooperation from below. If you want to change laws, you have to go to Berlin and the Hague, and we cannot do that and neither can our municipalities.

I-1: And what are some of the projects that EUregio Rhine-Waal carries out?

R-1: About 65% of the projects focus on the development of new products by collaborating companies, so products that make someone rich. Preferably two companies, a Dutch and a German, but there are possible more German ones. They mainly earn that money in Canada or Hong Kong. Then, economic cooperation comes first. The other part of the projects have more of a social focus. An example of four museums, two German and two Dutch. Who together rewrite regional history that occurred during and after the Second World War. With a common perspective, which is very different from the perspective of who is the good one and who is the bad one. This means that history is written from the eyes of the inhabitants of the region and not from the perspective of the general. The general will say that he won, but the resident will say that his house was shot to pieces.

I-1: Why would it be a good idea for the Netherlands and Germany to work together?

R-1: From an economic and social point of view, there is an advantage. Also, because many Dutch and German municipalities are neighbours. Simply summarized, you can drive from Nijmegen to Düsseldorf in 20 minutes by car. When you drive from Nijmegen to Amsterdam / The Hague, you have to drive for almost an hour. So, in that context it is not so strange to work together.

I-1: What can they learn from each other?

R-1: Learning from each other is not the primary goal, but doing something together. If one Dutch border municipality is going to install beautiful windmills on the outer edge of its municipality, ten centimetres from the border, a neighbour may suffer from this. Then you would expect it to be useful to agree on something about this, but regulations are usually not included. Those are the very simple examples.

I-1: Plastic does not stop at the border. Plastic waste from the Netherlands could end up in Germany. When have Germany and the Netherlands collaborated on the plastic pollution issue?

R-1: Of course, and then it is mainly about the Rhine. The Rhine is polluted with plastic that comes through Germany and then the Rhine brings the plastic to the Netherlands. You really share a problem there. However, from a purely local point of view, I don't see really see a problem. Empty bottles that are on the streets in Nijmegen do not bother us in Duisburg. The plastic pollution problem is present in the Rhine, but it largely takes place outside the perspective of the municipalities. In the Netherlands, it is primarily the Directorate-General for Public Works and Water Management (Rijkswaterstaat) that is responsible for this and in Germany it is primarily the Federal Government (Bundesregierung) in Berlin. Not the state governments of Rhine Westphalia and therefore not a municipality. You may suffer from it, but we are not the one to deal with it.

I-1: What are differences between Germany and the Netherlands when working together?

R-1: In a general sense there is of course a difference. Because they are two different systems and the further away from the border, the higher the difference becomes. If you are going to do something together, you will see that the systems do not fully connect, or law books do not connect. Even levels of government don't connect. They are familiar with the Rijkswaterstaat instrument in Germany, but Water Boards is something they have never heard of. That means that if a Dutch water board wants to make an agreement in Germany. That it must either go to Berlin or to all 40 municipalities along the river in Germany. There are other systems and other structures. Also, other institutions of government and policy.

There are also cultural differences. If you say jump to a German, he will say how high. If you say the same to a Dutch person, he will ask why? It's a bit of a simple example, but it does show the

difference. The Dutch often just start solving a problem and a German will first make a plan, which will take two years. That means that after a year and a half, those Dutch people start to wonder what they were doing again and after that, it may come to a standstill. The German has been working on his plan for a long time, but when he starts implementing it, he will continue, because the plan is already there. However, from a European perspective, there is not much difference between the Netherlands and Germany. We are more alike than as Dutch and Italians or Greeks.

I-1: So, if I understand correctly then from the German/Dutch perspective the two main areas in which we differ are in communication and in legislation?

R-1: Yes, and language. If you think about language, you would think Dutch and German. However, on average, the Dutch have a better command of English than German.

I-1: So, is communication at the EUregio mainly in English, German or Dutch?

R-1: No, here in the EUregio Rhine-Waal, in the border area there is a piece of the past that many people forget. That is that during the Second World War, large parts of the Netherlands, at the Dutch border, were German for hundreds of years. That, for example, in the city of Cleves, around 1850, Dutch the official language of the government was. That means that if you speak in dialect, everyone can understand you. This dialect is understood by people on both sides. So, at meetings in the EUregio Rhine-Waal, basically everyone speaks their own language. To prevent that everything will be in English. Then you could have the issue that one has mastered the language and the other has not. Then you know for sure that it will go wrong. The majority can at least understand the neighbour language and then you can communicate.

I-1: What are similarities between Germany and the Netherlands when working together?

R-1: What they share is the border. From a municipal perspective, for example, a German mayor has been elected and a Dutch mayor has been appointed. That means that a German mayor wants to score differently than a Dutch one. If you want to be mayor again next year, you will try to gain votes. A Dutch mayor is not elected, so he does not have to persuade the population.

Other similarities occur during collaboration. If you, as a Dutchman, start talking to a Greek, you assume that you both have a completely different perspective on life. If you talk to someone who lives 20 kilometres away, you assume that you have the same perspective on things. Things can go wrong there, so you get stuck in communication.

I-1: Okay so if I understand correctly, the things that are the same are also things that can cause problems?

R-1: Yes, for example, if there are problems with crime. It was very common until recently for the German police commissioner to want to discuss something with his colleague in the Netherlands. He would then ask, "who should I call?" Then we would say "you should call the mayor of Nijmegen, that's the head of the police." Then the German police commissioner would laugh and say that you misunderstood him. This means that in the Netherlands the mayor is in charge of the police and in Germany this is not the case. It always takes a while before you realize such things. They are just different systems, but at the same time we manage to have Dutch and German policemen patrolling with each other in a car at the border. It will all work out, but only after that first problem. From a human point of view, everything is much easier. Then it is disconnected from the systems.

I-1: What problems occur when working together?

R-1: The differences in politics. In the Netherlands we have an alderman, who is the municipal minister for a particular theme. We don't have that at all in Germany.

The Dutch also have the hobby that everything has to be renewed every four / five years, the faster the better. A Dutch municipal member also sits on the municipal council for an average of 7 years and in Germany a German one for 12 years.

Digitalisation can also be a problem. Dutch can do their tax return via the computer and in Germany you do it on paper. The Netherlands is at the forefront of digitalisation in Europe and Germany is the middle. When we have a meeting with 10 Dutch mayors and 10 German mayors, the Dutch all have a laptop with them. While the Germans are still walking around with piles of papers.

I-1: So, especially now with Corona you do see a difference digitally between the Germans and the Dutch?

R-1: Yes, the Dutch really have a head start. In the border regions it isn't too bad, but in large parts of Germany there is no cable connection. Some organizations in Germany also couldn't communicate digitally before Corona. Corona is a good example. One of the reasons that Germany is also lagging behind in collecting the Corona figures, is because the German GGD, the Gesundheitsämter, has to collect everything. However, some of the German Gesundheitsämter, are still behind with their fax. They have so many forms they want to fax to the central office that they can't do it within a day. In the Netherlands we already have a common digital central system.

I-1: You also said that Germans are generally faster with plans and finishing them. Is that also the case with the plastic problem?

R-1: Yes, because since 2003 you can pay a deposit on all cans and plastic bottles in Germany. I do not want to say that this is typically German. However, the environment and climate are more important in Germany than in the Netherlands.

I-1: Why do you think that in Germany the environment and climate are more important as in the Netherlands?

R-1: I think it partly has to do with the country in a physical sense. Germany has more rural areas than the Netherlands. The average person is more in contact with the environment and find it more important. Then when you look at the Netherlands, people find their wallets especially important. In addition, the privatization plan that has been drawn up in the Netherlands over the past 20 years, has not taken place in Germany. Germany is somewhat more collective than the Netherlands, where the individual is seen as more important.

I-1: Okay. So, in Germany the plastic problem is really seen as a collective problem and in the Netherlands, it is not?

R-1: Yes. I do suspect that sort of thing is behind it. In addition, there are also political choices that are made about it that make a difference.

I-1: How can we solve these problems and let Germany and the Netherlands work together?

R-1: The simplest solution, when taking the Rhine as an example. The more plastic the Germans throw into the river, the more plastic the Dutch will have to remove. At the moment, there is a first initiative, but nothing more than an initiative of the Rijn-IJssel water board to see whether they can come to a compromise together with German authorities to clean the Rhine from plastic waste. That's just a plan now, so it could take another year or two.

I-1: What else could Germany and the Netherlands do to solve the plastic pollution issue?

R-1: The same thing anyone in the world can do. That is also the big problem why there isn't really a joint approach. So, not using plastic is the solution. If you do your shopping, put it in a paper bag or in your own bag. The problem starts with individuals and their behaviour. If they change their behaviour, then producers realize that consumers no longer want plastic. Then they have to start earning money in a different way. The problem won't be solved with regulations, because that

mainly shifts the problem. The first thing we do when a rule comes up is to think about how we can get around it.

I-1: How do you think we could help people understand that they need to change their behaviour?

R-1: Possibly regulations could work, such as with a deposit with cans and bottles. You really see that difference when you walk down the street in Germany. In that sense there is a difference between the Netherlands and Germany. It should also work in the Netherlands. We have to look at Germany and see what works there and what doesn't and what would suit us. I think the deposit return scheme in the Netherlands certainly would do well.

I-1: Are there any other solutions to solve the plastic pollution issue?

R-1: Maybe look for all kinds of variants of drainage and collection nets that remove the plastic from rivers and oceans. However, it's not the real solution. The real solution is to use less plastic and change our behaviour. Then, the market will follow.

I-1: Could you sum up in a few sentences what you really think is the plastic problem?

R-1: Primarily, it's the throw-away culture, both for individuals and for companies. A normal Albert Heijn has two press installations behind its shop. This is the same in Germany by the way. One for cardboard and one for plastic, so that is where these simple things start. If we want to buy six bottles of cola, it will be in plastic bottles and wrapped in plastic. Those bottles are then also held together in the container by a whole layer of plastic. So, all those extra things in the industry just have to go.

Appendix 4: Informed Consent Form Interview 2

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APPLIED SCIENCES

Informed Consent Form

Informed Consent Form

1) Research Project Title: Plastic Pollution Reduction in the Netherlands and Germany

2) Project Description (1 paragraph)

One of the most used materials for consumer products is plastic, because it is durable, lightweight, and inexpensive. In 2015, the world produced around 381 million tonnes of plastic. One third being single-use plastics, such as coffee cup lids, stirrers, or straws, as mentioned by Sigler (2014). Plastic is detrimental to the environment, because it will not biodegrade in nature, but will only become smaller and smaller (Sigler, 2014). Plastic can cause collisions, obstructions or abrasions and it can wrap around animals and trap them. In addition to that, it has entered the food chain, as seen with fish, turtles, cetaceans and birds. This will eventually show up in our food as well according to the Plastic Soup Foundation (n.d.) and Ritchie & Roser (2018).

Therefore, it is important to find out how the Netherlands and Germany can contribute to the reduction of plastic pollution. This dissertation will answer this by focusing on the European Union and its regulation. It will also focus on Germany and the Netherlands and their similarities and differences, as well as their problems. In addition to that, possible solutions will be given.

If you agree to take part in this study please read the following statement and sign this form.

I am 16 years of age or older.

I can confirm that I have read and understood the description and aims of this research. The researcher has answered all the questions that I had to my satisfaction.

I agree to the audio recording of my interview with the researcher.

I understand that the researcher offers me the following guarantees:

All information will be treated in the strictest confidence. My name will not be used in the study unless I give permission for it.

Recordings will be accessible only by the researcher. Unless otherwise agreed, anonymity will be ensured at all times. Pseudonyms will be used in the transcriptions.

I can ask for the recording to be stopped at any time and anything to be deleted from it.

I consent to take part in the research on the basis of the guarantees outlined above.

Name: *Henriette Schneider*

Signature: *H.Schneider* Date: *8.12.2020*

Appendix 5: Transcript Interview 2**I-1: Meija Verkleij****R-1: Anonymous**

I-1: Could you please introduce yourself?

R-1: Yes, of course. So, I am _____ and I am a circular economy expert at Deutsche Umwelthilfe e.V. in Germany. I work at the Berlin office and have been working for the organisation for over 3 years now. I mainly focus on plastics, packaging and everything that has to do with waste and circular economy legislation at national and EU level.

I-1: Could you tell me more about the Deutsche Umwelthilfe e.V.?

R-1: Deutsche Umwelthilfe e.V is a Dutch is a consumer and environmental protection organization. The organization was founded in 1975 near Lake Constance in the South of Germany. We have two main offices and three smaller offices. At the moment, we have over 100 full-time employees and we work on many topics in the fields of nature conservation, consumer protection, traffic and air pollution, circular economy and energy and grid expansion. So, those are the main field we work in.

I-1: Could you tell me more about the plastic pollution problem in Germany?

R-1: Yes, of course. In Germany, last week the numbers were published of how much packaging we use, and it has risen again. So, it's at the highest it has ever been. Per capita we use in Germany 228 kilograms of packaging per year. So, this is a lot and we really are at the top when comparing every country in Europe. I think just Luxembourg is ahead of us, but we are really EU champions of service packaging waste production. I think we still produce 16 billion single use bottles per year. I have to verify that number, but I think that's the right number. Although we have in our packaging law a quota for reusable bottles of 70%, it is not fulfilled. So, at the moment it's at 42%, so there is still a huge gap. In the beverage segment and with other consumer packaging it's the same as in other countries, that there is just a lot of single use products.

I-1: And how can you really see that plastic pollution problem in Germany?

R-1: I mean with the introduction of the DRS on single use bottles mainly we eliminated a big factor of environmental pollution, because at least single use bottles and cans from most beverage types are now collected within the DRS. So, this is really something where we took the step a little earlier than other countries in 2003. That does not mean that there is no litter in Germany. In fact we have a lot of littering of, for example, single use cups, food containers, cutlery, bags and all the items you can expect to see basically in other countries as well. Plastic pollution is not just a littering issue, it is

also a climate problem, because single use packaging immense a lot more CO₂ emissions in the production and along the whole life cycle than reusable packaging or no packaging at all. We know this from studies that look at beverage packaging that refillable beverage packaging along the whole life cycle produces 50% less CO₂ compared to single use beverage packaging. I assume that this can be transferred to other packaging segments as well. So, it's a huge problem, also for the climate and we have to go towards a true circular economy. Also, for the benefits of the climate, but if you want to look at the littering specifically. Then in Germany we do have a littering problem that is more caused by, for example, cups and food containers than by beverage containers, because they are usually collected by the DRS.

I-1: So, the DRS system is actually very useful in Germany? That we should expand the system in the Netherlands as well?

R-1: Well, we also don't have everything included in the DRS system. We still don't include juices and nectars, or a milk or liquor or wine, for example. Typically juices and nectars are bottled in single use plastic bottles or in beverage cartons. So, this type of packaging can still be found, and this is still litter. However, for everything that has deposit on it, like for example, single use containers for water, for soft drinks, for beer, etc. it's really collected by the DRS.

I-1: Why do you think that those other products that could be included in the DRS aren't included? Is there a reason for that?

R-1: I mean there were several reasons for it, but in general we would say that not only the beverage packaging should be included in the DRS system. So, regardless of what type of beverage and what type of beverage packaging, because it really makes the legislation more complicated. At the moment, there is really no problem to collect, for example, juices and nectars via the DRS system. In the past there were some concerns that this packaging is going to disturb the recycling process of other PET bottles, but this problem really doesn't exist anymore. For example, Denmark also recently included juices and nectars into their DRS system. Also, in Germany we had a resolution by the federal states, that we urged the government to take steps to include juices and nectars into the DRS. So, at the moment there is really no reason that they still are excluded. We do think they will be included sooner or later.

I-1: Do you think the German policies in regard to plastic pollution are sufficient or should more be done?

R-1: We don't think that it's sufficient at all, because I don't know if you're aware, but in EU legislation as well as the German legislation the overarching principle really is the waste hierarchy. That states that waste prevention should be the top priority and then second priority we have reused and then we have recycling. Then come all the other possibilities like for example, incineration or landfilling, etcetera. So, we really have to start at the top of this hierarchy. However, at the moment neither in EU legislation nor national legislation are these priorities put into legislation in a binding way. So, we don't have waste prevention targets. We don't have binding reuse targets. This is really what we would need to really make a change towards a true circular economy. So, we need a waste prevention target that says okay we have to reduce our overall waste by X amount. We would suggest for example, a reduction of packaging waste by at least 50%. Another example is that, in Germany we have a reuse quota for beverage packaging of 70%. So, in theory 70% of beverages would have to be sold in refillable bottles. That means that they are taken back by reverse vending machines or manually, the same as the single use containers. However, they are then not destroyed and recycled, but they are refilled as they are and reused. This saves a lot of resources and energy compared to single use containers. Even if they are collected by the DRS. So, reuse is always the better option and as I said in Germany, we have this refillable quota of 70%. So, in theory 70% of the beverages have to be sold in refillable containers, but this quota is not obligatory for any market operators. So, it's not obligatory for retailers and it's not obligatory for producers, and this leads to this quota not really being fulfilled. So, at the moment in reality we're 41-42% and this is something that we really need to change in Germany. We need to make this quota obligatory or we need to introduce further measures, like a levy on single use containers. Then consumers have to pay, or retail has to pay 0.20 cents extra per single use container they sell. In Austria, at the moment, they're doing something similar. They are planning to introduce a levy, or they are planning to introduce a refill quota for retail. So, every retailer has to sell X number of beverages in refillable bottles and if the retailer does not fulfil this quota then this specific retailer has to pay a levy for every single use container they sell instead of refillable container. We expect this from Germany and the EU, that there are more and more refill quotas introduced or reuse quotas also for other packaging that are actually binding. Those are just two main aspects. For the DRS, like I already said, we really would suggest for Germany to include all single-use beverage containers, regardless of the type of container or beverage into the DRS system. Then there are several other points like for example, mandatory recycled content for certain product groups. Also, mandatory rules for public procurement that refillables and reusables have to have a priority in public procurement. Also, products that are used and products with the high recycled content. So, those are all things that should be regulated by legislation.

I-1: So, do you think that the problem is more with the consumers or more with the producers?

R-1: Yeah, in the end everybody has to contribute their part and that applies to policy makers, retailers, producers and also consumers. However, if the consumer doesn't even have the opportunity to act in an environmentally friendly way. Then we need measures that change this. Here we really see a lot of responsibility with retail and the industry, but they don't change things by themselves. There was this report where they kind of listed all the voluntary initiatives that have been put forward by retailers and by the industry or by the big plastic producers. It was about how they're just misleading and postponing effective legislation. That they are really misleading policy makers and consumers into thinking that the industry and retailers are already doing something and are already acting on the problem which in fact they are not. So, to make them kind of change their approach, we need effective policies. This is something that policymakers have to understand, is that the time of voluntary agreements is over. We really need binding measures like for example, waste prevention targets, like a plastic tax, like reuse targets. So, the responsibility is with everybody, but to get retailers and producers to act. We really need policy makers to force them to act. At the moment, they're not doing a lot. They need to pass binding measures. In Germany, we had an announcement by the environment minister, and she put forward a five-point plan against plastic pollution. One aspect of this five-point plan, was that she was going to have a round table with retailing industry to discuss voluntary ways prevention measures. We keep asking the ministry what happened, but in the end, nothing resulted from this round table. So, there was no agreement to reduce waste. It just kind of disappeared and now nobody really thinks about it anymore. This is what happens when you do voluntary agreements with the industry. It just kind of vanishes and you don't know where it went. So, we really need measures that everybody has to fulfill and that have sanctioning mechanisms. Then, if they are not fulfilled those sanctioning mechanisms enter into force like for example, in Austria with this levy.

I-1: You mentioned that retailers and industries are against these stricter regulations and why do you think that is?

R-1: I cannot answer the question for them. I can only guess, but I think it's obviously always more convenient to just keep doing the thing you're doing right. If you get away with it and consumers believe that you're doing something environmentally friendly or if policymakers believe you that you're going to change the way you act just because you give them false promises. Then it's a really easy way to behave and I think that is mostly the reason.

I-1: My next question was what else could Germany to reduce plastic pollution politically? However, I think you already answered that one. So, I am going to go to the next question, which is why would it be a good idea for the Netherlands and Germany to work together?

R-1: It is a good idea for everybody to work together to reduce plastic pollution. We have formed a big alliance of German NGO's, that are really pushing Germany to take a leading role within global plastics treaty. We think not even certain EU countries or the whole EU should work together. We need really a global approach. Why Germany and the Netherlands should work together... I mean you can always find pilot projects or look at the other countries approaches and see if something fits for you. I think cooperation is never a bad idea in this field.

I-1: So, It doesn't really matter which countries would work together?

R-1: What countries should do is try to find progressive approaches to fight plastic pollution. Also, at EU level really try to convince other governments to do the same thing. What many countries are doing right now is more look at what everyone else is doing and nobody's really doing anything. Then they're like well nobody else is doing this, so this won't work here. So, we really welcome initiatives like this new legislation in Austria or like Romania. There they have reused targets for all packaging segments. Those are really the front running approaches, that we need to make known and that need to be replicated in other countries. It doesn't matter which countries cooperate, the only thing that matters is that countries try to really act progressively. Also, try to look at for example, which progressive measures other countries are introducing and stop sticking to the bare minimum approach that would be I think our wish.

I-1: What can they learn from each other?

R-1: The DRS system, but also maybe go beyond the German approach. I think that Germany really has the biggest refill system for beverage packaging. Even if we're not happy with it here, because we think the quotas should be higher. It is really something that other EU member states could learn from us to go back to refillables and not rely so much on recycling.

I-1: Why is a circular economy important/useful?

R-1: It's a very wide field, but in the end it all comes down to this hierarchy that we have, where the top priority is prevention and then we reuse and then we have recycling. So, a true circular economy is one where a product has a really long life and can be easily repaired. Where it is also economically beneficial to repair them and not just buy new products and throw them away. A true circular economy is where there is no planned obsolescence. Like I said, if things break they can be repaired

and where there is for example, more models of sharing products etc. What also belongs to a circular economy is not as to go away from this linear approach also with packaging. So, avoid and reuse packaging. Why is all of this important? It's important, because it is really beneficial for the climate and it saves resources. Those are really big environmental issues and beyond that, we also see that there is a huge problem with plastic waste for example, in the oceans. This problem can also be solved by just having more reusable products and packaging. Also implementing efficient and effective collection systems. So, those are all good reasons to move toward a certain economy.

I-1: And do you think that plastics could belong in that circular economy? Or rather more alternative packaging?

R-1: Yeah this is where the discussion gets often very misleading and that's a pity, because the discussion is not about materials. It's really about is this a reusable product or a product with a long life or is it a single product with a very short life. So, it's not about replacing single-use plastic products with other single use product, such as paper or mixed between plastics and paper or bioplastics. Those are all not the solution. The solution is to move away from the single use and throw away mentality to reuse. So, in reuse systems a plastic has its place. When you look at Germany, we have glass reusable bottles, but we also have PET reusable bottles. In the equal balance both reusable bottle types have way better results than single use bottles. However, the PET bottles are even minimally better than the glass bottles. So, plastics definitely have a place in reusable packaging and also in products. I think it would be really hard to not use plastics. The focus should just be on moving away from the current single use approach and try to make products with a really good eco-design and reusable packaging. So, for products that are not packaging, it's will they be used for a long time. So, the conditions are for example, that they are able to be upgraded and repaired, etc. For packaging it's also not just about can it be reused, but it's also about ensuring that it will be reused. This you do by implementing a collection infrastructure and for example attaching a deposit amount. So, as a legislator you have to ensure that those products are reused, An example, if a fast food chain gives out, instead of single use food containers, they now start giving out single use food containers that are little thicker. Then they say those are reusable, the people won't come back next time with the same container and ask at the food company to fill in the food in this container. They will only do that if there is a deposit amount attached to the container, so that then they will come back because they obviously want their money back and hand in the container. Then, the next time they will get another container with their food in it and with paying deposit. This is what needs to happen, because otherwise we'll just end up with single use containers that are a little thicker, which are then thrown away at home. Then, we just waste more material than we do now.

I-1: Okay and how far is Germany with implementing a circular economy?

R-1: In theory, here we also have this waste hierarchy, like every EU country and legislation. However, we only really have targets for recycling like also every EU country has. We don't start at the top. So, one thing that we're really lacking is waste prevention targets, but this is also lacking at EU level. However, somebody has to be the one to do it first obviously. What we do have is this reuse target for beverage containers, but we need it also for transport packaging, for shipping packaging, for other consumer packaging etc.

I-1: So, what is your opinion on the European single-use ban?

R-1: I would always say that more should already have been done, but at least got increased awareness on this issue. The EU showed that it will act on this issue. I don't think this will be the last step in this process. So, it's a really good start and it's a really good sign, but what we now need is not only to tell countries what they're not supposed to do, but also what they are supposed to do. We already talked about replacing single use products with other single use products and this is really likely to happen at the moment with those bans. You will see single use straws from other materials, or single use plates from other materials. I'm pretty sure that some companies will even be so smart that they don't give out plates anymore with the food, because plates are banned. Then they start giving out containers that maybe look more like a bowl. That's the danger with this, that we don't have targets for what needs to be done. Those targets need to be introduced. That's the same thing I mentioned earlier, overall waste prevention targets. So, that single use plastic products are not replaced by other single products and its reused targets. So, for example, for the big fast food chains we have a target that they have to give out reusable food containers or reusable coffee cups. Just another example, is that it's really overdue as an obligation to give out reusable packaging and reusable cutlery. If a person consumes the food in the restaurant or café. So, this would be already one small step, but then we also need those targets for take away. Otherwise those systems cannot live on if policymakers don't support them. You need a whole infrastructure with those systems. You need to implement this take back structure and this needs political support.

I-1: What is your opinion on the European Circular Economy action plan?

R-1: I mean this action plan is really promising. We're really looking forward to the concrete legislative suggestions that the Commission will make based on this plan. What we're kind of missing are concrete numbers, concrete timelines and concrete targets. But, at first glance it looks really promising. We just have to see how it is put into practice and again the binding character really is everything. What happened in the single use plastic directive in the article we have a reduction or an

obligation of I think it's ambitious and sustained a reduction of plastic or single plastic container food containers and cups. But ambitious and sustain basically doesn't mean anything if there is no number attached to it. So, if you don't say we need a 40% reduction, or we need a 60% reduction. Then, in every country can interpret this the way they want. I mean the success of this provision is much smaller than if you would put a concrete and binding target to it. This is what we hope for with circular economy action plan. We know that commissioner Sinkevicius has great ambition to really make a change and move a bit further to a circular economy. But obviously everything the Commission suggests also has to be approved by the parliament and the council. Then debated between the parliament and the council. So, there's still a lot that could happen to weaken these concrete suggestions that the Commission makes. That is why we would really hope that they are as strong as possible already in the beginning.

I-1: What are other solutions that Germany could use in regard to the plastic pollution issue?

R-1: So, there's a lot. What you should do with the binding targets, is really financial support. As with most things in this field, such as also high-quality recycling. You need to build up a system capacity and infrastructure and for that they kind of need investment security. This is why binding quotas are so important, because that's the first step for startups, for companies and for the industry to know, OK this is going in this direction. So, we have to start working in this direction. The second thing that we really need is financial support. We see this for example, right now in Germany with the Covid crisis, that there's really no financial support for systems that already exists. We have really good systems for cups for big events, for example. But right now, there are no big events. These system providers are really in danger of just disappearing, because they don't get any support in these really hard times. There are new national recovery and resilience plans that are going to be elaborated right now, that basically our plans on how to spend the money from the recovery funds, that will be decided upon at EU level. So, there will be money to basically for economies to recover from on the Covid crisis. Those plans that are now being drafted, they set the tone of how this money is going to be spent. In those plans we really need governments to include, for example, reuse systems and the buildup of reuse infrastructures. Then, we need other physical and financial incentives, for example, a reduction of the VAT on reusable solutions. Or, like the city of Tübingen is doing, introducing a levy on single use containers for takeaway. So, for every container, let's say singles coffee cups or food containers, you have to pay 0.50 cents. This is really an incentive to give out more reusable containers. At the same time, this city is supporting people who are giving out reusable containers. For example, cafes, who were giving up reusable containers, are supported financially. If they for

example, have to buy a new dishwasher for it. So, all those kinds of financial instruments would also be really valuable in this whole fight for circular economy.

I-1: So, could you please explain once more what these financial instruments really focus on?

R-1: It always works in two ways. You can penalize the single use solutions, or you can really support the reasonable solution. So, you can for example raise a levy on single use, but you can also financially support the introduction of reuse. So, either of those ways of doing is fine and maybe there can also be a combination of approaches.

I-1: Okay, so could it also be possible that you use the levy, for example that money you use for financial support for other more sustainable options or a circular economy?

R-1: Definitely. That's a great suggestion and in fact something that we also suggest so that would be a great way of doing it.

I-1: I've read over the past couple weeks a lot about a German policies and the plastic pollution problem so could you perhaps in your own words make up two to three sentences like what is the main issue of this plastic pollution that like what's the biggest reason this exist was the problem .

R-1: Yeah, the problem of plastic pollution is that we are still following the single use and throw away mentality and we need to make a real shift towards true a circular economy, that focuses on ways prevention and reusable solution and sustainable products with good eco-design.

Appendix 6: Informed Consent Form Interview 3

Informed Consent Form**Informed Consent Form**

- 1) Research Project Title: Plastic Pollution Reduction in the Netherlands and Germany
- 2) Project Description (1 paragraph)

One of the most used materials for consumer products is plastic, because it is durable, lightweight, and inexpensive. In 2015, the world produced around 381 million tonnes of plastic. One third being single-use plastics, such as coffee cup lids, stirrers, or straws, as mentioned by Sigler (2014). Plastic is detrimental to the environment, because it will not biodegrade in nature, but will only become smaller and smaller (Sigler, 2014). Plastic can cause collisions, obstructions or abrasions and it can wrap around animals and trap them. In addition to that, it has entered the food chain, as seen with fish, turtles, cetaceans and birds. This will eventually show up in our food as well according to the Plastic Soup Foundation (n.d.) and Ritchie & Roser (2018).

Therefore, it is important to find out how the Netherlands and Germany can contribute to the reduction of plastic pollution. This dissertation will answer this by focusing on the European Union and its regulation. It will also focus on Germany and the Netherlands and their similarities and differences, as well as their problems. In addition to that, possible solutions will be given.

If you agree to take part in this study please read the following statement and sign this form.

I am 16 years of age or older.

I can confirm that I have read and understood the description and aims of this research. The researcher has answered all the questions that I had to my satisfaction.

I agree to the audio recording of my interview with the researcher.

I understand that the researcher offers me the following guarantees:

All information will be treated in the strictest confidence. My name will not be used in the study unless I give permission for it.

Recordings will be accessible only by the researcher. Unless otherwise agreed, anonymity will be ensured at all times. Pseudonyms will be used in the transcriptions.

I can ask for the recording to be stopped at any time and anything to be deleted from it.

I consent to take part in the research on the basis of the guarantees outlined above.

Name:

Robert Mächty

Signature:



Date:

10 nov. 2020

Appendix 7: Transcript Interview 3**I-1: Meija Verkleij****R-1: Robert Möhring**

I-1: Could you please introduce yourself?

R-1: Of course, my name is Robert Möhring and I work as a campaigner for the Plastic Soup Foundation.

I-1: Could you tell me more about the plastic pollution problem?

R-1: Yes, the organization was founded in 2001 by Maria Westerbos. She has been working in the TV production scene for quite some years and decided at some point to completely change her career path. She decided to stop the plastic pollution, because she was sick of all this madness of plastic trash on beaches, shores and all over the world. So, she decided to kind of take the initiative to fight plastic pollution. That's when basically the Plastic Soup Foundation was founded. We exist for nearly 10 years in February next year. So, we have a celebration then.

I-1: Why is this plastic issue important to solve?

R-1: What we've seen for years is that the plastic pollution is harming the environment. The soil is getting toxic, the air is full of plastic particles. In addition, our waters, our rivers and our oceans are full of plastic particles. It harms the environment, the nature, but it also harms the animals and the creatures who are living in ecosystems. It is also starting to get to the point that plastic pollution is harming our own health. So, the health of the people is at stake here. That's why we really think that we should act now and stop the plastic pollution with everything we can.

I-1: Do you think the European Union policies in regard to plastic pollution are sufficient or should more be done?

R-1: Well, that's a difficult question. Since the 50s we've had to deal with plastic. So, it was created around the 50s and from that point on the whole throw away living started. So, some plastic was being presented as this beautiful material. It is cheap, it is strong, and you can kind of produce it in all kinds of shapes and forms. Like hard products of plastics, but also the soft ones, stretchy ones. Whatever you want could be done with plastic. However, it also was used to create this throw-away living. So, throwaway cutlery, for example, was like a big thing. It was presented as the Holy Grail; you no longer need to wash your plates and your cutlery. You could just use a plastic one and after you finished you throw it away. Then your whole kitchen is still as clean as possible. That's when we

started to kind of lose the control of the plastic as a material, because it has been used in so many different ways. Look outside at the streets and at the shores of the River. Plastic is everywhere and it's getting more and more out of hand. So, I think for many years we haven't done enough to fight plastic pollution, but there is some good news. This Single-use Plastic Directive is on the table now in European Union. Which basically says that from the European Union we would like to have solutions and legislation to stop the plastic pollution. Mainly for the single use plastic items, which is most of the plastic production basically. Also, that all the member states of the European Union have to create this legislation in their own country, to ban certain products or to give more clear instructions on the packaging, how to throw it away or how to deal with it after you've been consuming it. I think that's it's a step ahead, but I think more should be done for sure.

I-1: Do you think the Dutch policies in regard to plastic pollution are sufficient or should more be done?

R-1: Well I think an annoying part is that for the last 16 to 18 years, we've had the discussion to invent a deposit scheme on plastic bottles and on drink containers. But the industry was very defensive about this, because they were not really into the deposit scheme, because it would cost them money. Those items had to be returned to the supermarket, so the supermarket was also a little bit while holding back all these kinds of things. So, there was a big lobby against the deposit scheme and we as Plastic Soup Foundation are very satisfied that a deposit scheme will be there in the Netherlands from July 1st, 2021. For bottles and it's almost sure that we will also have a deposit scheme on the cans/drinking containers from the summer of 2022. So, that's good news, but still until that moment the whole pollution of these bottles and cans in the environment will be increasing more and more. It's also why we find those two items, the cans and bottles, on the top lists of our research. One of the projects is called the Clean Rivers Project, where we monitor all the trash found on river shores. A lot of items of single use is the plastic bottle. It's the number one found item. On World clean-up day, the cans are number 3 at the moment. So, it shows that these items desperately need a solution to prevent them from ending up in the environment. So, the deposit scheme is the perfect system for that.

I-1: Do you think that if we have that deposit scheme that the problem won't shift itself to other materials?

R-1: Absolutely. I mean it's not only the bottles and cans. We also have a lot of different items, such as the food wrappers, the food packaging, the fast food stuff, the coffee cups. Which you have for on-the-go consumption. It looks like a paper one in most cases, but it has a plastic layer on the inside.

The same thing as when you have a plastic layer on the inside of a drinking container for cans. It looks like metal, but it's not only metal. It also has some plastic on the inside. So, yes, I think we can solve the bottles and the cans by using the deposit scheme. But still we have a lot of problems ahead of us with the wrapping and packaging of food, chips, plastic bags, coffee cups. It's a lot and we're not there yet. We're getting somewhere now, but still we need to fight for more alternatives for these plastic ways of packaging. Which nowadays always includes plastic, because plastic is very cheap and that's the main reason for producers to choose plastic. However, they are right for choosing plastic. It's a good material, because it makes sure that the food and drink inside can last longer. So, plastic is also somewhat good of course, for not spilling food. But when talking about pollution of the environment, it's horrible. Plastic is everywhere, when we go to the supermarket all these hallways are fully packed with products in plastic and a lot of them really don't need to be in plastic. Like avocado, for example, has a natural layer, but in the supermarket it's in a plastic cup with plastic foil over it. Then you go to the cashier and there you don't have a bag with you. So, you have to buy a plastic bag there. So, you have three plastic layers, while the product itself already has as a natural layer, which will never harm the environment. So, we are using so many foolish ways of packaging, which we don't need. There's a lot of ridiculous plastic. Bananas is also a good example. In a lot of supermarkets, you can buy bananas in a plastic bag, but since when do we need bananas wrapped in plastic bags or cucumber in a plastic foil. We don't need it, it's ridiculous. It's more convenient for the consumer and that's why a lot of these producers and these brands came up with these kinds of innovations. We of course understand that convenience is also worth something, but we have to be more aware of the impact of all those unnecessary plastic packaging for the environment. We know that a lot of plastic packaging, as soon as it ends up in the environment, that it's the biggest problem. The bigger items, they kind of fragment into smaller particles. So, a plastic bottle will last forever in the environment. It will breakdown in smaller particles, because of the sunlight, because of the water current, because of the wind. These factors make this plastic bottle become smaller pieces and those pieces can be so small that you will not be able to see it with your own eyes. Then, those particles will be eaten by birds and by animals. It will end up in our drinking water. We have to start worrying about what those plastics might do our health.

I-1: So, do you think that consumer behaviour is really something that should be changed?

R-1: Absolutely. That doesn't mean that we say that the responsibilities are at the consumer. We do think that's the producers have to come up with smarter and more sustainable ways of packaging their product. However, the consumer has a say in all of this, because when the consumer at some point says, it's enough, I don't want all these plastic in my life. Then, you choose for more sustainable

alternatives. Then, you can as a consumer can make a difference. The main thing that we do at Plastic Soup is that we gain awareness around the pollution of plastics. We are focusing on this is the problem, but how do we get to a solution. We aim to do that by putting pressure on politics for legislation on certain items, or getting in contact with those polluters and talking with them about alternatives, like paper. Can you think about that and what can you do with that, etc. So, we tried to stimulate them to choose for more sustainable packaging ways. To the consumers we say 'hey you have a lot of plastic items in your daily life, but we have an app which is called My Little Plastic Footprint'. It is basically your plastic diet app. So, everyone can download that app and you can put all the items on your diet, which is currently used by you and is plastic. This app provides you alternatives for straws, for example, for drinking containers, for coffee for on roads and whatever suits you. I think those kinds of products and those applications are very useful for consumers to know that these alternatives exist. Also, to give you this understanding how much plastic you are using in a week. So, start recording it for seven days, what plastic items we use on a daily basis and collect them, it's crazy.

I-1: Why is it difficult for the Netherlands to create a policy for plastic pollution?

R-1: Well, I think it's difficult, because I think in many cases it's like a money issue. I think a lot of producers are not really a fan of adapting their current way of producing products, into more sustainable ways of producing their products. I think their assumption is that it's more expensive than plastic. I also think in other cases, it will be more expensive. Those brands and those companies they are big, they have to earn a certain amount of money or certain turnover targets to achieve. So, of course, they try to keep their margins as high as possible to make as much profit as possible. So, we have to see how far our influence can get to letting those producers and those brands think, yeah, we really are harming the environment and we need to make a change in our way of producing products. I think they are the ones having the control over the situation. They can decide how to package a product. A consumer can't, the influence of a consumer is only about not buying products anymore, but that's where the power stops. I think the power is at the producer and they have to take responsibility for all the pollution we've seen in the past few years.

I-1: And do you think that policy can help with that?

R-1: Absolutely. I think a good example of legislation, which would definitely work is starting to use like a minimal share of recycled plastic in every packaging you create as a producer. So, for example, at this point the price of oil is very low. Plastic is produced with of shale gas and oil. So, when the price of oil is so cheap, plastic is cheap. The problem we are facing now is that the recycling of plastic

is more expensive than the production of new plastic. So, knowing that these companies really want to produce plastic and keep their margins as high as possible. They rather choose for virgin plastics, new plastics, because it's nicer. The colour is a little bit cleaner, it's stronger, it's new and it's cheaper. Why the hell would you even choose for recycled plastics. So, we think that legislation, saying that when you put a packaging product on the globe, then a certain share like 30%-40%, should be used by recycled plastic. So, you stimulate the recycling industry and you force those companies to no longer make 100% virgin plastic. So, then at some point, we can really create like a circular system. Where plastic from a bottle and goes through the converter and it makes new recycled plastic and it will become a bottle again. As soon as we achieve that for a lot of different products, then we can finally talk about a circular economy system.

I-1: So, do you think a circular economy would be beneficial for our country?

R-1: Yeah, but it's a long, long, long, long term in my opinion. It's not going to happen in the upcoming years. Also, because at this point in the Netherlands, we don't have the capacity for the recycling. So, even if you would want to recycle all the plastic materials we produce on a daily or weekly basis, we won't even be able to recycle it. So, first we have to make sure that the Secretary of State, Stientje van Veldhoven... She's been in this article of the NRC last week; it is very interesting. It's about exporting trash of the Netherlands to countries, such as Turkey. She's saying in that article that we don't have the capacity now to recycle all these plastics. So, we need to, at some point, get rid of it. Burning is one thing, which is not very environmental friendly. So, that's why we've been throwing it all to other countries, such as China, Malaysia, but also Turkey apparently. It's a mess, but I really think that in the future we can have a circular economy, more than we're having now.

I-1: What do you think are the biggest problems the Netherlands or your organisation are facing when fighting plastic pollution?

R-1: I think the biggest challenge is trying to actually reduce plastics and convince the producers and the companies to choose for alternative ways of packaging. I think that's the biggest challenge, because they don't really feel the need to change their current ways of producing. I think that's the biggest challenge. We need to find a way how we can convince them to actually say yes we have been doing it so wrong for many years and now we really want to make a change, we really want to see how we can avoid our plastics ending up in the environment. But they have to feel the urgency to change and I think that's the big challenge we're facing now. We always say that cleaning up all the trash is not the solution. It's a little bit like the Dutch saying 'Dweilen met de kraan open'. It's not going to change anything. I think we really have to make sure that these plastics don't even end up in

the environment. One way of fixing it, is choosing not for plastic, but for paper, because paper degrades in nature. So, it will not harm the ecosystems in the way that plastic does. So, I think that that will be a focus point to see, how can we get those producers to use paper rather than using plastic. Also, accepting that there will a little less profit then before.

I-1: Are producers difficult with this? Or are they willing to change?

R-1: Well some producers look at the life cycle assessment of the product. Like what kind of impact does the production of a product make and the transportation of the product. Until the point of when a consumer buys it. Then, the life cycle assessment, the LCA, is over. We believe that this life cycle assessment should also include the phase after the use by a consumer, because we see that a lot of items end up in the environment. And why is the impact on the environment not calculated in this life cycle assessment, because if we would do that, then plastic would be less interesting than paper, for example. So, that's the big challenge we're facing, that we want to have this life cycle assessment extended until the final phase.

I-1: So, is the polluter pays principle something that you find useful?

R-1: Absolutely. That's an interesting point, because I talked about the Single Use Plastic Directive from the European Union. One file in that Directive is called 'Extended Producer Responsibility'. So, it basically says that from 2024 producers can be held responsible for the costs involved by the pollution of their products in the environment. They are responsible for cleaning it up and kind of processing it into trash. So, I really think that will help, but the thing is that I don't want it to start in 2024. Why aren't they starting now? For 50 to 60 years a lot of big companies, such as Coca Cola and PepsiCo, they have been polluting our environment with all their products. All those years they were not held responsible enough. I think these kinds of ways of giving them responsibility and accountability is very good. We should have done it earlier.

I-1: Why is it difficult for the Netherlands to implement packaging deposit money (statiegeld) for more plastic items?

R-1: I think for a lot of parties involved in the deposit scheme the distribution is difficult. For example, Coca Cola produces this plastic bottle and it's being sold at supermarkets. A consumer buys it and from that point, as soon as someone paid for it, it's gone. It's no longer the responsibility of Coca Cola. They say the consumer should not throw it away in the environment, but yet we see it happen for many years. So, let's stop blaming the consumer for not throwing it away carefully enough. The reason their holding back is that at some point, when this Coca Cola bottle has to be returned to the

supermarket, the machine in the supermarket has to be adapted to also recollect these bottles. So, for the supermarket is a hassle and it will cost them money. However, for the brands as well, because they will be given back these plastic bottles, which consumers have been using. Then, they have to kind of process it again. So, it impacts their way of producing their drinking containers. I think they don't really like it this way and they don't feel the need to do it. It's a big deal and I'm happy it's coming now. I mean we have the deposit scheme from the summer next year on the bottles and 2022 for the cans. I really think that's a big win, because these were two of the five most found items on World Clean-up Day last September. Next year, maybe the year after, we will not find those items in such volumes again. That's a big win for sure.

I-1: What are some possible solutions that the Netherlands could use in regard to the plastic pollution issue?

R-1: I think a deposit scheme is a solution. I think focusing more on alternative ways of packaging. So, less plastic more paper or not even any packaging. A lot of vegetables and fruit don't have to be wrapped in plastic. So, I think that could be a big win. I think raising a tax for virgin plastics would also be of much help. So, we make plastic more expensive. So, other materials can compete more fairly with plastic, because now it's not even a competition, because of the low oil price. I think we have to facilitate more recycling capacity, so we are actually able to process all these plastics we have nowadays. Then see how to process it, so that we can reuse it again. I think that will be a big win.

I-1: And perhaps also better the labelling, so people know how to throw products away?

R-1: Yeah, because you have to know that there are thousands different types of plastic. So, all these types of plastics they have to be recycled in a different way. A PET, for example, is a type of plastic, which is very suitable for recycling. You can shred it; you can you can melt it and you can create new plastic balls out of it. However, a plastic foil, for example, which is often used in kitchens. Those are so fragile it will for sure burn. You're not even able to recycle it in a certain way. I think the biggest challenge is that all these plastics are different, build in different chemical ways. So, you cannot throw everything together into the recycling machine and have new plastics. We have thousands of different types of plastic, so let's reduce it to a list, which is acceptable, and we can actually realise to recycle it better. It's too difficult now.

I-1: What's your opinion on bioplastics?

R-1: It depends. Bioplastics aren't very developed yet. So, a lot of these bioplastics are being presented as 'it biodegrades', 'it's okay for nature', but a lot of the bioplastics they degrade only in

certain circumstances. So, when it's like at a certain temperature or certain humidity. So, at certain environments it degrades, but a lot of bioplastics don't degrade on our streets or in our parks or whatever. So, for me it's then, in many cases, the same kind of product as the regular plastics. So, you cannot throw it in your organic waste container, it's not possible.

I-1: Why would it be a good idea for the Netherlands and Germany to work together?

R-1: Good question. I think it's not only important for Germany, but also for other countries to share knowledge, to share experiences. In Germany the deposit scheme is in place for many years now and it has been a success. Maybe we could use their knowledge and their experience in convincing our own government to also have a deposit scheme. I also think that a lot of countries are also having organisations, such as the Plastic Soup Foundation. Who are focusing on awareness for the pollution of plastics, but are also, at the same time, working on solutions on how we get the trash out of the environment? Or, how can we use more innovative ways of packaging to avoid that these plastics even end up in the environment. I think plastic is also quite a new topic and nowadays you see plastic articles or items on TV or in newspapers on a daily basis. I think this is the moment to really make a change in the way we use plastic. I think we have to use the knowledge of the Germans to see what are they doing now and how can we apply it in the Netherlands. Also, the other way around of course, because we are a tiny country, but we have clever minds. We are very good in technical solutions, so I think we can also be of great help to them.

I-1: What can they learn from each other?

R-1: Difficult to say I mean we are now in a space that we are investigating what impact all these plastic particles have on our body. For example, probably the air you're breathing in now also includes plastic. So, we know that plastic ends up in our lungs or in our blood streams. So, we were investigating what does that do with our bodies. Does it attack our immune system, are you more vulnerable for viruses or for diseases? I don't want to be too arrogant, but I think we as the Plastic Soup Foundation are getting more and more understanding of what it actually does to our health. As soon as we have the information, I think we will be like a big important player for a lot of countries, who would like to see what it does to your body. Because if it affects the Netherlands, the Dutch people, it for sure also has an impact on the Philippines or the Germans or whatever. So, it's a global problem.

I-1: Why is World Clean-up Day so important in regard to this issue?

R-1: Yeah good question, because we say in our mission statement that cleaning up is not the solution, because it's 'dweilen met de kraan open'. But, if you're cleaning up and at the same time you are applying citizen science, which is basically collecting and registering all the trash you find along the way. So, you clean it up and you put it in the application called 'Litterati' and by doing so we get a clearer understanding of the plastic pollution in the Netherlands. So, we know what the most found items are and from which brands. With that information we can go to those companies saying 'hey guys we noticed that a lot of items came from your factory shall we find a solution? So, we can avoid your brand ending up on our top lists for the next World Clean-up day. So, to have a clear understanding what is the plastic pollution in terms of litter. Then we have to have events like the World Clean-up day, but we definitely need to keep on investigating all the litter we find. Now it is just one day, eventually we would like to have it all year long. Like everyday people going outside, going for a walk with the dog, going to the supermarket, clean up what you find and map it in the in the application.

I-1: Okay, it's not just a clean-up day. It really is more than that.

R-1: Yeah well, I think a good example is that last year in 2019 on World Clean-up day we've been able to gather like 78,000 unique items in the application Litterati. Redbull was the brand, which was tagged the most and also the cans were the most found item. So, our press release said that Redbull is the number one of World Clean-up day. Of course, Redbull didn't like that. We were kind of naming and shaming them. This year the results were again Red Bull on number one. So, now we were aiming to find solutions together with them, because they don't want to be mentioned in our press release and we don't want their cans to end up in the environment. So, we basically want the same and we have to see in those meetings with them how we can create this urgency at companies like Redbull. Them saying yeah, we don't want our can to be found in the middle of the streets everywhere, in the rivers or canals. We don't want that, it's bad for their brand as well. So, yeah, I think those events like World Clean-up day are very useful to address the real problem, which is being investigated by citizens. Thousands of people went outside to contribute to this registration and method. I think it's very impactful and I really hope that someday they realise that they cannot longer do it like this.

I-1: That's a smart way. It's also bad publicity for those companies.

R-1: Yeah, but it's basically step #1 and step #2 is ok now we know that you're on the top list and we see it every year. Then what are we going to do about it and that's where the challenges occur.

I-1: Do companies also come to you sometimes for help?

R-1: No that would be great. Then it would say that they do feel the need to want to change anything in the way of acting. However, we haven't had that since we started in 2001. Companies only react when they think they can no longer keep on doing it like we're doing it. So, we have to make a change, but if they respond they only respond, because we kind of put them on the on the naming and shaming platter.

I-1: Could you perhaps summarize the cause of plastic pollution problem?

R-1: I think, first, we have too many items wrapped in plastic. I think that's probably number one everything is in plastic, it's crazy. Secondly, from all these plastics, the main stuff is produced for single use. So, you use it one time, then throw it away and the product life cycle is dead. I think that's the main problem, we should have more products invented in reuse methods. So, for example, when you go outside and you have this metallic drink water container or glass, use that one. You can use it multiple times, it's not plastic, it's safe and you can use it for years. So, that could save so many of these plastic bottles. I think that's problem #2, that the main stuff is packed for single use purposes.

I-1: Okay, that was the interview thank you so much! Do perhaps want to add anything that we haven't discussed yet?

R-1: I think a very interesting topic is the source of all these plastics. I said before that the plastic is produced by using oil and shale gas. From those two ingredients you make plastic, but you have factories in the Netherlands and in Belgium. In the Rotterdam region, the Rotterdam Harbour, the port of Antwerp and also in Limburg, there are plastic producers allocated. So, we've been investigating as Plastic Soup Foundation, on how bad it is with the leakage of plastic nurdles. I don't know are you aware of nurdles or pallets?

I-1: Yes, I've read something about them.

R-1: I would recommend you have a look at the Nieuwsuur programme of the 16th of January. There our investigation was broadcasted. So, what we basically did is that we noticed during our Clean River Project, we have volunteers who investigate what they find on their 100-metre close to the river. We now have hundreds of volunteers having their own territory of the river. So, they found all these tiny plastic round bullets. It's really small, it could be like 5 millimetres, even smaller sometimes. So, they found all these plastic particles and those plastic particles are not items which has been fragmented from bigger pieces, but it is produced like this. So, the plastic producers they create these tiny little balls, but all these tiny little balls they leak as soon as the truck leaves the

territory gates from the producer factory. So, we've been investigating all these plastic producers in Rotterdam, in Antwerp and in Limburg, to see how bad it is with leaking those plastic balls. So, we have been mapping all these balls in a presentation, where you can see the Netherlands and Belgium, these factories and all the places we've been to. We've been taking samples and we've been shooting videos and photos. We called Nieuwsuur in January to let them know that this is bad. We fight the source as Plastic Soup Foundation, and you can't get closer to the source than we've done. So, these plastic balls are being transported to converters and at those converters they melt into those plastic balls into a plastic bottle or into toy stuff or a monitoring screen for your computer, for example. Then we notice that they were leaking it everywhere. All the producers were making a massive pollution mess right next to their gates and also in nature protected areas. So, we have a file and it shows clearly what is wrong with the production of plastic.

I-1: So, already at the production process these plastics pollute the planet?

R-1: Yes. Knowing that every plastic item we use started as these plastic round balls called 'pellets'. When it goes wrong in certain volumes, then you realise it goes wrong at the source. It's not even a plastic product yet, but it's leaking already, it's crazy. So, if it goes wrong at the source, that's problem number two. Then, it becomes a product, mostly single use, it ends up in the environment that problem number two. So, it's leaking in certain phases in the whole life cycle of plastic. When those plastic particles leak, it had no purpose yet. It never became a bottle or whatever. That's a disaster. In the "Nieuwsuur" item a professor was being interviewed, who has been investigating a certain type of bird. The bird had multiple plastic particles/nurdles in its body. So, birds see it as food, so they eat it and think their bellies are full of food. However, at the same time they are starving to death. It's really sad and it is one of the biggest cases we're facing right now.