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A.A. Nukusheva[1*], S.E. Assanova[2]

[1]*Karaganda Buketov University, Karaganda, Kazakhstan;*
[2]*Al Farabi Kazakh National University, Almaty, Kazakhstan*
(E-mail: akuka007@mail.ru)

ORCID ID: https://orcid.org/0000–0001–8018–6666,
Scopus Author ID: 57193229324, Researcher ID WOS: AAK-2173–2021
ORCID ID: https://orcid.org/0000–0001–8813–6823,
Scopus Author ID: 57219238863

Legal aspects of solid waste recycling and disposal in Kazakhstan: international standards and national regulation in the context of a circular economy

The Republic of Kazakhstan, possessing significant natural resources and a rapidly developing economy, is faced with growing volumes of municipal solid waste (MSW), which requires effective measures for their processing and disposal. The main purpose of this study is to analyze the legal aspects of solid waste management in Kazakhstan, assess the compliance of national legislation with international standards and explore the potential for integrating the principles of a circular economy. The study covers the current state of the legal regulation of solid household waste in Kazakhstan and identifies key problems. The use of methods of political and legal analysis, comparative legal approach and system analysis helps to assess how modern initiatives can contribute to improving solid waste management and maintaining environmental balance. The conclusions of the study indicate the need to improve the legislative framework of Kazakhstan for the management of solid household waste. The introduction of a new Ecological Code based on the European principles of waste management hierarchy and extended producer responsibility is an important step forward. However, further progress requires the adoption of the Law "On Waste", which would specify the implementation of the principles of the circular economy. The importance of creating conditions for small and medium-sized businesses in the field of waste recycling and increasing environmental awareness of the population through informing and involving public organizations and the media is also emphasized.

Keywords: municipal solid waste, recycling and disposal of municipal solid waste**,** the principle of manufacturer's responsibility, the principle of the waste management hierarchy, circular economics, European waste management standards.

Introduction

One of the most significant problems of the modern world is the solution of issues related to the processing and disposal of municipal solid waste (MSW) [1; 150]. In conditions of intensive population growth, active urbanization and continuous industrialization, waste volumes inevitably increase. This process brings with it serious environmental and social challenges. Inefficient waste management systems lead to contamination of soil, water resources and atmospheric air, which exacerbates the overall environmental situation and poses significant threats to public health.

The annual formation of MSW in the world exceeds two billion tons. So, if we imagine that all these wastes are packed in standard shipping containers and lined up, then in this case the length of this chain will be 25 revolutions around the equator of the Earth [2].

The projected increase in the volume of MSW from 2.3 billion tons in 2023 to 3.8 billion tons by 2050 indicates an aggravation of the environmental problem. Global waste management costs are estimated to have reached US$252 billion in 2020. Taking into account the additional costs associated with negative consequences for the environment and health, as well as climate change caused by inefficient waste management methods, the total costs increase to 361 billion US dollars. Without immediate action in the field of waste management, these global annual costs could almost double by 2050, amounting to about 640.3 billion US dollars [3].

According to the consolidated global report on solid waste management by 2050, unless urgent measures are taken, in 2050 the amount of waste in the world will increase by 70 % compared to current lev-

* Corresponding author. E-mail: *akuka007@mail.ru*

els due to rapid urbanization and population growth. This corresponds to an annual global waste generation of 3.4 billion tons over the next 30 years, compared with 2.02 billion tons in 2016 [4].

Annually, about 4.5–5 million tons of municipal waste are generated in Kazakhstan — about 0.6 kg per day per inhabitant of the country and only 15 % of them are recycled [4]. Thus, according to various sources, currently more than 45 billion tons of MSW have accumulated on the territory of Kazakhstan [5]. According to the results of space monitoring, 5,552 unauthorized landfills, 688 authorized landfills and 393 violations of landfill boundaries were identified [6]. Meanwhile, only 25 % of this volume is spent on sorting and recycling [7].

According to experts of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, there are many factors that hinder the effective processing and disposal of MSW. The main ones include: the non-compliance of the majority of existing landfills of MSW with environmental standards, the lack of programs for the processing and disposal of MSW in a number of regions, the growing number of spontaneous unauthorized landfills, the lack of innovative approaches and technologies in the MSW management system, as well as a low level of environmental awareness among the population [5].

In addition, these problems are supplemented by insufficient motivation for recycling and reuse of waste, an underdeveloped system for collecting and sorting waste, the absence of strict restrictions on waste disposal and insufficient economic incentives for enterprises. It is also important to note the weak integration of the principles of the circular economy and limited support for innovations in waste management. All these factors require a comprehensive approach and significant efforts to eliminate them.

The modern policy of MSW recycling and disposal is closely intertwined with the concept of a closed-cycle economy. Before the advent of the circular economy, a linear economy based on the principle of "take–produce –consume — throw away" dominated. This model provided for the extraction of natural resources, their processing into goods, which after use became waste that had no further use.

The circular economy is a system aimed at maximizing the use of resources and minimizing waste. Its main idea is to create closed cycles of production and consumption, where the waste from one process becomes the raw material for another. This makes it possible to ensure economic development without overexploitation of natural resources and minimize the negative impact on the environment.

Kazakhstan continues to actively support international initiatives aimed at combating climate change, emphasizing the importance of global cooperation in this area. President Kassym-Jomart Tokayev focuses on the need to include in the national policy the principles of a closed-loop economy, which are aimed at optimal use of resources and minimization of waste. In his speech, he noted: "Our goal is to gradually expand opportunities to attract "green investments" and implement environmentally oriented projects. I am sure that it is worth seriously evaluating the prospects for applying the principles of closed-loop economics". [8]. These statements demonstrate Kazakhstan's determination to support environmentally sustainable development and use international standards and best practices to improve the national waste management system. The introduction of the circular economy concept in Kazakhstan contributes not only to the implementation of global climate goals, but also opens up opportunities for innovative and economic growth.

The European Union is purposefully implementing the European Green Course Strategy aimed at protecting, preserving and increasing natural resources, protecting the health and well-being of citizens from environmental risks and impacts by reducing greenhouse gas emissions, improving air and water quality [6], and combating soil pollution [9].

International cooperation plays a key role in the development and implementation of effective waste management methods. The experience of the EU, which has achieved significant success in this area, can serve as a valuable guide for Kazakhstan.

Methods and Materials

Within the scope of this article, methods of political-legal analysis and comparative legal research were utilized. These methods facilitated a comprehensive examination of the current state and future prospects of legislation in the Republic of Kazakhstan concerning the recycling and disposal of MSW. Previous publications by the author, such as "Legal aspects of household waste management in Kazakhstan and foreign countries: comparative legal analysis" [1] and "Regulatory Obstacles in Municipal Solid Waste Management in Kazakhstan in Comparison with the EU" [10] have served as foundational benchmarks for evaluating and contrasting Kazakhstani legislation with the regulatory frameworks of the European Union.

The study identifies the absence of a systematic, unified approach to addressing legal challenges as a primary issue. It employs a systematic approach and empirical methods to address this. The main objective is

to establish an effective collaboration among governmental bodies, Kazakhstan's citizens, NGOs, and businesses to implement a normative and regulatory framework for the MSW recycling and disposal in Kazakhstan.

Additionally, the research explores promising directions in international policy and legal regulation in the field of MSW management.

Results

The danger of pollution by solid household waste consists in contamination of a larger area, soil, groundwater, plants, as well as organisms of living beings: animals, birds and humans. Also, emissions into the atmosphere in the form of gases from organic waste released from garbage are the main factor affecting climate change [1; 151].

Studies show that plastics in landfills, when exposed to solar radiation, emit greenhouse gases such as methane, as well as other harmful substances, such as ethylene. By 2050, greenhouse gas emissions from plastic waste could reach 56 billion tons, accounting for almost 14 % of the Earth's remaining carbon budget [11].

Moreover, such waste gets into the soil, underground sources, and plants, causing life-threatening pollution. And further, it enters the human and animal bodies by consuming such water and plant foods.

Approximately 43 billion tons of production and consumption waste have been accumulated on the territory of Kazakhstan, while only 5 % of solid household waste is recycled or incinerated, and the remaining 95 % of waste is sent to landfills for burial. In the fifteen largest cities of Kazakhstan, the level of air pollution exceeds acceptable standards. A significant part of anthropogenic greenhouse gas emissions comes from the energy sector, which in Kazakhstan is mainly based on the use of coal, which leads to high emissions of carbon dioxide (CO2) [5; 15]. The pace of climate change in Kazakhstan exceeds the global average. The country's economy is characterized by one of the highest levels of energy consumption per unit of production in the world [5; 15].

According to Prime Minister Olzhas Bektenov, the principles of closed-loop economics have been widely implemented in advanced countries, allowing the reintegration of secondary materials into the economy. In Kazakhstan, on the contrary, the practice of burying waste in the ground or leaving it on the surface is still relevant, which leads to a deterioration of sanitary and environmental conditions around settlements [12].

The constitutional rights of citizens of Kazakhstan are violated due to the difficult environmental situation in the country. Article 31 of the Constitution obliges the State to protect the environment for a favorable life, and article 38 requires citizens to respect nature. However, the current state of the environment and waste management prevent the fulfillment of these constitutional obligations [1; 151].

The Environmental Code of the Republic of Kazakhstan, in Article 13, establishes the right of every individual to a favorable environment. Furthermore, Articles 4 and 41 aim to reduce the volume of waste disposed of and encourage preparation for reuse, promoting sustainable development and environmental protection [1; 151]. In this framework, implementing the waste management hierarchy has become a critical task. This principle prioritizes waste prevention, followed by reuse and recycling, and places disposal as the last resort [10].

In 2013, Kazakhstan endorsed the “Green Economy” transition concept, articulating foundational principles such as enhanced resource productivity and accountability for resource utilization [5; 54]. This concept advocates for the economic modernization through advanced technologies, boosts investment appeal for prudent resource management, and prioritizes the execution of economically viable projects. Furthermore, it emphasizes the development of environmental consciousness and education both within the business sector and among the general populace [13]. These principles collectively strive to drive economic expansion while minimizing ecological degradation.

In 2021, Kazakhstan initiated the National project titled “Zhasyl (Green) Kazakhstan”, designed to enhance the environmental quality and elevate the standard of living for its citizens. The project's primary goals focused on improving air quality, advancing waste management efficiency, sustainably managing water resources, preserving the ecosystems of Lake Balkhash and the Northern Aral Sea, increasing the populations of endangered species, expanding urban greenery, and fostering environmental consciousness and culture among the populace [5; 53]. However, due to the project's limited effectiveness, it was officially discontinued on January 1, 2024, by Government Decree No. 828 issued on September 22, 2023 [14].

In February 2018, the Republic of Kazakhstan adopted the National Development Plan through to 2025, setting specific goals and objectives for the implementation of best available technologies in accordance with the standards of the Organization for Economic Cooperation and Development (OECD) at existing enterprises [5; 58]. A significant focus of the plan is on the development of "green" technologies and supporting energy recovery from waste, which contributes to enhancing the environmental situation and sustainable economic development [15].

In November 2022, the Concept for the Development of Housing and Communal Infrastructure for 2023–2029 was ratified. This strategy aims to improve the infrastructure for waste collection and recycling, which is critically important for effective municipal waste management and enhancing the quality of life for citizens [16].

At the meeting of the UN General Assembly on September 25, 2015, the resolution "Transforming our World: The 2030 Agenda for Sustainable Development" was adopted, in which 193 UN member states pledged to promote sustainable development and environmental protection. By September 2022, 52 States had approved strategies to reduce carbon emissions. The European Union and the United States are aiming for carbon neutrality by 2050, and China by 2060. In addition, 13 countries, including Canada and Germany, have made legal commitments to zero emissions, representing 25 % of global GDP. Another 33 countries, including the United States, India and Saudi Arabia, have included zero emissions targets in their national plans, covering 50 % of global GDP [17].

On February 2, 2023, Kazakhstan ratified its Strategy for Achieving Carbon Neutrality by 2060, aligning with its dedication to international sustainability targets. The strategy outlines pivotal measures for decarbonizing the waste management sector, including: 1) diminishing waste generation; 2) hastening the full implementation of MSW collection and sorting; 3) boosting the ratio of recyclable and compostable waste [18]. The plan anticipates reducing total greenhouse gas emissions from MSW through progressively phasing out open waste disposal and significantly curtailing the amount of waste directed to landfills. These initiatives are expected to offset a minor rise in emissions due to enhanced utilization of organic waste for composting and energy generation [18]. Moreover, the strategy promotes the swift deployment of comprehensive systems for waste collection, sorting, and recycling.

The following situation has developed in the European Union in the field of solid waste management. Until the early 1970s, EU waste legislation was within the internal competence of the EU member States.

The situation changed in 1975, when the European Council adopted the Waste Framework Directive (75/442/EC) to harmonize various national practices. This directive established fundamental requirements and defined key terms in the industry. It underwent a significant revision in 2006, and the current version is Directive 2008/98/EC, adopted in 2008 [1; 153].

Directive 2008/98/EC supports the "waste management hierarchy", a system that prioritizes waste management approaches to minimize waste generation. At the top of this hierarchy is "prevention", followed by reuse, recycling, recovery and disposal in order of preference [1; 153].

By the end of 2014, 36 national and regional "prevention" programs had been adopted in the EU, each of which differed in focus, objectives and duration. These programs target various sectors, including households, municipal administrations, agriculture and mining, and usually target waste types such as organic materials, electronic components and hazardous substances [10].

The transition to a closed-loop economy has become a central political and economic task of the European Union, reflecting its commitment to sustainable development. The concept of a circular economy is one of the key political and economic priorities of the European Union.

In December 2015, the European Commission unveiled the definitive edition of the Action Plan on the Circular Economy, identified as COM (2015) 614 [19]. This plan has received support and funding from European Structural and Investment Funds, the Horizon 2020 program, the European Fund for Strategic Investments (EFSI) and the LIFE program aimed at combating climate change [20; 28].

In June 2018, a package of four EU directives came into force, which amended previously existing regulations on waste, packaging, landfills, electronic waste, used vehicles and batteries. These directives aim to decrease annual CO_2 equivalent emissions by 617 million tons, generate approximately 500,000 new jobs, and bolster economic growth within the EU. Collectively, these efforts are anticipated to contribute to a 7 % increase in the EU's GDP by 2035 [8].

Also in 2018, the European Commission presented a mini-package on the closed-loop economy, including a "Plastic Strategy" aimed at radically changing approaches to the development, production, use and recycling of plastic products [21]. By 2030, all plastic packaging should be recyclable, the consumption of sin-

gle-use plastic will be reduced, and the use of microplastics will be limited. The strategy provides that plastic recycling will be beneficial for entrepreneurs, the amount of plastic waste and garbage in the sea will be reduced, and investments and innovations will be supported.

In 2018, the European Commission introduced an additional package focused on the circular economy, which includes a comprehensive "Plastic Strategy". This strategy is aimed at fundamentally altering the processes of designing, manufacturing, using, and recycling plastic goods [23]. By 2030, it is expected that all plastic packaging will be recyclable [22]. The strategy also plans to reduce the use of single-use plastics and limit the application of microplastics. It ensures that plastic recycling becomes economically beneficial for entrepreneurs, reduces the volume of plastic waste and debris in the oceans, and bolsters support for investments and innovations.

As part of the European Green Deal, on March 11, 2020, the European Commission approved a new Action Plan for the Circular Economy [4]. This Plan provides for measures at all stages of the product life cycle aimed at adapting the economy to an environmentally sustainable future, increasing competitiveness, protecting the environment and granting new rights to consumers. The new Action Plan is based on the EU Action Plan on the Closed-Loop Economy, adopted on December 2, 2015, which stimulated the transition to a circular economy, increased global competitiveness, sustainable economic growth and the creation of new jobs [24].

The European Commission also revised the circular economy monitoring system in May 2023, which made it possible to more effectively assess progress and identify areas for further improvements. In March 2023, proposals on "green" claims and the right to repair were adopted, and in November 2022, a revision of the EU rules on packaging and packaging waste. In April 2022, EU measures to combat air pollution from large industrial enterprises were revised, and in March 2022, a package of measures on sustainable products was adopted, including regulation of ecodesign and a strategy for sustainable textiles [25].

Based on these initiatives, it becomes clear that the European Union is consistently moving towards the formation of a climate-neutral closed-cycle economy in which resource efficiency is maximized and losses are minimized at all stages of the product life cycle.

Practically, the legislation of Kazakhstan in the field of MSW recycling and disposal consists of the Constitution of the Republic of Kazakhstan, the Ecological Code of the Republic of Kazakhstan 2021 and several policy documents, and today there is an urgent issue of adopting the Law of the Republic of Kazakhstan "On Waste", which would regulate at the legislative level the main provisions in the field of waste management.

In recent years, as Kazakhstan has increasingly engaged in global environmental policies and initiatives aimed at promoting sustainable development and combating climate change [9], the country has made significant strides in modernizing its environmental sector. This includes decisive improvements in the management of household waste, aligning these efforts with European Union standards.

Consequently, drawing from the aforementioned insights and international practices in solid waste recycling and disposal, the author has formulated a set of recommendations. These recommendations advocate for the adoption of a cohesive and integrated strategy for managing household waste across the Republic of Kazakhstan.

Initially, this involves the enhancement and expansion of infrastructure dedicated to the processing and disposal of solid household waste. Secondly, it includes the ongoing refinement of environmental laws and the enforcement of compliance with environmental standards. Thirdly, there is a focus on establishing an economic incentive system for businesses and individuals to minimize waste production and disposal. This also entails elevating the environmental awareness and practices among the general populace. Lastly, it emphasizes the need to sustain international collaborations and adopt the most efficient and advanced methods and technologies.

Enacting these recommendations will enable Kazakhstan to notably enhance its household waste management system, diminish its adverse effects on the environment, and establish a foundation for sustainable environmental growth. Realizing these objectives will necessitate a holistic strategy, harmonized efforts from government bodies, the business sector, and the community, coupled with the proactive incorporation of international practices and cutting-edge technologies.

Discussion

Addressing the challenges of MSW processing and disposal in Kazakhstan is crucial, demanding state focus and legislative enhancement. As a national priority, these efforts are directed at environmental protec-

tion, sustainable development, and climate change mitigation. However, the analysis indicates that Kazakhstan's current waste management policy is sporadic, often prioritizing economic interests over environmental concerns [1, 10].

In recent years, Kazakhstan has been proactively aligning its environmental standards with those of the European Union within its national waste management framework. A significant step in this direction was the incorporation of the waste management hierarchy principle into the Environmental Code of the Republic of Kazakhstan. This principle, which prioritizes options in descending order of environmental preference, is aimed at sustainable development and mirrors practices common in the EU. It emphasizes waste prevention as the primary goal, followed by reuse and recycling, with disposal as the last resort. This strategy shifts focus toward minimizing waste generation and maximizing resource efficiency, thereby reducing environmental impact and promoting sustainable resource management.

The concept of extended producer responsibility (EPR) has also been introduced in Kazakhstan since 2016. This approach imposes an obligation on manufacturers and importers to ensure the collection and processing of products after their use. Such a mechanism contributes to the creation of more environmentally friendly goods and the support of infrastructure for efficient waste management. EPR principles encourage Kazakhstani companies to develop products that are easier to recycle and invest in collection and recycling systems.

In addition, the introduction of an electronic waste management system has become a significant innovation in our country. This system provides a higher level of control and transparency of waste management processes, from the moment of their formation to their final disposal or recycling. The electronic system helps to improve the collection of data on waste flows, which allows government agencies and private companies to plan and implement waste management strategies more effectively. This digital solution improves the ability to monitor and manage waste recycling and disposal processes, which is an important step towards creating a sustainable waste management system.

These developments reflect Kazakhstan's commitment to align with global environmental norms and establish a more sustainable system for managing waste. Regrettably, despite numerous initiatives undertaken by the Government of Kazakhstan, the state of recycling and disposal of household waste continues to be dire.

Kazakhstan has implemented regulations for separate waste collection as stipulated in Article 321 of the Ecological Code. Nevertheless, facilities for segregated household waste disposal are still lacking nationwide. Additionally, 19 % of the population lacks access to municipal solid waste (MSW) collection and removal services, and those using coal for heating face challenges in ash disposal [26].

Additionally, the development of infrastructure for processing and disposal of MSW in Kazakhstan is progressing slowly. The country faces a scarcity of waste processing facilities and adequate disposal equipment, along with non-compliance of landfills with sanitary standards. This is compounded by numerous unauthorized dumpsites and a generally low level of environmental awareness among the population.

In 2021, Kazakhstan initially planned to establish Waste-to-Energy incineration plants, a method designed to generate electricity or heat from burning waste. However, the project was later discontinued [27]. A significant public outcry, evidenced by a petition with over 8,000 signatures, contributed to this decision. Aliya Salmenova from Recycle Birge highlights that in 2017, the European Commission removed incineration from its recommended waste management practices due to its negative impact on recycling rates, the release of toxic substances and ash, and the high maintenance costs of cleaning filters, which can consume up to 40 % of a facility's budget [28].

Italian researchers have found in their studies that both landfilling and incineration of waste present considerable risks to the environment and human health. The disposal of waste in landfills leads to methane emissions, increases the risk of explosions, and releases toxic chemicals that can contaminate groundwater, surface waters, and soil. Such contamination adversely impacts biodiversity and poses significant health threats to humans [29].

As discussed above, Kazakhstan has focused its efforts on the transition from a traditional linear economy to an innovative closed-loop economy, which underlines its commitment to sustainable development.

The circular economy concept draws from the theories of K. Boulding, who posited that the sustainability of human life on Earth necessitates the adoption of closed-loop systems within the global economy [30].

Nonetheless, the definition of "closed-loop economics" remains contentious among scholars. J. Kirchherr, D. Reike, and M. Hekkert point out that there are 114 distinct definitions of the term, indicating that it can be interpreted variously by different individuals [31].

A closed-loop economy, or circular economy, is a model in which the value of products, materials and resources is maintained for as long as possible, minimizing the loss and use of new resources. Simply put, it is a system aimed at resource regeneration, minimizing waste, emissions and energy losses through the improvement of technological processes. This goal is achieved through innovative design, regular maintenance, repair, reuse, restoration and recycling of materials.

Studies on the impact of circular economy measures on the environment indicate that significant reductions in emissions of CO_2 and other greenhouse gases can be achieved through policies aimed at efficient resource management, environmentally sound design and reuse of materials [32].

The concept of SWM adopted in the EU reinforces the strengthening of the "link between waste recycling and resource recovery" by increasing the cost of end-of-life products, thus stimulating the circulation of materials [33].

According to the authors E. Chioatto, M.A. Khan, P. Sospiro, with whom it is difficult to disagree, it is necessary, firstly, to contribute to the prevention of waste generation, secondly, to promote more efficient waste management by encouraging reuse, recovery and recycling, and, thirdly, to reduce the amount of waste thrown away to the landfills. This approach will help reduce emissions from waste accumulation and save 17–24 % of raw materials, which from an economic point of view corresponds to savings of about 630 million euros and an increase in EU GDP by 3.9 % by 2030 [33].

According to the concept of a circular economy, waste should be perceived not as an undesirable by-product of economic activity, but as a valuable resource to be reused [29].

For example, Sweden ranks first in the world in terms of waste management efficiency, so back in 1947 the Swedish Waste Management Association Avfall Sverige was formed, today with 400 collective members and through them representing 99.9 % of the country's population. To reduce the number of landfills, a landfill tax was introduced in 2000, the disposal of explosive waste was banned in 2002 and organic waste in 2005; later, a tax on the incineration of household waste was also introduced [1; 154].

Currently, over 99 % of household waste is managed effectively: 50.6 % is recycled, 48.6 % contributes to energy generation, and a mere 0.8 % is landfilled. The recycling infrastructure, evolving since the 1970s, significantly supplies heat across the nation. To promote waste sorting and recycling, the government has implemented tax breaks for repairs, penalties for inadequate waste handling, and robust environmental education programs. Furthermore, the widespread adoption of sharing services by Swedish supports sustainable consumption and development [34].

To solve acute issues of waste disposal and recycling in Kazakhstan, it is planned to build 37 new waste recycling plants that will process waste paper, glass, plastic, metals and electronics, as well as modernize 8 existing domestic waste recycling plants, for which it is planned to allocate about 200 billion tenge [12].

Kazakhstan's Prime Minister, Olzhas Bektenov, has stated that "a robust waste management system will yield economic and environmental advantages while also fostering the establishment of new businesses, the adoption of cutting-edge technologies, and the creation of numerous job opportunities" [12].

Therefore, to fulfill the objectives of transitioning to sustainable development in the Republic of Kazakhstan, it is essential to further refine legislation and actively incorporate innovations in the processing and disposal of MSW.

Conclusions

The assessment indicates that Kazakhstan's regulatory framework for MSW processing and disposal is still developing, and the effectiveness of the existing MSW management system is limited. By incorporating lessons from European models, the Ecological Code of the Republic of Kazakhstan has introduced progressive waste management principles such as a waste hierarchy and extended producer responsibility, proving advantageous. It is essential to accelerate the adoption of the "On Waste" Law to comprehensively tackle waste management issues and lay down a legislative groundwork for applying the principles of the circular economy.

Furthermore, refining the current legislative framework for household waste management necessitates promoting the growth of small and medium-sized enterprises (SMEs) in the waste processing and disposal sector.

From our analysis of European practices, we conclude that it is vital for businesses to foster conditions conducive to zero-waste production, and effective sorting and disposal of solid waste, supported by incentives and preferences.

It is also critical to ensure continuous and detailed public communication about the environmental status, particularly concerning landfills, and the available disposal options. This can be achieved through collaborations with media and public organizations. Moreover, providing Kazakhstani citizens with choices in disposal methods and purchasing options, such as biodegradable packaging, is crucial.

Adopting this approach will not only enhance public awareness but will also encourage individuals to make environmentally responsible choices, understand their impact, and thus, foster the growth of environmental education within the community.

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А.А. Нукушева, С.Э. Асанова

Қазақстандағы қатты тұрмыстық қалдықтарды қайта өңдеу мен кәдеге жаратудың құқықтық аспектілері: тұйық циклді экономика контексіндегі халықаралық стандарттар және ұлттық реттеу

Қазақстан Республикасы айтарлықтай көлемдегі табиғи ресурстарға және қарқынды дамып келе жатқан экономикаға ие бола отырып, қатты тұрмыстық қалдықтардың өсіп келе жатқан көлемдеріне тап болады, бұл оларды қайта өңдеу және кәдеге жарату жөніндегі тиімді шараларды жүргізуді талап етеді. Мақаланың негізгі мақсаты Қазақстандағы қатты тұрмыстық қалдықтарды басқарудың құқықтық аспектілерін талдау, ұлттық заңнаманың халықаралық стандарттарға сәйкестігін бағалау және тұйық цикл экономикасы қағидаттарының интеграциялану әлеуетін зерделеу. Зерттеу Қазақстандағы қатты тұрмыстық қалдықтарды құқықтық реттеу саласындағы ағымдағы жағдайды қамтиды және негізгі мәселелерді анықтайды. Саяси-құқықтық талдау әдістерін, салыстырмалы-құқықтық тәсілді және жүйелік талдауды қолдану қазіргі бастамалардың тұрмыстық қатты қалдықтарды басқаруды жақсартуға және экологиялық тепе-теңдікті сақтауға қалай ықпал ететінін бағалауға көмектеседі. Зерттеу нәтижелері Қазақстанның қатты тұрмыстық қалдықтарды басқару жөніндегі заңнамалық базасын жетілдіру қажеттігін көрсетеді. Қалдықтарды басқару иерархиясы мен өндірушінің кеңейтілген жауапкершілігінің еуропалық принциптеріне негізделген жаңа экологиялық кодексті енгізу алға жасалған маңызды қадам болып табылады. Алайда, одан әрі ілгерілеу үшін айналмалы экономика қағидаларын іске асыруды нақтылайтын «Қалдықтар туралы» Заң қабылдау қажеттігін негіздейді. Сондай-ақ, қалдықтарды қайта өңдеу саласында шағын және орта бизнес үшін жағдай жасаудың және қоғамдық ұйымдар мен БАҚ-ты ақпараттандыру мен тарту арқылы халықтың экологиялық хабардарлығын арттырудың маңыздылығы атап өтілген.

Кілт сөздер: қатты тұрмыстық қалдықтар, қатты тұрмыстық қалдықтарды қайта өңдеу және кәдеге жарату, өндірушінің жауапкершілік принципі, қалдықтарды басқару иерархиясы принципі, айналмалы экономика, қалдықтарды басқарудың еуропалық стандарттары.

А.А. Нукушева, С.Э. Асанова

Правовые аспекты переработки и утилизации твердых бытовых отходов в Казахстане: международные стандарты и национальное регулирование в контексте экономики замкнутого цикла

Республика Казахстан, обладая значительными природными ресурсами и быстро развивающейся экономикой, сталкивается с растущими объемами твердых бытовых отходов, что требует эффективных мер по их переработке и утилизации. Основной целью данного исследования является анализ правовых аспектов управления твердыми бытовыми отходами в Казахстане, оценка соответствия национального законодательства международным стандартам и изучение потенциала интеграции принципов экономики замкнутого цикла. Исследование охватывает текущее состояние в области правового регулирования твердых бытовых отходов в Казахстане и выявляет ключевые проблемы. Использование методов политико-правового анализа, сравнительно-правового подхода и системного анализа помогает оценить, как современные инициативы могут способствовать улучшению управлением твердыми бытовыми отходами и поддержанию экологического равновесия. Выводы исследования указывают на необходимость усовершенствования законодательной базы Казахстана по управлению твердыми бытовыми отходами. Внедрение нового Экологического кодекса, основанного на европейских принципах иерархии обращения с отходами и расширенной ответственности производителя, является важным шагом вперед. Однако для дальнейшего прогресса требуется принятие Закона «Об отходах», который бы конкретизировал реализацию принципов экономики замкнутого цикла. Также подчеркивается важность создания условий для малого и среднего бизнеса в сфере переработки отходов и повышения экологической осведомленности населения через информирование и привлечение общественных организаций и СМИ.

Ключевые слова: твердые бытовые отходы, переработка и утилизация твердых бытовых отходов, принцип ответственности производителя, принцип иерархии обращения с отходами, экономика замкнутого цикла, европейские стандарты управления отходами.

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Information about the authors

Nukusheva Aigul Ashimovna — Candidate of juridical sciences, Full Professor, Professor at the Department of Civil and Labor Law, Karaganda Buketov University, Karaganda, Kazakhstan;

Assanova Saida Ergashevna — PhD, Deputy Dean for Research and Innovation and International Relations of the Faculty of Law, Al Farabi Kazakh National University, Almaty, Kazakhstan. E-mail: assanovasaida@gmail.com.