https://www.proconference.org/index.php/usc/article/view/usc27-00-020
DOI: 10.30888/2709-2267.2024-27-00-020

UDC 354:328.185

HOUSEHOLD WASTE MANAGEMENT IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

УПРАВЛІННЯ ПОБУТОВИМИ ВІДХОДАМИ У КОНТЕКСТІ СТАЛОГО РОЗВИТКУ

Radionov V. / Радіонов В. С.
graduate student /аспірант
https://orcid.org/0009-0001-0439-492X
O. M. Beketov National University of Urban Economy in Kharkiv,
Ukraine, Kharkiv, Chervonoglazivska Street, 17, 61002
Харківський національний університет
міського господарства імені О. М. Бекетова
Україна, Харків, вулиця Червоноглазівська 17, 61002

Abstract. *The article considers the mechanisms of household waste management in the context of the concept of sustainable development. Based on the experience of developed countries, more effective ways of building a solid waste management system than burial are being investigated. Special attention is paid to household waste management technologies that meet the principles of sustainable development: recycling, composting and energy utilization. The triune concept of sustainable development is analyzed. It has been proven that neglecting any of the components brings the system out of balance and prevents sustainable development. The need to change the paradigm of socio-economic development from a linear model of production and consumption to a model of a closed cycle is substantiated. Improving the waste management system is perceived as one of the areas of development of the "blue" economy.*

Key words*: concept of sustainable development, municipal solid waste, waste management mechanisms, closed cycle economy, "blue" economy.*

Анотація. *У статті розглядаються механізми управління побутовими відходами у контексті концепції сталого розвитку. Спираючись на досвід розвинених країн, досліджуються ефективніші способи побудови системи поводження з твердими побутовими відходами, ніж поховання. Особлива увага приділяється технологіям поводження з побутовими відходами, які відповідають принципам сталого розвитку: рециклінг, компостування та енергетичну утилізацію. Аналізується триєдина концепція сталого розвитку. Доведено, що зневага будь-яким із компонентів виводить систему з рівноваги і не дозволяє досягти сталого розвитку. Обґрунтовується необхідність зміни парадигми соціально-економічного розвитку з лінійної моделі виробництва та споживання на модель замкнутого циклу. Удосконалення системи управління відходами сприймається як один із напрямів розвитку «синьої» економіки.*

Ключові слова*: концепція сталого розвитку, тверді комунальні відходи, механізми керування відходами, економіка замкнутого циклу, "синя" економіка.*

Introduction.

In recent decades, at the global level, the concept of sustainable development has taken an important place in the establishment of environmental principles. The term sustainable development implies that the development of mankind should take place in such a way as to satisfy current needs without compromising the ability of future generations to satisfy their own needs. Despite the fact that the need to

transition to a model of sustainable development at the international and national levels has been discussed for several decades, sufficient progress, especially in the field of waste management, has not yet been achieved. Until now, waste is one of the main anthropogenic sources that make a significant contribution to soil, ground and surface water pollution and littering and is one of the main sources of greenhouse gas emissions. The main task of state authorities and local governments is to create optimized waste management mechanisms and tools to reduce the volume of waste generation, as well as the creation of complex principles of waste management, contributing to the greening of the entire sphere of waste management through the introduction of closed-loop waste management mechanisms [1].

Degree of development of the problem.

A number of authors dealt with the issues of waste management as secondary material resources: Bagrov N. V., Balatsky O. F., Bozhko S. M., Burkinsky B. V., Voronchuk M. M., Galushkina T. P., Gerasimchuk Z. V., Grigor'ev A. S., Danylyshyn B. M., Melnik L. G., ta in.However, despite many scientific publications and studies on this topic, to date, the issues of assessing the negative impact on the environment in the field of waste management and methods of stimulating industry entities to separate collection and processing of secondary material resources from municipal solid waste have not been sufficiently studied.

The purpose of the article is to develop methods for managing production and consumption waste as a mechanism for waste management taking into account sustainable development.

Core material.

Currently, one of the main sources of anthropogenic impact on natural systems on a planetary scale is municipal solid waste. During the anaerobic decomposition of organic substances included in household waste, “landfill gas” (biogas) is released into the atmosphere. At its core, it is a flammable gas consisting mainly of methane (55–75%), carbon dioxide (25–45%) and impurities of hydrogen sulfide, ammonia, nitrogen oxides, etc. (<1%) [2]. As is known, methane, which forms the basis of landfill gas, makes a significant contribution to greenhouse gas emissions. Estimates

of the contribution of landfill gas to global greenhouse gas emissions vary. According to one of the existing estimates, on a planetary scale, the contribution of household waste disposal sites to greenhouse gas emissions is about 40 million tons/year, which is about 15% of global emissions [2]. It is worth noting that the decomposition process is very long in time, the active decomposition phase with gas release varies and can reach up to 50 years [2].

In addition to the release of pollutants into the atmosphere, if waste disposal sites are not properly organized, water and soil resources are polluted. But the most important thing is soil degradation as a result of littering with solid municipal waste. When waste is placed on them, the land is taken out of economic circulation for a long period of time and becomes unsuitable for economic activity, which consequently leads to economic losses.

The experience of many foreign countries shows that there are more effective ways to build a solid waste management system that excludes their disposal. In China, the burial rate is about 52%, the USA – 50%15, Italy – 22%, Germany, Finland and Sweden – 1% [3]. The success of these countries is due to the introduction of various technologies for handling household waste that comply with the principles of sustainable development. Such technologies include recycling, composting and energy recovery.

The term and concept of sustainable development were first formulated in 1980, when the term “sustainable development” was first mentioned in the world conservation strategy developed under the auspices of UNEP [4]. The integration of three main areas – environmental, economic and social – was the catalyst for the emergence of the concept of sustainable development. This concept was first proposed by economist Rene Passet in 1979 [5]. And it was subsequently enshrined in the United Nations Millennium Declaration, adopted by the UN General Assembly on September 8, 2000, which defined the principles of sustainable development as economic development, social development and environmental protection [6], subsequently confirmed at the World Summit on Social Development held in 2005 in New York [7].

To solve the problems of sustainable development, development strategies and technologies must be used that break the connection between economic growth and the unconditional increase in environmental damage and the depletion of resources caused by it.

The ecological component of the concept assumes that sustainable development must ensure the integrity of biological and physical natural systems, preserving the ability of ecosystems to self-heal and adapt. Within the framework of the environmental component, two main approaches to reducing the negative human impact on the environment have been developed – environmental management systems and consumption management.

The key elements of the social component are population, poverty, human relations with nature, where people live, human rights, as well as peace, security and social justice. In recent decades, the human population has grown rapidly and continues to grow, which, due to the limited availability of basic resources such as water and food, is a big problem.

Together, the economic, environmental and social components make up the triune concept of sustainable development. The essence of this concept is that these three components are interdependent and, as a result, none of them can exist independently. Neglecting any of the components puts the system out of balance and does not allow achieving sustainable development. It is possible to give everyone equal rights and be more environmentally responsible, but without economic development it is impossible to maintain the current level of consumption. A balance can be struck between economic development and sustainable use of supporting ecosystems, but without social development benefits will be unevenly distributed. It is also possible to promote equity and support economic growth, but without respect for the environment, such development will lead to the degradation of supporting ecosystems and their depletion.

The term “sustainability” implies proactive decision-making and innovation that minimizes the negative human impact on the environment, maintaining a balance of interests between the desired level of economic development, the

sustainability of ecosystems and the necessary level of social progress in order to ensure the most favorable environment for all residents species now and in the future.

Over the past decades, scientists have conducted a lot of research in the field of waste management in the context of national and regional sustainable development. In our opinion, it is necessary to change the paradigm of socio-economic development from a linear model of production and consumption to a closed one. It is commonly called the circular economy or circular economy [8]. At the national level, it is necessary to reorganize the forms of production and economic activity, their reorientation from the consumption of primary resources to renewable ones. At the same time, we emphasize the high potential of municipal solid waste for the development of processing, composting and energy recovery, as well as the need for a differentiated approach to the implementation of a circular economy in different territories of the country. The need for this is due to differences in the benefits and risks of introducing a circular economy associated with differences in the development of individual territories due to the specific socio-economic priorities and environmental culture of the regions of Ukraine.

Effective management of household waste should ensure the recovery of resources and be based on the processes of improving the infrastructure for collecting and sorting waste with the creation of appropriate production capacities. But not only this mechanism, in our opinion, sustainable economic development today should be implemented through the prism of creating a “blue” economy [8], because it has significant multiplicative and anti-crisis potential. At the same time, comparable growth rates and employment levels are ensured, as with traditional business activities. Indirectly, this leads to increased competitiveness of the economy and stimulates innovation.

We consider improving the waste management system as one of the areas for developing the “blue” economy, although practical implementation is still far away. In our opinion, such incentive methods as organizational and administrative (creation of waste disposal and recycling programs), legal (control over the activities

of “blue” enterprises at all stages of production), economic (subsidies, grants, fiscal policy), socio-psychological (educational projects) are aimed at overcoming barriers to the implementation of the blue economy concept [8]. In this context, it should be highlighted: the rationale for the need to create an accounting and monitoring system in the field of waste management and the development of methods for economic stimulation of various subjects in the field of waste management.

Conclusions.

So, the essence of sustainable development in the context of household waste management is to create a management system that would ensure a reduction in the negative impact on the environment and the population, and also promote the rational use of available resources. Such a system should be based on the principles of a circular economy. The essence of these principles is that at the end of their life cycle, goods are not sent to landfills as unsuitable for further use, but are involved in economic circulation as secondary resources. The introduction and stimulation of a system of separate waste collection, as well as the development of waste recycling, will certainly contribute to achieving the goals of sustainable regional and national development.

References

1. Що нам потрібно для успішного реформування системи управління відходами? Підсумки експертної дискусії. URL: https://www.irf.ua/shho-nam-potribno-dlya-uspishnogo-reformuvannya-systemy-upravlinnya-vidhodamy-pidsumky-ekspertnoyi-dyskusiyi/

2. Білецька І. М. Управління відходами як складова еколого-орієнтованого управління підприємством. URL: http://www.economy.nayka.com.ua/?op=1&z=3063

3.Переробка відходів в розвинених країнах світу. URL: http://www.biowatt.com.ua/analitika/pererobka-vidhodiv-v-rozvinenih-krayinah-svitu/

4. IUCN-UNEP-WWF World Conservation Strategy: Living Resource

Conservation for Sustainable Development. – 1980. – 77 p.

5. Passet, R. L'économique et le vivant, Paris, France: Traces. – 1975. – 287 p.

6. United Nations General Assembly, United Nations Millennium Declaration, Resolution 55/2, adopted by the General Assembly on 8 September 2000. – 2000. – 9 p.

7. United Nations General Assembly, 2005 World Summit Outcome, Resolution A/60/1, adopted by the General Assembly on 16 September 2005. – 2005. – 38 p.

8. Радіонов В. С. Впровадження концепції синій економіки в управлінні відходами як інноваційний напрям / Актуальні питання хімії та інтегрованих технологій в умовах кризових ситуацій. III міжнар. науково-практич. інтернет-конф. 24–26 вересня 2024 р. / Харків. нац. ун-т міськ. госп-ва ім. О. М. Бекетова – Харків : ХНУМГ ім. О. М. Бекетова, 2024. – 161 с.