

Waste Management in the European Union: A Case Study of Netherlands

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ABSTRACT

This Study aims to explore Waste Management Strategies in the European Union with examples of waste management implementation in Netherlands. In this study, Multidisciplinary approach was carried out where waste management would be linked to the commitment of Dutch political parties in carry out regional cooperation related to waste management. EU member states agreed to cooperated on the Waste Prevention Programme (WPP). This study used qualitative method with data sources from documents published by European Union and The Dutch government. In this Study, the concept of waste management was used. The findings of this study show that waste management in The European Union and its member states is carried out as an effort to achieve the sustainable Development Goals (SDGs). The results show that producers of goods produced in the European Union and their distributors are responsible for the abundance of waste from these products. Basic mechanisms of waste management in Europe, ranging from waste sorting, the use of renewable technology in waste management, and increasing recycling capacity. The conclusion that can be drawn from this study is the importance of waste management strategies for the European Union and its member states. In regional studies, social issues related to the environment such as waste management in Europe can be the subject of in-dept research that can be explored with a multidisciplinary approach and viewed from political perspective.

KEYWORDS



European Union; Netherlands; waste management; waste prevention program; Sustainable Development Goals.

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INTRODUCTION

The importance of waste management is related to efforts to reduce the impact of waste on the environment and health, and to encourage recycling of waste materials. The importance of implementing Sustainable Development Goals (SDGs), which are *Sustainable Development Goals* in the program created by the United Nations (UN), serves as a guide for all member countries to achieve sustainable development (Al-Fadhat & Savitri, 2023; Gambetta et al., 2021; K. K. R. Indonesia, 2017; S. Indonesia, 2015; McCowan, 2019; Wuaten, 2023). The SDGs were ratified through the UN General Assembly, agreed upon by 190 countries on 25 September 2015 in New York, United States, with a global development agenda spanning from 2015 to 2030 (UN, 2015). The SDGs cover various aspects of sustainability, from economic and social to environmental. The SDGs consist of 17 goals for the 2016–2030 period. In the SDGs, caring for the environment is important; therefore, it is necessary to continue efforts to preserve the environment, as well as to add challenges to ensure effective actions to protect the environment and its sustainability, especially the main target of minimizing the dangers of human-caused climate change related to waste.

There are a number of reasons why it is important to set significant goals for proper waste management in developed countries, and of course, this is greatly influenced by the country's political decisions. An important objective is to direct waste management towards recycling for reuse in accordance with the waste processing hierarchy, and to avoid the accumulation of waste at landfill sites. Waste processing is directed in one direction to help achieve sustainable development, but this will be very difficult to do due to the complex global situation, which is highly influenced by the political decisions of local governments and often

requires special efforts to support consistent progress towards common goals. Using global will encourages individuals, institutions, and governments around the world to agree on shared goals. The SDGs create shared responsibility, especially for waste management, which has broad environmental implications. By adopting the SDGs, every step taken by political leaders to eradicate the waste problem will always be a matter of debate, related to the programs being proposed and the effectiveness of the efforts to be made (Burger & Parker, 2022; Fatimah et al., 2020; Kopnina, 2020; Tahir et al., 2024).

It is important to discuss the issue of waste management by linking and involving parties with the same goals, including a network of expertise, knowledge, and environmentally caring communities, to overcome the difficulties of sustainable development related to waste management. The important role of these parties will be to encourage the realization of common goals by jointly solving waste problems based on knowledge and experience, to jointly formulate recommendations for practical ways to achieve the most optimal results. The importance of political decisions regarding waste processing lies in their ability to mobilize a network of stakeholders, including community leaders, politicians, ministries, the scientific community, leading non-governmental organizations, religious groups, international institutions, donor agencies, and foundations, all of whom will be encouraged to join in a common goal of good waste management. Through this multi-stakeholder process, success really depends on the government's political policies determined through general elections to overcome complex challenges in sustainable development efforts to handle waste as a measure to protect the environment [L1].

This study reviews various literature on waste management and the electoral process in the Netherlands. Key references include Garnett et al. (2017), who emphasize public participation in waste management decision-making, and Campitelli et al. (2023), who propose a holistic approach to assess waste systems for a circular economy. Malek et al. (2023) analyze the impact of waste policies in Europe, while Ma et al. (2023) develop a classification framework for urban waste policies in China. Kannan et al. (2024) introduce *Smart Waste Management 4.0*, integrating modern technology for efficient waste control.

On electoral politics, Agranov et al. (2018) and Bali et al. (2020) explore voter motivations, such as altruism, duty, and social belonging. Meanwhile, Annema & van Wee (2008) assess the environmental impact of Dutch election manifestos, helping parties design realistic policies. These studies provide comparative insights to refine research on waste management and political processes. This study aims to explore waste management strategies in the European Union, with examples of waste management implementation in the Netherlands. In this study, a multidisciplinary approach was carried out, where waste management is linked to the commitment of Dutch political parties to carry out regional cooperation related to waste management. EU member states agreed to cooperate on the Waste Prevention Programme (*WPP*).

METHOD

This study aims to explore the waste management strategy in the European Union, with the example of implementing waste management in the Netherlands. A multidisciplinary approach is employed, where waste management is linked to the commitment of Dutch political

parties to regional cooperation regarding waste management. EU member countries agreed to cooperate in the Waste Prevention Programme (*WPP*). A qualitative method is used, with data sources drawn from documents published by the European Union and the Dutch government. This multidisciplinary approach requires a simultaneous bridge between various scientific disciplines, addressing the development of sustainability towards political development in the Netherlands as a research topic.

This methodological model links political democracy with waste management policy in the Netherlands. Methodologically, the research question can be formulated as follows: What is the correlation between general elections and waste management in the Netherlands? This political process is sensitive to phenomena that may become policies in the environmental sector related to waste management. The approach applied here links democratic theory with innovation theory and employs exploratory methodological means. Innovation is considered essential to the economy, and higher education also appears to be organically connected to economic growth and innovation capabilities. In the context of the analysis here, democracy and ecology are integrated as important components for a fairly comprehensive understanding of innovation.

In this research, the problem formulation can be stated as: How is political freedom related to environmental sustainability, and what is the correlation between political freedom and environmental performance? This problem formulation was determined to answer the general description of waste management in the European Union, with an explanation of a case study of the Netherlands. This study uses a qualitative method with data sources from documents published by the European Union and the Dutch government.

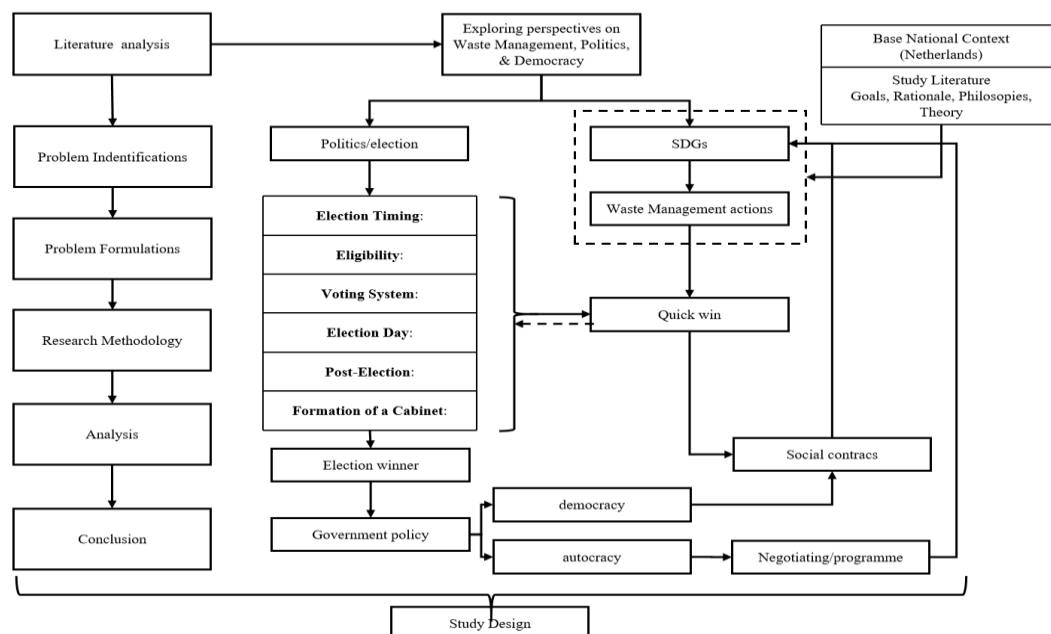


Figure 1. Methodology Scheme

RESULT AND DISCUSSION

The social contract in relation to democracy and the environment

At this stage, the results of the analysis from an SDGs perspective and a political process perspective are related to the role of parties in elections. From an SDGs perspective with waste management and waste prevention programs as well as a political perspective related to the social contract in relation to democracy and the environment. In the implementation of the Dutch political party, there were six dynamics faced which made it possible to voice the content of SDGs and waste management as a social promise that could increase electoral figures.

The electoral timing aspect talks about the time it will be implemented for four years, this makes it very possible for the elected government to make careful planning regarding waste management action plans and waste prevention programs. The eligibility aspect relates to voters aged 18 years and over who certainly have sufficient understanding of waste management and Dutch involvement in the waste prevention program.

Aspects of the voting system, where the party list proportional representation system uses proportional representation as part of the general election where candidates are selected based on their position on the election list. This party list system is influenced by several things, including: the level of proportion of representatives, party system, representative institutions, the relationship between representatives and voters, vote counting methods, thresholds, regulations and legislation, social and demographic factors, the legal system and political dynamics. Of the several things that influence the party list proportional system, things related to the relationship between representatives and voters become their own dynamics when waste management becomes a program that can attract voters' sympathy, in open elections voters determine democratically elected representatives who consistently encourage waste prevention programs and care about the environment. Election day and post-election, when this event takes place when voting starts, the swing voter target is the best target of the supporting party and the SDGs program is one of the standard choices. And when representatives do not respond to the SDGs, the potential for swing voters will occur. In the Dutch elections there were two parties with sustainability and environmental platforms, namely Patai GroenLinkks (GL) and Partij Voor Didren (PvdD). Regarding the formation of cabinet, when a new cabinet is formed negotiations between parties become prominent regarding SDGs and the environment.

The realization of policies as implementation of the social contract

The realization of policies as implementation of the social contract in Dutch politics related to waste management includes: achieving the objectives of the waste management program. policy on food waste, measuring per capita waste, supply chain collaboration, campaigning and facilitating and reporting to parliament, as well as voucher schemes. Politics and waste management are interrelated in several ways, namely regarding Policy and Legislation, where politics has the power to make laws and regulations in accordance with community needs. The party that wins the election has the authority to lead the implementation of regulations and political will to implement every policy, including waste management. Policies can be described in several ways, including:

Establishing a framework, national, state and local governments create policies and laws that determine how waste management is also related to SDGs. Waste hierarchy Policies often prioritize waste reduction, reuse, recycling, and composting before using landfills or incineration. Regulations when the Government establishes regulations for the collection,

transportation, processing and disposal of waste. This includes emission standards, pollution control and environmental protection. Funding, the government budget allocates funds for waste management infrastructure, programs and research.

Objectives and indicators of waste handling

Municipal Waste Management in the Netherlands has long preceded EU policy in waste management and has influenced European policy in Waste Management (LAP, 2009). The waste data for the Netherlands from 2013 to 2023 shows a trend of waste prevention and management efforts. Here are some key points based on the available information: Municipal Solid Waste (MSW): The generation of MSW per capita decreased steadily from 599 kg in 2004 to 508 kg in 2019. A peak was reached in 2007, at 606 kg per capita, after which the decreasing trend continued. Total Waste Generation: Between 2010 and 2014, total waste generation in the Netherlands decreased, followed by an increasing trend after 2016. However, the Netherlands does not seem to be on track to completely decouple total waste generation from economic growth, although a partial decoupling has been achieved since 2018. Waste Prevention Program: The first Dutch Waste Prevention Program (WPP) came into force in 2013, which may partially explain the decreasing trend in waste generation from 2013 onwards

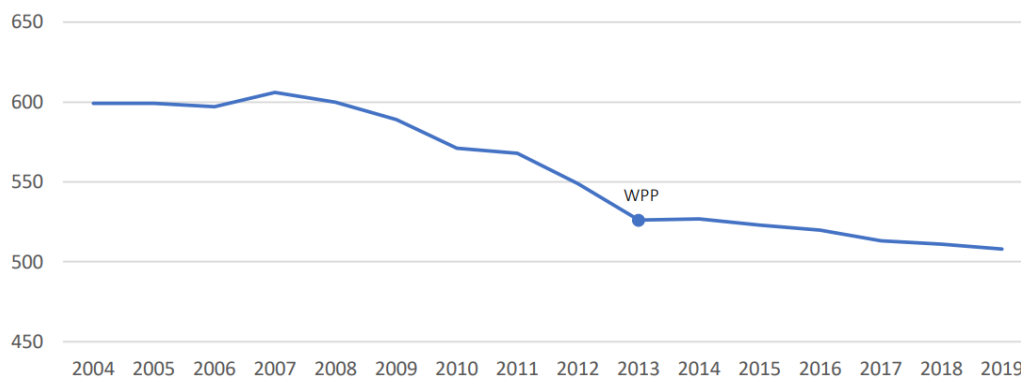


Figure 2. Municipal waste generation in the Netherlands (kg per capita), 2004-2019

Source: Eurostat, Circular Economy

Total waste generation in the Netherlands decreased between 2010 and 2014 and followed an increasing trend after 2016 (Figure 2). A different trend can be observed for the Netherlands GDP, which increased unequally between 2010 and 2018. Although a longer time series is needed to confirm any conclusions on decoupling, the Netherlands does not seem to be on track to completely decouple total waste generation from economic growth, although a partial decoupling has been achieved since 2018. A link between waste generation and population growth, which has increased slightly, cannot be observed. In contrast to MSW, the measures within the Netherlands' first WPP, which were implemented in 2013, resulted in a slight increase in total waste generation

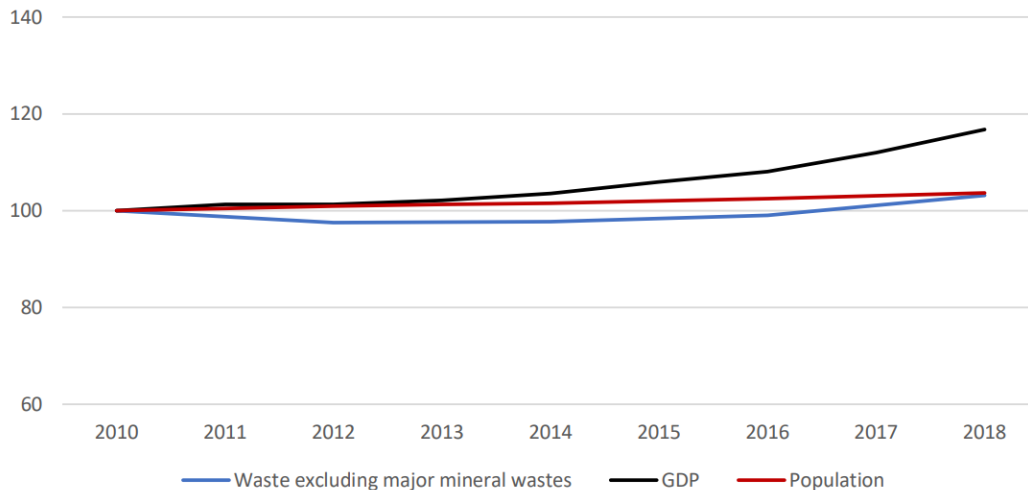


Figure 3. Development of waste intensity, Netherlands, 2010-2018 (2010 = 100)
Source: Eurostat, Circular Economy

Data from the last 10 years shows that the increasing level of consumption is not accompanied by the availability of space and actually contributes to environmental damage, so the Dutch government is taking anticipatory action by reducing waste disposal. Regarding waste management in the Netherlands which was influenced by political decisions, it occurred in 1979, where the proposed program was approved by the Dutch Lower House as the Lansnik Ladder (NL, 2008). Political events related to waste management in the Netherlands also included the inclusion in Dutch law in 1994 of the European Waste Framework Directive regarding waste hierarchy. The Waste Hierarchy uses limits to avoid waste, recover valuable raw materials from waste, generate energy from remaining waste and finally landfill the rest in an environmentally friendly manner. (NL, 2008).

Responsibility for waste management was centralized by the Netherlands in 1997 by transferring responsibility from the provincial level to the central government through amendments to the Environmental Management Law in 2002. The Ministry of Housing, Spatial Planning and the Environment prepares the Waste Management Plan every six years, which is outlined in the Plan National Waste Management which started in 2002-2012 (LAP, 2003) and took effect in early 2003 and was reviewed in 2009. Subsequently, it produced a National Waste Management Plan for the following period which was valid for the period 2009 to 2015 (LAP, 2009). The second period of the National Waste Management Plan from 2016 to 2021 is intended to limit the growth of waste generation by paying attention to economic growth and reducing environmental impacts through recovery through reuse.

Calculate waste per capita

In several policy documents, the Dutch government has confirmed its commitment to halving per capita food waste at the retail and consumer level by 2030. What effect the government's political policies regarding the environment have can be seen from several existing data. Data in 2018 shows that food waste per capita is between 96 kilograms and 149 kilograms, with an average food waste per capita of 123 kilograms, so that the total amount of food waste decreases by an average of 6 kilograms per capita per year.

Monitoring of household food waste in the Netherlands is carried out every 3 years. Since the first monitoring was carried out in 2010, there has been a decline of 29%. In 2010, there was 48 kilograms of food wasted per person, decreasing to 41.2 kilograms in 2016 and to 34.3 kilograms in 2019.

Table 3. Wasted food

Years	Year Food Wasted Per Person(Kg)	Description
2010	48	significant reduction in the amount of waste from bread, dairy products, fruit and vegetables (the most frequently thrown away products)
2016	41,2	
2019	34,3	

In 2018, one of the policies made by the Dutch Government was to focus on collecting data on food waste from the retail sector, as well as information on the amount of food sold per product group and destination, which includes large Dutch supermarkets (83.8% net turnover of all market share in 2018). The results show that types of ingredients such as: potatoes, vegetables and fruit have the highest contribution to supermarket food waste (34.5%), followed by bread and cakes (31.5%), milk, eggs and produce, cold products (13.3%); total food waste accounted for 1.7% of the amount sold.

Table 4. Food waste from the retail sector

Food waste from the retail sector			
	Food Waste		Food turnover total food waste accounts for 1.7% of the amount sold
Potatoes, vegetables and fruit have the highest contribution to supermarket food waste	34,5%	83.8% net turnover of all market shares in 2018	
Bread and pastries	31,5%		
Milk, eggs and cold products	13,3%		

Campaign, facilitate and report to parliament

The Dutch government's fight against food waste is by actively collaborating with food supply chain actors, including companies, research and non-governmental organizations, to reduce and prevent food waste, through the Food Waste Free United Foundation's voluntary agreement. The government facilitates and supports these efforts and regularly reports to parliament regarding the implementation of the food waste prevention agenda. The mission of the Food Waste Free United Foundation is to catalyze the transition towards a zero-waste food system and contribute to the national food waste prevention agenda through monitoring progress, collaborating on handling food waste in the food supply chain and by consumers and changing food waste regulations. In order to increase awareness about food waste among consumers, the Food Waste Free United Foundation and the Ministry of Agriculture, Nature and Food Quality in 2019 launched a national campaign entitled waste free.

Voucher scheme

Companies can receive financial support for tailor-made suggestions to reduce food waste in their operations, by implementing the voucher scheme launched by the Ministry of Agriculture, Nature and Food Quality in 2019 and managed by Wageningen University & Research. In 2021, a public-private partnership that rewards food waste reduction with lower interest rates was awarded by a Dutch financial institution.

Government and political parties in waste management

The government and political parties do have an important role in determining the success of the waste management system in the Netherlands. Policies created by governments can influence how waste is managed, including reduction, recycling and waste disposal. Political parties, through their platforms, can influence public policy and legislation relating to waste management. In the Netherlands, as in many other countries, effective waste management policies are often driven by a combination of factors such as high environmental awareness among the public, strong regulations and technological innovation. The Dutch government has long been known for its progressive approach to environmental management, including waste management, which includes incentives for recycling and reuse, as well as restrictions on waste disposal in landfills. Political parties in the Netherlands also play a role in shaping waste management policy through advocacy and legislation. For example, a party focused on sustainability and environmental protection might push for stricter policies regarding waste management, while another party might focus more on the economic aspects of waste management. Overall, synergy between government, political parties, companies and civil society is essential to achieve a successful and sustainable waste management system in the Netherlands.

Political Will and Leadership are needed in effective waste management where political will and strong leadership make a contribution. Politicians through their political policies can determine problem priorities by allocating sufficient resources and attention to waste management policies and programs. Politicians through their political policies can educate the public to increase awareness about waste reduction and responsible disposal practices. Politicians through their political policies can also promote innovation by supporting research and development of sustainable waste management technology. Apart from that, it is necessary to pay attention to community involvement for the success of waste management, that community participation and support is very important. The government can also be involved in the decision-making process and solving their problems. One of the important things about waste management is international cooperation to encourage international collaboration to overcome global challenges such as plastic pollution. In general, politics plays an important role in shaping waste management practices. Effective policies, regulations and leadership are essential to implementing sustainable and environmentally responsible waste solutions.

Legal Arrangements

The success of legal regulations in the Netherlands in supporting the deposit and recycling system deserves thumbs up. The Netherlands has implemented a very systematic waste sorting system, which includes separating paper, organic and other types of waste¹. In addition, there is cooperation between Indonesia and the Netherlands in waste management and climate change, which shows the commitment of both countries in overcoming environmental problems.

In the Netherlands, municipalities provide special waste disposal depots for recyclable glass materials, as well as textile waste depots located around supermarkets. This is part of their efforts to encourage a circular economy and reduce waste. The legal arrangements supporting this system certainly play an important role in the success of recycling programs in the Netherlands. Laws and regulations designed to facilitate this process not only help in waste management but also in promoting environmental sustainability.

Incentives and Subsidies

In the Netherlands, the government has implemented various economic incentives and subsidies to encourage companies and consumers to actively participate in recycling as part of their commitment to transition to a circular economy by 2050. Here are some measures:

- Reducing raw material usage: Encouraging the purchase of fewer products, sharing items, and producing items more efficiently,
- Substituting raw materials: Using sustainable, renewable, and widely available raw materials like biomass, which is made of plants, trees, and food waste,
- Extending product life: Promoting the reuse and repair of products and parts to slow down the demand for new products and raw materials,
- High-grade processing: Recycling materials so that they can be used to make new products, reducing waste sent to landfills or incinerated/

The National Circular Economy Programme 2023-2030 includes specific measures for these approaches, as well as for particular product groups and focus areas such as education, circular procurement, and circular business models. Additionally, there are intelligent market incentives such as higher prices for products whose manufacture is harmful to nature and the environment, and financial benefits for companies that use resources sustainably and efficiently. The Dutch government also supports innovative recycling solutions through funding, as seen in the backing of a circular economy fund for recycling plastic's impact on climate change and the environment. These initiatives are part of a broader strategy to reduce the use of primary raw materials by 50% by 2030 and to achieve a waste-free economy by 2050. The government collaborates with public authorities, knowledge institutions, environmental organizations, industry, trade unions, financial institutions, and civil society organizations to achieve these goal.

Public Education

To increase public awareness about the importance of recycling and waste management in the Netherlands, and the following strategies:

- Engage and Educate Local Communities, Implement campaigns that inform communities about the impact of plastic waste and the importance of recycling. This can include school initiatives, community workshops, and local clean-up activities.
- Media Channels, Spread the message through various media channels such as social media, television, and print media. Tailor the content to be relatable and easily understandable to ensure it resonates with the target audience.
- Collaborate with Stakeholders, Work with local authorities, businesses, and environmental organizations to create a unified message. This can help in reaching a wider audience and making a greater impact.
- Showcase Success Stories, Share case studies and success stories from other regions where public awareness campaigns have led to positive changes in waste management practices.
- Implement Eco-Friendly Practices, Encourage the adoption of eco-friendly waste management practices such as reducing, reusing, and recycling. Highlight the benefits of these practices for the

environment. Create Interactive Campaigns, Develop interactive campaigns that involve the public directly, such as challenges, pledges, and rewards for sustainable practices.

International Cooperation

The Netherlands is actively engaged in international cooperation on waste management and environmental issues. International Waste Transfers The Netherlands participates in international agreements and has encouraged the import and export of non-hazardous waste with neighboring countries. In 2010, approximately 12 million tons of total waste were imported, with a similar level exported, mainly to Belgium and Germany. Sustainable Development Goals (SDGs) The Netherlands is committed to the UN Sustainable Development Goals, aiming to achieve a sustainable world by 2030. However, it is unlikely to meet all the environmental goals, particularly those related to ecosystems, biodiversity (SDGs 14 and 15), and climate change (SDG 13). Climate Change Adaptation: Collaboration between the Netherlands and the UN Environment Programme includes the Global Commission on Adaptation, launched in 2018 in the Netherlands to raise the visibility of climate adaptation and inspire global action.

Table 5. Government and political parties

Waste Management	
Government And Political Parties can Influence The Success	Legal Arrangements , Establish laws and regulations that support deposit and recycling systems
	Incentives and Subsidies , Provide economic incentives for companies and consumers to encourage active participation in recycling
	Public Education , Carry out campaigns to increase public awareness about the importance of recycling and waste management
	International Cooperation , Participate in global and regional initiatives to address waste and environmental problems

The level of democratization

Political freedom can be described from the level of democratization of the country, the Netherlands has a fairly good democracy index, namely 9th in the world and has a democracy index score of 9.00. (democracy Indexs) so it can be said that the Netherlands really values political freedom.

Table 6. Democracy Index

Country	Overall Score	Rank	Change in rank from previous year	Electoral process and pluralism	Functioning of government	Political participation	Political Culture	Civil liberties
Norway	9.81	1	0	10.00	9.64	10.00	10.00	9.41
New Zealand	9.61	2	0	10.00	9.29	10.00	8.75	10.00
Iceland	9.52	3	2	10.00	9.64	8.89	9.38	9.71
Sweden	9.39	4	0	9.58	9.64	8.33	10.00	9.41
Finland	9.29	5	-2	10.00	9.64	8.33	8.75	9.71

Denmark	9.28	6	0	10.00	9.29	8.33	9.38	9.41
Switzerland	9.14	7	2	9.58	9.29	8.33	9.38	9.12
Ireland	9.13	8	-1	10.00	8.21	8.33	10.00	9.12
Netherlands	9.00	9	2	9.58	8.93	8.33	8.75	9.41
Taiwan	8.99	10	-2	10.00	9.64	7.78	8.13	9.41
Uruguay	8.91	11	2	10.00	8.83	7.78	8.13	9.71
Canada	8.88	12	0	10.00	8.57	8.89	8.13	8.82
Luxembourg	8.81	13	1	10.00	8.93	6.67	8.75	9.71
Germany	8.80	14	1	9.58	8.57	8.33	8.13	9.41
Australia	8.71	15	-6	10.00	8.57	7.78	7.50	9.71
Japan	8.33	16	1	9.17	8.57	6.67	8.13	9.12
Costa Rica	8.29	17	3	9.58	7.50	7.78	6.88	9.71
United Kingdom	8.28	18	0	9.58	7.50	8.33	6.88	9.12
Chile	8.22	19	6	9.58	8.21	6.67	7.50	9.12
Austria	8.20	20	0	9.58	7.14	8.89	6.88	8.53
Mauritius	8.14	21	-2	9.17	7.86	6.11	8.75	8.82
France	8.07	22	0	9.58	7.86	7.78	6.88	8.24

Source: Eurostat, democracy Indexs

Comprehensive analysis of the democracy index in 10 countries in the EU (Sweden, Finland, Denmark, Switzerland, Ireland, Netherlands, Luxembourg, Germany, Austria and France), Sweden is the country with the highest democracy index of the 10 EU countries compared. The democracy index of the 10 countries from the democracy aspect has the highest overall score of Sweden, Finland and Denmark at a value of 9.28 to 9.39, in the middle there are Switzerland, Ireland and the Netherlands at a value of 9.00 to 9.14 and the lowest is Luxembourg, Germany, Austria and France at a value of 8.07 to 8.81 However, in the case of Germany it turns out that it has good index scores in electoral process and pluralism and also civil liberties.

Table 7. Democracy Index (10 Countries EU)

Country	Overall Score	Electoral process and pluralism	Functioning of government	Political participation	Political Culture	Civil liberties	Rank
Sweden	9.39	9.58	9.64	8.33	10.00	9.41	1
Finland	9.29	10.00	9.64	8.33	8.75	9.71	2
Denmark	9.28	10.00	9.29	8.33	9.38	9.41	3
Switzerland	9.14	9.58	9.29	8.33	9.38	9.12	4
Ireland	9.13	10.00	8.21	8.33	10.00	9.12	5
Netherlands	9.00	9.58	8.93	8.33	8.75	9.41	6
Luxembourg	8.81	10.00	8.93	6.67	8.75	9.71	7
Germany	8.80	9.58	8.57	8.33	8.13	9.41	8

Austria	8.20	9.58	7.14	8.89	6.88	8.53	9
France	8.07	9.58	7.86	7.78	6.88	8.24	10

Source: Eurostat, democracy Indexs

In terms of the democracy index, related to civil liberties, Germany, Denmark and Switzerland are high, between 9.12 and 9.41. Meanwhile, Luxembourg and Finland which have the highest score for civil liberties of 9.71 may have something to do with the high electoral process and pluralism in these two countries.

Meanwhile, the Netherlands is in sixth place with high civil liberties at 9.41, but is in sixth position because it is influenced by the Functioning of Government, Political Participation and Political Culture indexes which are relatively not very good compared to the 10 countries mentioned.

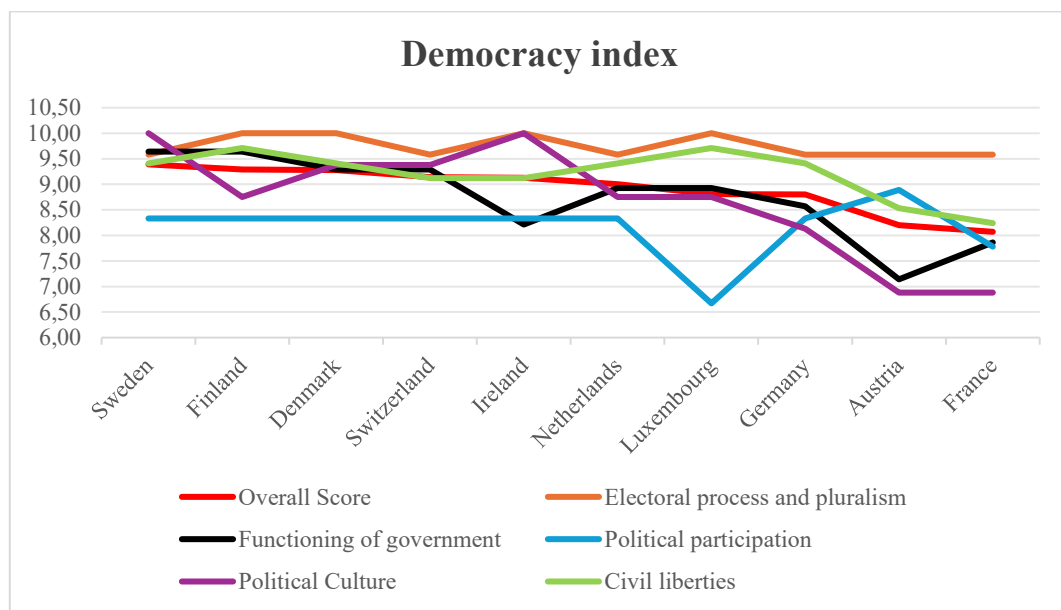


Figure 4. Democracy Index

Comprehensive analysis of waste management in 10 countries in the EU (Sweden, Finland, Denmark, Switzerland, Ireland, Netherlands, Luxembourg, Germany, Austria and France), Sweden is the largest waste producing country of the 10 EU countries compared. Recycling apparently is not yet part of Sweden's waste management by recycling 87 kilograms of waste per capita, Germany recycles the most of the 10 countries with an index of 302 kilograms of waste per capita, while the Netherlands' position is still in the middle with an index of 148 kilograms per capita. From a comparison of the 10 countries, no waste was found that was dumped illegally or uncontrolled in these 10 countries.

Table 8. Global Waste Index 2022

Country	Waste Generated (kg)	Recycling (kg)	Incineration (kg)	Landfill (kg)	Open Dump (kg)	Unaccounted Waste (kg)	Recycled / Generated (%)	Rank
Sweden	431	87	259	3	0	0.0	20.2	10
Finland	596	168	345	3	0	0.1	28.2	6

Denmark	845	300	382	7	0	0.2	35.6	2
Switzerland	706	210	333	0	0	0.0	29.8	3
Ireland	598	175	255	86	0	6.0	29.3	5
Netherlands	535	148	224	7	0	0.0	27.7	7
Luxembourg	790	232	257	31	0	2.0	29.4	4
Germany	632	302	204	5	0	13.0	47.8	1
Austria	588	154	226	12	0	12.0	26.2	8
France	537	121	204	97	0	0.1	22.5	9

Source: Global Waste Index 2022, <https://sensoneo.com/global-waste-index/>

From an environmental point of view, the highest amount of waste burning is carried out by this country in Denmark at 382 kilograms per capita and the lowest in Germany and France at 204 kilograms per capita, while the Netherlands is at 224 kilograms per capita. This burning is better than the waste landfilling carried out by France with 97 kilograms per capita followed by Ireland with a figure of 86 kilograms per capita, for the Netherlands only 7 kilograms per capita. Only Switzerland does not use landfills, open dumps and unaccounted waste. Germany is in first place with a recycling percentage of 47.8 percent in the period 2019 to 2022, second is Denmark with a percentage of 35.6 percent while the Netherlands is in seventh place with 27.7 percent of recycled waste. Several EU countries can boast of their progressive waste management and high recycling rates, such as Germany, Denmark and Switzerland, which are considered leading countries in the field of recycling, while the Netherlands is seventh out of ten compared countries.

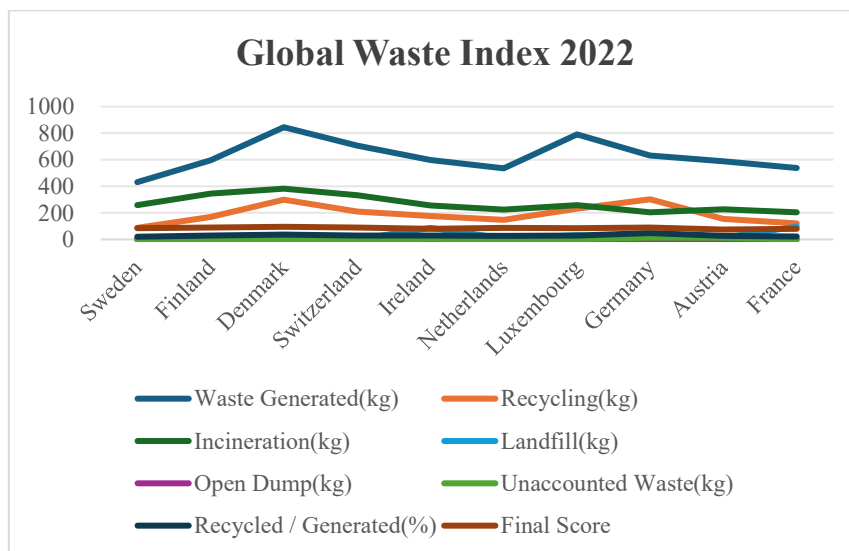


Figure 5. Global Waste Index 2022

With a guaranteed index of democracy and political freedom, of course guarantees for the environment are related to waste management to preserve the environment. Based on the Environment Performance Index (EPI), the Netherlands has a performance index of 75.3 related to political stability in the face of policies regarding waste management.

Table 9. Political Stability Index

Political Stability	
Sweden	78.7
Netherlands	75.3
Slovenia	72
Taiwan	57.2
Saint Vincent and the Grenadines	48.4
Mauritius	45.1
Tonga	45.1
Bahamas	43.5
Marshall Islands	30.8
Vanuatu	28.9

Source: Eurostat, democracy Index

CONCLUSION

The importance of waste management strategies for the European Union and its member countries in regional studies, where social issues related to the environment and waste management are interesting to research, cannot be overstated. In this case study, waste management in the Netherlands is linked to the Sustainable Development Goals (*SDGs*), Waste Management, and the Waste Prevention Programme (*WPP*). From an *SDGs* perspective, with waste management and waste prevention programs, as well as a political perspective related to the social contract in relation to democracy and the environment, the results of this correlation provide the following interpretation: The higher the political freedom of a country, the more likely it is that the country has higher environmental performance. Likewise, the lower a country's political freedom, the more likely it is that the country has lower environmental performance. Therefore, as an initial proposition, democracy, environmental sustainability, and an innovation-driven knowledge economy may have a dynamic and synergistic non-linear relationship. Measuring political freedom from election results compared to the previous government shows that if political freedom is higher, there will be environmental guarantees. In the theoretical framework of analysis, we refer to the concept of waste management, which emphasizes the importance of ecology, environmentalism, environmental sustainability, and climate, as well as knowledge that allows us to show possible empirical patterns and relationships between election-related democracy in the Netherlands and environmental policies related to waste management. This empirical model links political freedom to environmental performance.

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