

Artur Modrzejewski

- University of Białystok
- e-mail: a.modrzejewski@uwb.edu.pl
- ORCID: 0000-0002-3849-4208

Justyna E. Kulikowska-Kulesza

- University of Białystok
- e-mail: j.kulikowska@uwb.edu.pl
- ORCID: 0000-0001-6934-9014

THE IMPACT OF THE DEPOSIT SYSTEM ON SOCIETY AND ENVIRONMENT

| Abstract

- *Goal* – The aim of this article is to present the principles of operation of the deposit system in Poland and to indicate how society can engage in the functioning of this system, with the active participation of non-governmental organisations (NGOs). The study examines the legal framework governing the deposit system implementation and its potential environmental and social impacts.
- *Research methodology* – The research methodology is based on legal analysis of the European Union directives, particularly the Single Use Plastic (SUP) Directive, and comparative analysis of deposit systems functioning in the selected EU Member States. The study also incorporates the analysis of the Polish legal regulations implementing the deposit system and the examination of the role of non-governmental organisations in environmental protection.
- *Score/results* – The analysis reveals that the Polish deposit system, scheduled to begin operation in October 2025, goes beyond the requirements of the SUP Directive by including not only single-use plastic bottles for beverages up to 3 liters but also reusable glass bottles up to 1.5 liters and metal cans up to 1 liter. The research demonstrates that deposit systems in other EU countries achieve collection rates of 80–90% through high consumer participation.
- *Originality/value* – The study contributes to the understanding of legal and social mechanisms for implementing environmental policies at the national level. The

originality lies in analysing the role of non-governmental organisations in creating an “ecological society” and examining the Polish deposit system in the context of the EU legal requirements and comparative experiences of other Member States.

| **Keywords:** deposit system, environmental law, non-governmental organisations, packaging waste, circular economy, Single Use Plastic Directive

1. Introduction

The deposit system represents a mechanism whereby consumers are charged an additional cost, called a deposit, when purchasing beverages in specific packaging. This cost is refunded when the packaging is returned to a designated collection point. This solution has been proven effective in many countries, such as Germany, Slovakia, Sweden, and Norway, where significant waste reduction has been achieved through high consumer participation. In Poland, this system is scheduled to begin operation from October 2025. The subject of this article is to present the principles of operation of the deposit system in Poland and to indicate how society can engage in the functioning of this system, with the active participation of environmental organisations.

2. The “Plastic Directive”

The European directive known as Single Use Plastic (SUP) has been in force since July 3, 2019. It aims to phase out certain single-use products made from plastics [www 1].

The Directive’s objective is to reduce the use of the most environmentally polluting products listed in its annexes, as well as all products made from oxo-degradable plastics and fishing gear containing plastics. According to estimates, single-use plastic products covered by the measures of this directive constitute approximately 86% of single-use plastic products found on beaches in the European Union [www 2].

In accordance with the directive, EU Member States are obligated to introduce bans and other measures aimed at reducing the use of these products. Furthermore, the SUP Directive aims to support a circular economy, which prioritises sustainable and non-toxic reusable products and reuse systems, instead of single-use products, primarily aimed at reducing the amount of generated waste. The Directive

assumes ensuring separate collection of packaging waste from single-use plastic bottles for beverages with a capacity of up to 3 litres (including their caps and lids) at a level of 77% in 2025 and 90% in 2029. The Directive prohibits the sale of plastic cotton buds, cutlery, straws, and single-use polystyrene cups. In addition to bans on placing certain products on the market, the SUP Directive obligates EU Member States to collect at least 77% of the plastic bottles introduced into circulation after 2024, with this level expected to increase to 90% in 2029.

The EU Directive on single-use plastic products recommends introducing solutions such as establishing deposit return systems and setting targets for separate collection in relation to the appropriate extended producer responsibility systems as ways to meet the challenges associated with plastic pollution of the environment. Importantly, the SUP Directive does not directly mandate the implementation of deposit systems in EU Member States; this is only a recommendation, indicating – in accordance with the spirit of EU directives – the goal to be achieved, without simultaneously specifying binding methods or legal instruments for achieving this goal [Cesarz, 2014: 188].

The Directive emphasises taking measures to promote awareness, and it indicates that the role of various types of non-governmental organisations should be recognised and emphasised. It is assumed that Member States take measures to inform consumers and encourage them to behave responsibly to reduce littering from products covered by this directive and take measures to inform consumers of single-use plastic products listed in part G of the annex and users of fishing gear containing plastics [www 1].

EU Member States are taking active measures to implement the provisions of the SUP Directive. For example, France mandated a reduction in the introduction of plastic bottles to 50% by 2030 and achieving a minimum level of returnable beverage packaging of 5% by 2023 and 10% by 2027 [www 3].

Currently, deposit systems function in Croatia, Denmark, Estonia, Finland, the Netherlands, Iceland, Lithuania, Latvia, Malta, Germany, Norway, Slovakia, and Sweden. It is estimated that approximately 138 million people use it, and it ensures a return rate of 80–90% [www 4].

3. The Polish deposit system

In Poland, approximately 240,000 tons of PET bottles alone are put into circulation annually, of which only 50% are recycled.

The provisions of the directive were transposed into the Polish law only by the Act of April 14, 2023, amending the Act on entrepreneurs' obligations regarding the management of certain waste and the product fee and certain other acts [Act of April 14, 2023, item 877, 2023]. The Polish legislator, when designing the deposit system, showed certain overzealousness, as it exceeded the requirements of the SUP directive. The deposit system covers not only single-use plastic bottles for beverages with a capacity of up to 3 litres but also reusable glass bottles up to 1.5 litres and metal cans up to 1 litre. However, milk packaging was excluded from the system due to the potential contamination of this waste and hygienic consequences.

The deposit for PET bottles and metal cans will be PLN 0.50, and for reusable glass bottles – PLN 1.00 [Regulation of July 8, 2024, item 1046, 2024]. The maximum deposit amount is PLN 2.00 [Regulation of July 8, 2024, item 1046, 2024].

Consumers will not be required to show a receipt to obtain a deposit refund. Any reservations by entrepreneurs making the deposit refund conditional on presenting a receipt will not be effective. This follows directly from Article 40 g paragraph 1 point 4 of the Act on Packaging and Packaging Waste Management [Act of June 13, 2013, item 927, 2024].

According to the Act amending the Act on entrepreneurs' obligations regarding the management of certain waste and the product fee and certain other acts, large stores with an area exceeding 200 square meters will be required to collect empty packaging and refund deposits. Smaller stores will collect deposits, but joining the packaging collection system will be voluntary in their case.

The system's assumption is that a deposit will be collected for each beverage introduced to the market in packaging covered by this system. The refund of this deposit to the end user will also occur through the system, without the need to show a purchase receipt for the beverage [Act of June 13, 2013, item 927, 2024]. Uncollected deposits will be allocated to financing the deposit system. The deposit is intended to encourage the return of packaging and increase the amount of reused and processed raw materials used to produce packaging [Act of June 13, 2013, Art. 40i para. 4, 2013].

The assumptions of the Polish deposit system are based on the principle that when purchasing a beverage in packaging with a logo, a deposit will be collected from the customer. The deposit is to be added to the price of beverages only at the checkout. All commercial units, regardless of their area, if they offer beverages in packaging covered by the system, will collect deposits, with the business profile of a given store being irrelevant – only the products offered matter.

Packaging covered by the system will be appropriately marked with the deposit system logo. It will not be possible to collect a deposit for packaging without a logo, so it will not be possible to obtain a deposit for bottles purchased before the system comes into effect. A deposit can be collected when returning packaging. When returning packaging to recover the deposit, showing a receipt will not be required. Packaging can be returned at any collection point. Packaging should not be crushed before being handed over to the collection point. This represents a significant difference from how society has been educated so far, requiring the crushing of plastic bottles primarily so that more could fit into the waste bag and consequently onto the waste collection vehicle – which in practice reduces waste transport costs.

A requirement was introduced to create at least one stationary point for collecting packaging and packaging waste covered by the deposit system in each municipality. It will be possible to create points for collecting empty packaging outside commercial units.

An important element of the system will be entities operating the deposit system. According to Article 40 g paragraph 2 of the Act on Packaging Management, the deposit system is operated by a representing entity that meets the conditions specified in the act:

1. is a joint-stock company with its seat in the country, established by entities introducing products in beverage packaging or directly introducing products in beverage packaging, or representing their employers' associations or chambers of commerce;
2. its shareholders are exclusively the entities mentioned above;
3. members of its supervisory board, members of its management board, or its proxies have not been convicted by a final court judgment for an intentional crime or intentional fiscal crime;
4. has not been finally convicted under the provisions of the Act of October 28, 2002, on the liability of collective entities for acts prohibited under the threat of penalty;
5. fulfills the obligations specified in the act, and revenues obtained from business activities are allocated exclusively to statutory purposes;
6. exclusively performs the activities related to packaging and packaging waste management and organising and operating the deposit system;
7. has an appropriate permit and required share capital (of at least PLN 500 000).

The representing entity has ownership rights to waste from the packaging collected within the deposit system operated by this entity. The representing entity that collected packaging or packaging waste from packaging covered by the deposit system from this entity is obligated to refund the deposit to the entity that refunded the deposit to the end user.

In case of an operation of more than one deposit system, representing entities operating these systems are obligated to establish among themselves, through a written agreement in paper or electronic form under penalty of invalidity, the conditions for settling the collected and refunded deposits and settling and exchanging packaging or packaging waste collected within the deposit systems operated by them. The agreement is concluded before the launch date of each subsequent deposit system.

The representing entity that concluded the agreement is obligated to provide a copy of this agreement no later than within 14 days from the date of its conclusion to the minister responsible for climate affairs.

The representing entity within the deposit system ensures:

1. selective collection of packaging and packaging waste to achieve the required levels referred to in Annex 1a to the act;
2. collection of packaging and packaging waste from retail and wholesale trade units and other points collecting packaging and packaging waste covered by the deposit system;
3. transport of packaging to the entity introducing products in beverage packaging or directly introducing products in beverage packaging and packaging waste to the waste processing facilities;
4. maintaining records and preparing reports;
5. settling deposits with retail and wholesale trade units and other points collecting packaging and packaging waste covered by the deposit system, particularly financing the deposit payments for end users;
6. financing costs of collecting packaging and packaging waste by entrepreneurs operating retail and wholesale trade units and other points collecting packaging and packaging waste covered by the deposit system.

The costs of these activities are financed by the entities introducing products in beverage packaging and directly introducing products in beverage packaging. The financial settlement between retail and wholesale trade units and other points collecting packaging and packaging waste covered by the deposit system and the representing entity, as well as between representing entities operating different deposit systems, occurs within a settlement period not longer than one month.

The permission to operate a deposit system is issued upon application by the representing entity. Operating a deposit system requires obtaining a permit issued by decision by the minister responsible for climate affairs. The permission to operate a deposit system is issued for a specified period, not longer than 10 years from the launch of the deposit system.

The entities introducing products in beverage packaging and directly introducing products in beverage packaging are obligated to place marking on packaging indicating coverage by the deposit system and specifying the deposit amount. Throughout 2024, 8 applications from 8 companies seeking the status of the representing entity were submitted to the Minister of Climate and Environment. Currently, 5 companies have received permits to operate deposit systems [www 5].

It appears that the shape of the system proposed by the legislator and the role of the representing entities assumed in it does not provide for an important issue, which is ensuring space for managing the waste collected within the deposit system. No provision requires that the representing entity must have installations allowing for the management of waste collected within the deposit system. Therefore, it should be assumed that the representing entities will currently seek waste managers with whom they will sign contracts for waste management. The problem is that the waste management (not only these, but all, regardless of how valuable material they may constitute on the market) will have to be paid for, and the costs of the system operation are to be covered by uncollected deposits – probably the amount of funds obtained in this way will not cover the management costs. It can be assumed that the representing entities will want to transfer waste for management free of charge, so that managers can obtain funds either from further transfer of waste for recycling or from trading in documents confirming recycling (DPR). However, such action is legally questionable, considering that it is not possible to perform waste management services free of charge (at zero rate). Even if the waste in question is only collected by another entity, this undoubtedly constitutes waste management, which should lead to accepting waste according to the applicable price list.

It is also worth noting that nearly one in four Poles (23%) has never heard of the deposit system and does not know that it will begin operation this year. A similar number of people believe that the problem of littering public areas with waste hardly exists in Poland. Among the litter we most often see in forests, parks, and on the streets, we primarily mention cigarette butts (39% of respondents see them “a lot” and “daily”), small alcohol bottles, so-called “małpki” (25%), and PET plastic bottles (24%) [Pawłowski, 2025].

4. The deposit system in the selected EU countries

The Polish deposit system is modeled on solutions introduced in other EU states, particularly on the German system. A mandatory deposit system was introduced in Germany in 2003. Initially, it covered single-use packaging for mineral water, beer, and carbonated beverages. In the subsequent years, deposits began to apply to additional packaging.

In Germany, two deposit systems are primarily distinguished – for single-use and reusable packaging. The first type consists mainly of single-use plastic bottles and beverage cans, which are subject to a deposit of 25 euro cents. Their distributors are obligated to accept completely emptied packaging free of charge. Reusable packaging (including glass bottles) is subject to a deposit of 8–15 euro cents. In their case, distributors must accept only those emptied packages that they introduced into circulation. This means that in Germany, almost every type of bottle (plastic and glass) and beverage must be returned to the store. Packaging return takes place in special machines located near or inside larger stores, and in smaller stores – in a designated place near the checkout. The machine provides a refund in the form of a voucher to be used for shopping in a specific store branch. Each deposit packaging must have appropriate marking enabling identification of the deposit type. The German system is not only about collecting packaging but also concerns recycling it. According to regulations, every seller must ensure the collection of all the returned single-use and reusable packaging and transfer them for appropriate recycling.

Another example is Sweden, which achieves one of the highest waste recycling levels. Sweden was the first country in the world to introduce a deposit for glass bottles in 1885. The modern system has included beverage cans since 1984 and small and large PET plastic bottles since 1994. Since last year, juice packaging has been included in the system, and the Swedish state monopoly store chain Systembolaget began charging fees for some plastic wine bottles. The Swedish Parliament set a goal for 90% of beverage packaging to be returned. Currently, this is 88.5%. The deposit usually amounts to 1–2 crowns (approximately 0.4–0.8 PLN). Customers can recover money by putting bottles and cans into machines, which are usually located in grocery stores or nearby. In many locations, this involves the necessity of shopping for the recovered amount, though there is also the possibility of donating the recovered money to charity.

In Sweden, the private company Returpack AB, created by three industry organisations associating producers of beer and non-alcoholic beverages, is responsible for organising the deposit system for packaging. The company has its

own PET bottle processing plant in Norrköping and also promotes bottle returns through social advertising [www 6].

Deposit systems already operate in Scandinavian countries, Slovakia, Romania, and Estonia. Countries such as France and Italy have not yet decided to introduce them.

5. The role of non-governmental organisations in creating an “Ecological Society”

The theoretical framework for understanding the role of non-governmental organisations in environmental policy implementation is grounded in the governance theory, especially through the lenses of multi-level governance (MLG) and network governance.

Multi-level governance is a concept that emerged from policy debates and from the restructuring of political systems, emphasising the vertical integration of governance across multiple levels – local, regional, national, and international – and the involvement of diverse actors, including NGOs, in decision-making processes [Partelow et al., 2020]. It recognises that environmental policies often require coordination between different levels of government and non-state actors to be effectively implemented, highlighting the importance of communication and cooperation across these levels. MLG assumes that better vertical integration enhances governance effectiveness, allowing top-down policies to be adapted and implemented at local levels where NGOs often play a critical role. This framework is especially useful for understanding how international or national environmental policies translate into local action through the participation of NGOs and other stakeholders [Paavola, 2015; Di Gregorio et al., 2019]. On the other hand, network governance complements MLG by focusing on the horizontal relationships and interactions among actors within governance systems, including NGOs, government agencies, and private stakeholders [Partelow et al., 2020]. It highlights how NGOs and other actors form decentralised, pluralistic networks that facilitate information sharing, social learning, and collective action outside traditional hierarchical government structures [Di Gregorio et al., 2019]. Network governance theory examines the structure and quality of connections among actors, showing how these influence policy outcomes and implementation effectiveness [Wang, 2021]. This approach underscores the agency of NGOs and their capacity to influence environmental governance through partnerships and alliances.

Together, these theories provide a comprehensive framework for analysing the complex roles NGOs play in environmental governance, emphasising their participation in multi-level, networked processes that transcend traditional state-centric policy models. This reflects a shift towards more inclusive, adaptive, and collaborative governance arrangements necessary to address complex environmental challenges, such as the deposit system. These theoretical frameworks provide the foundation for understanding how NGOs operate in practice within the deposit system context.

Non-governmental organisations play a significant role in promoting and supporting the deposit system [Buijs et al., 2024]. Their activities encompass public education, monitoring of system operation, and initiatives for its expansion and efficiency improvement. The role of non-governmental organisations in creating an “ecological society” is particularly crucial in relation to the deposit system implementation and encompasses several key areas.

Education and shaping social awareness constitute the fundamental area of activity for environmental organisations [Fien, 2002]. These entities conduct educational programs, information campaigns, and workshops that increase the society’s knowledge about environmental threats and promote responsible attitudes toward the natural environment. Through social education, they contribute to building ecological awareness, which is the foundation for the development of an ecological society [Heimlich, Ardoin, 2008: 216]. In the context of the deposit system, these organisations play a crucial role in explaining the principles of operation, benefits for the environment, and practical aspects of participation. They organise workshops in schools, local communities, and workplaces, explaining how the system functions, where packaging can be returned, and what environmental benefits result from active participation [Kollmuss, Agyeman, 2002: 251].

The mobilisation of society to action, in which organisations arrange civic actions such as protests, petitions, cleaning of green areas, or legislative initiatives that engage local communities and encourage active participation in environmental protection [Mariyam, Satria, Samsudin, 2023: 112], is equally important. Environmental associations often operate locally, allowing their members to actively participate in decision-making and implementation of pro-environmental actions. In the deposit system context, NGOs organise campaigns promoting packaging return, coordinate establishment of additional collection points in cooperation with local governments and mobilise citizens to actively use the system through competitions, challenges, and community initiatives.

The influence on policy and monitoring of government actions represents another crucial dimension of NGO activity. Non-governmental organisations serve as “guardians” of ecological policy implementation, monitoring the actions of governments and institutions, as well as influencing the formation of environmental protection law and policy at local, national, and international levels [Mariyam, Satria, Samsudin, 2023: 113–116]. Through lobbying, social consultations, and social campaigns, they force changes towards sustainable development and nature protection. Regarding the deposit system, NGOs monitor the effectiveness of implementation, evaluate the achievement of collection targets set by law, conduct independent assessments of system operation, and advocate for improvements in legal regulations and expansion of the system to include additional types of packaging.

Cooperation and partnership building constitute the final essential element of NGO activity. Environmental organisations often create civic coalitions that combine different groups and resources for more effective environmental action. Partnership between the public sector and non-governmental organisations is crucial for developing and implementing comprehensive, socially acceptable environmental protection plans [Scott, 2015: 18–19]. In relation to the deposit system, cooperation between NGOs, representing entities, local governments, and commercial units enables the creation of an effective network of collection points, ensures broad social acceptance of the system, and facilitates information exchange about best practices and encountered difficulties.

The activities of non-governmental organisations are crucial for the success of the deposit system because they ensure social legitimacy, civic oversight, and continuous improvement of its operating mechanisms. Without their involvement, the system could remain merely a “dead letter” legal provision, failing to deliver the expected environmental and social benefits. Non-governmental organisations act as a bridge between formal legal regulations and practical implementation, ensuring that the deposit system becomes not only a legal obligation but also a socially accepted and actively supported environmental protection tool.

Based on the presented analysis, non-governmental organisations are indispensable in fostering an ecological society by bridging policy frameworks and community action. Their multifaceted roles, ranging from public education and awareness-raising to active mobilisation and vigilant monitoring, ensure that environmental initiatives like the deposit system transcend legal obligations to become socially embraced and effectively implemented. By facilitating cooperation among citizens, governmental bodies, and commercial entities, NGOs enhance transparency, legitimacy, and responsiveness within the environmental governance.

6. Conclusion

The deposit system is an effective legal and social instrument for reducing packaging waste and for promoting a circular economy, as confirmed by experience in various EU countries and currently being implemented in Poland. The Polish deposit system, which covers a broader range of packaging types than the minimum requirements of the Single Use Plastic Directive, has the potential to achieve high collection rates and to significantly reduce the environmental pollution from beverage packaging.

It is essential to emphasise the key role of NGOs in the system's success. Through public education, community mobilisation, monitoring, and partnership building, they bridge the gap between the legal framework and practical results. They contribute to raising environmental awareness, ensuring social acceptance, and fostering active citizen participation in packaging return activities. Furthermore, NGOs' oversight and advocacy activities enhance transparency, accountability, and continuous improvement of the system's operation.

Nevertheless, challenges remain – including ensuring adequate waste management infrastructure and ensuring cooperation among various stakeholders. The participatory approach embodied in the Polish deposit system, supported by the active involvement of NGOs, promises to deliver significant environmental, social, and economic benefits.

| References

Legal acts

- Act of April 14th, 2023 amending the Act on entrepreneurs' obligations regarding the management of certain waste and the product fee and certain other acts, *Journal of Laws* 2023, item 877.
- Act of June 13, 2013 on packaging and packaging waste management, *Journal of Laws* 2024, item 927, consolidated text.
- Regulation of the Minister of Climate and Environment of July 8, 2024 on the amount of deposit for individual types of packaging covered by the deposit system, *Journal of Laws* 2024, item 1046.

Literature

- Buijs A.E., de Koning S., Mattijssen T.J.M., Smeding I.W., Smits M.-J., Steins N.A., 2024, *Civil Society for Sustainable Change: Strategies of NGOs and Active Citizens to Contribute to Sustainability Transitions*, "Journal of Environmental Planning and Management", Vol. 67, No. 12, <https://www.tandfonline.com/doi/full/10.1080/09640568.2023.2205571> [date of access: 3.07.2025].
- Cesarz M., 2014, *Porządek prawny Unii Europejskiej*, [in:] *Procesy integracyjne i dezintegracyjne w Europie*, M. Klimowicz, A. Paczeński, Z. Czachóra (eds), Wrocław.
- Di Gregorio M., Fatorellia L., Paavola J., Locatelli B., Pramova E., Nurrochmat D.R., May P.H., Brockhaus M., Sari I.M., Kusumadewi S.D., *Multi-Level Governance and Power in Climate Change Policy Networks*, <https://agritrop.cirad.fr/589860/1/Di%20Gregorio%202019%20Multi-level%20governance%20and%20power%20in%20climate%20change%20policy%20networks.pdf> [date of access: 3.07.2025].
- Fien J., 2002, *Education for Sustainability: Reorienting Australian Schools for Ecological Sustainability*, "Australian Journal of Environmental Education", Vol. 18, No. 1, pp. 15–23.
- Heimlich J.E., Ardoin N.M., 2008, *Understanding Behavior to Understand Behavior Change: A Literature Review*, "Environmental Education Research", Vol. 14, No. 3, pp. 215–237.
- Kollmuss A., Agyeman J., 2002, *Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to Pro-Environmental Behavior?*, "Environmental Education Research", Vol. 8, No. 3, pp. 239–260.
- Mariyam S., Satria A.P., Samsudin M., 2023, *Community Participation in the Prevention of Environmental Damage: Forms and Challenges*, "Administrative and Environmental Law Review", Vol. 4, No. 2, pp. 107–118, DOI: 10.25041/aclr.v4i2.2992.
- Paavola J., *Multi-Level Environmental Governance: Exploring the Economic Explanations*, <https://www.cccep.ac.uk/wp-content/uploads/2015/09/2015-EPG-Paavola.pdf> [date of access: 3.07.2025].
- Partelow S., Schlüter A., Armitage D., Bavinck M., Carlisle K., Gruby R.L., Hornidge A.-K., Le Tissier M., Pittman J.B., Song A.M., Sousa L.P., Văidianu N., Van Assche K., *Environmental Governance Theories: a Review and Application to Coastal Systems*, https://pure.uva.nl/ws/files/133805219/ES_2020_12067.pdf [date of access: 3.07.2025].
- Pawłowski J., 2025, *W pułapkach jednorazowości. Co Polacy wiedzą o nadchodzącym systemie kaucyjnym?*, https://ekobezkantow.pl/wp-content/uploads/2025/01/Interzero_W-pulapkach-jednorazowosci_kaucja.pdf [date of access: 19.05.2025].
- Scott T., 2015, *Does Collaboration Make Any Difference? Linking Collaborative Governance to Environmental Outcomes*, "Journal of Policy Analysis and Management", Vol. 34, No. 3, pp. 537–566, DOI: 10.1002/pam.21836.
- Wang H., *Network Governance and Collaborative Governance: a Thematic Analysis on Their Similarities, Differences, and Entanglements*, <https://www.tandfonline.com/doi/full/10.1080/14719037.2021.2011389> [date of access: 3.07.2025].

- www 1, Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment, <https://eur-lex.europa.eu/eli/dir/2019/904/oj> [date of access: 23.06.2025].
- www 2, <https://www.gov.pl/web/klimat/produkty-jednorazowego-uzytku-z-tworzyw-sztucznych-sup> [date of access: 23.06.2025].
- www 3, <https://eplastics.pl/wiadomosci/sp/13125-francja-za-20-lat-bez-opakowan-z-tworzyw> [date of access: 23.06.2025].
- www 4, <https://serwisy.gazetaprawna.pl/ekologia/artykuly/9293163,system-kaucyjny-w-polsce-co-sie-zmieni.html> [date of access: 23.06.2025].
- www 5, <https://energetyka24.com/klimat/wiadomosci/mkis-pracuje-nad-systemem-kaucyjnym-juz-piec-firm-z-zezwolezeniami> [date of access: 26.06.2025].
- www 6, <https://www.bankier.pl/wiadomosc/System-kaucyjny-po-europejsku-W-Niemczech-dziala-od-lat-we-Wloszech-wciaz-na-etapie-zapowiedzi-8836933.html> [date of access: 26.06.2025].