

THE LEVEL OF RESEARCH INTO THE RECYCLING AND USE OF WASTE AS A SECONDARY RESOURCE

Hamza Aminov ¹

Nomanjan Shakirov ¹

Alisher Bahriev ¹

¹ Research Institute of Environment and Nature Conservation Technologies

E-mail address: khamzaminov1964@gmail.com; obidjonergashev2904@gmail.com;
smukhtor94@gmail.com.

Abstract

Recycling waste and its use as a secondary resource have become important aspects of sustainable development and environmental protection. As people become more aware of the increasing amount of waste and environmental problems, recycling is not only economically beneficial, but also necessary for the conservation of natural resources.

According to the World Health Organization (WHO), more than 2 billion tons of solid waste are generated worldwide each year. This number is growing, causing major environmental and social problems. Improper waste management pollutes soil, water, and air, and also poses a threat to human health. Therefore, waste recycling is becoming an important task for modern societies.

Keywords: Recycling, waste, environmental knowledge, resource efficiency, sorting, plastic, composting, reuse, environmental initiatives, circular economy, waste reduction, renewable resources, education and awareness.

Introduction

Nowadays, due to the rapid development of economic sectors in our country, the rational use of natural resources on a large scale and environmental protection remain relevant. The purpose of studying the scientific topic is that, despite the fact that there are more than a thousand types of waste in the economy, the emphasis is mainly on household, industrial, medical, electronic, and wastewater waste, and the scientific basis for the use of construction waste resources is not sufficiently covered in the literature. Therefore, we found it necessary to highlight the scientific ways of using construction waste. Uzbekistan, like all countries in the world, is not left out in this area due to the problems of collecting, transporting, storing, utilizing, neutralizing, and destroying waste generated under the influence of human activity. According to data and analysis, each person generates an average of 1-1.5 kg of household waste during their daily lives, or about 11 million tons of waste worldwide. In Uzbekistan, due to rapid population growth, an average of 7-7.5 million tons of waste per year, or 16 million tons of solid household waste by 2030, is expected to be generated.

In the Russian Federation, 1.3 kg of household waste is generated per capita, of which 47% of solid household waste falls on the city of Moscow and the Moscow region, and 80-90% of this solid household waste is transported to landfills. Also, 13 million tons of plastic waste are dumped into the world's oceans every year. In 2018, 50 million tons of electronic waste were generated worldwide. Currently, 125-128 million tons of industrial waste, 1-1.3 million tons of construction waste, and more than 4 million tons of medical waste are generated annually in the territory of the Republic. The impact of this waste on human life and health, property, and the environment cannot be expressed in one word. [1-4]

Secondary resources – **these are** consumer and production wastes generated in households that can be reused directly or after additional processing ;

Solid waste – organic and inorganic waste generated as a result of the life and activities of legal entities and individuals, as well as as a result of natural processes on their territory and in landscaping facilities, i.e. (food and plant residues, textile products, packaging materials, glass, rubber, paper, waste generated from the use of solid fuel-burning household stoves and heating boilers, etc.

Construction waste - **includes waste generated as a result of the construction, reconstruction and (or) installation, repair, improvement and demolition** of buildings and structures, including roads and engineering communications, as well as production facilities. Renovation (from the Latin word renovatio - renewal) is construction waste generated during the demolition, reconstruction, and repair of buildings and structures.

Industrial waste **is** the unused by-products of a manufacturing process, which can be raw materials or particles of newly formed substances. Industrial waste can be in solid, liquid or gaseous form.

Waste recycling - carrying out technological operations related to changing the physical, chemical or biological properties of waste in order to ensure its environmentally safe storage, transportation or disposal;

Waste disposal – waste resulting from the separation of waste as secondary raw materials. The issue of using waste as a secondary resource has not yet been fully resolved. Moreover, although many scientific studies and analyses have been conducted on household waste, the issue of construction waste remains neglected, and there are few scientific studies, articles, scientific sources and literature on this topic by specialists and scientists in our republic [5-6].

MATERIALS AND METHODS

Strategic requirements for the processing of construction waste.

Typically, goals and tasks for the implementation of each sector's development are set. In particular, the main strategic principles for waste management are as follows:

- compliance with the requirements of environmental protection legislation in implementing the strategy;

- reduce the negative impact of waste on the environment and ensure state and public control over all processes in their implementation;
 - introduction of the principles of "green tariff" and "green subsidy" aimed at supporting public-private partnerships and the entrepreneurial class in waste management;
 - It is necessary to establish tasks to reduce environmental pollution by creating appropriate legal and economic frameworks, providing for the recovery of costs from waste generators in accordance with the "polluter pays" principle when carrying out waste-related activities.
- The Resolution of the President of the Republic of Uzbekistan No. 4291 dated April 17, 2019 "On Approval of the Strategy for the Implementation of Work Related to Solid Municipal Waste in 2019-2028" sets out the task of implementing the Strategy in 2 stages (Table 1.).

Table.1 Target indicators of the solid waste management strategy for 2019–2028
in percentage terms

Event name	2021	2025y	2028y
Covering the population with household waste collection and disposal services	85	100	
Solid waste recycling	25	45	60
Recycling of solid household waste at a specialized enterprise	10	15	25
Reducing the amount of waste being buried in landfills	25	45	60
Reclamation after landfills are full	20	65	100
Use of alternative energy generation at solid waste facilities	15	25	35
At waste disposal facilities to monitor	20	75	100
Organization of waste disposal in accordance with legal requirements	25	65	100

Note: Resolution No. PQ-4291, paragraph 3, paragraph 4, sets the task of ensuring the recycling of at least 60% of generated solid household waste[10], pages 2-3.

Therefore, as a special area of environmental protection in our country, a state-wide waste management system has been in place since 2017.

The general system of environmental management in waste management, that is, the prevention of harm to the life, health and property of the population, the reduction of negative environmental impacts, the systematic introduction of waste-free technologies and the effective use of waste sources as a secondary resource in the economy. This goal is aimed at reducing waste generation and organizing the widespread use of secondary material resources in the economy by recycling them, as well as increasing the environmental and economic efficiency of the enterprise.

World experience shows that we can observe positive approaches in the use of technogenic waste as a secondary resource in the countries of the European Union and a number of developed countries.

is reflected in the "environment" section of the 1957 founding treaty of the European Union, as well as in the general guidelines of the European Union on environmental and resource consumption issues.

According to this treaty, one of the main tasks facing the European Union is to "improve the quality and level of environmental protection."

In the European Union, waste management is implemented through legal instruments, the basis for their development is the environment and sustainable development programs adopted at different times. The most famous in this regard is the "Sixth Environment Action Program" No. 1600/2002/EU, adopted by the European Parliament and the European Council on July 22, 2002.

The main objectives of the program are to achieve "more effective management of resources and waste to create sustainable production and consumption patterns." Chapter 8 of this program identifies the following priority approaches to activities and tasks in the field of waste management. Namely:

- prevent the formation of waste and significantly reduce its volume through measures to use resources more efficiently;
- simultaneously achieve a significant reduction in the amount of waste harmful to the atmosphere, water and soil, as well as a significant reduction in the volume of landfills, as well as a reduction in the amount of hazardous waste;
- encourage the use of materials generated through waste recycling as a secondary resource;
- reduce the toxicity of waste and bury it as far away as possible.

The study of the origin, collection, transportation, sorting, processing, utilization, landfilling, burial, reclamation, introduction of waste-free technologies, reasons for investment, and historical management processes are among the priorities.

The UNECE's Environmental Performance Review 3 (2020) states in the section "Construction waste and demolition of buildings" [8], page 216.

- Despite the implementation of major infrastructure and housing projects in Tashkent, there is insufficient information on construction waste and building demolition;
- Uncontrolled transportation, disposal, and demolition of construction waste;
- Construction waste generated during the demolition process is often used as backfill for pits;
- The fact that the population is separating and reusing windows, doors, bricks, and wood generated during the demolition of buildings.

According to the scientific research of A. Yuldashev et al., the composition of construction waste generated by production types is as follows: *construction industry* - 3.5%, *repair* - 58.2%, *relocation (separation)* - 29.3%, *reconstruction* - 7.6%, *new construction* - 1.4% [8-10].

According to the World Bank, the world generates an average of 2.01 billion tons of solid waste per year, and this figure is predicted to reach 3.4 billion tons by 2050. An average of

931 million tons of food is wasted each year, and 14 million tons of plastic waste is dumped into aquatic ecosystems.

Due to rapid population growth, Uzbekistan is expected to generate an average of 7-7.5 million tons of solid household waste per year, or 16 million tons by 2030. Industrial waste is generated annually at 125-128 million tons, and medical waste at more than 4 million tons. The issue of using waste as a secondary resource has not yet been fully resolved. [11-14]

Table 2 Comparative indicators of household waste disposal by country in %.

Countries	Burn	To the dump release	Composting	Others
Switzerland	80	18	2	
Japan	72	24.5	1.5	2
Sweden	56	34	9.9	0.1
Belgium	47	44	9	
Netherlands	40	44	15	1
France	36	47	8	9
Denmark	32	64	4	
FRG	28	69	2	1
Italy	18.5	35	5.5	41
USA	8	82		10
Canada	6	93		1
Spain	5	76	19	
Russia and CIS	5	95		
Great Britain	2	2	98	

In the table cited countries inside waste burn technologies application average indicator – 31 % , output to laboratories recycling – 53.9 % , composting – 5.4 % organization Author KV Nikolayeva data in , Europe Union waste disposal to do (Waste Framework Directive), waste Landfill Directives) in directives to the landfills burial for to be sent waste secondary again at work in energy n use , utilization to do on account of their size to reduce priority given . This following table stay safe example be takes.

Table 3 Key indicators of waste management in the European Union in 2009 in %
(Nikolayeva KV, Sagdeyeva AA, Grigoryeva ON Vestnik Kazan. 2012)

Europe Union countries	Solid household waste burial	Enable solid household waste	Secondary again to work priority (recycling)	Average annual population Number (million people)	Surroundings the environment to the protection spent (as a % of GDP)
Germany	0	32	67	81.9	0.5-2008
Sweden	1	49	50	9.3	0.4-2008
Switzerland	0	49	51	7.7	0.6-2007
Finland	46	18	36	5.3	1.1-2006.
Belgium	5	34	61	10.8	0.6-2007
Bulgaria	96	0	4	7.6	2.1-2006
Czech Republic	72	10	17	10.5	1.9-2008
Denmark	4	48	48	5.5	0.5-2008
Estonia	62	0	38	1.3	--
Ireland	58	4	28	4.5	1.7-2007
Greece	81	0	19	11.3	0.5-2007
Spain	52	9	39	46.0	0.9-2007.
France	32	34	34	62.6	0.9-2007.
Italy	49	13	38	60.2	0.8-2008
Cyprus	86	0	14	-	-
Latvia	92	0	8	2.3	-
Lithuania	91	0	9	3.3	-
Luxembourg	17	36	47	0.5	1.1-2008.
Hungary	74	10	16	10.0	0.7-2008
Malta	95	0	5	-	-
Netherlands	1	32	67	16.5	0.8-2008
Austria	1	29	70	8.4	0.4-2008
Poland	65	1	31	38.1	0.6-2008
Portugal	62	18	20	10.6	0.5-2007
Romania	77	0	23	21.5	0.4-2007
Slovenia	69	2	30	2.0	-
Slovakia	81	7	12	5.4	-
Turkey	85	0	15	71.9	-
Great Britain	49	11	40	61.8	1.0-2007
Iceland	68	10	21	46.0	-
Norway	14	41	44	4.8	0.6-2008

Household waste secondary again work in the field Austria-70%, Germany and the Netherlands-67% and Belgium 61% leadership as are coming . Bulgaria, Malta, Latvia , Lithuania , Cyprus , Turkey , Greece , Romania , Poland , Estonia and other countries waste burial with to limit , to turn on from the methods almost less [15-20]

Conclusion

Analyses show that over the past 35 years, the insufficient provision of services for the generation, collection and disposal of construction waste in urban and rural settlements, the unsatisfactory infrastructure in this regard, and the failure to establish special landfills on a project basis have negatively affected environmental pollution and the lives and health of the population.

Due to the incomplete processing of the resulting construction waste, secondary resources were dumped in undesignated areas such as rivers, streams, canals, roadsides, and field edges, causing legitimate objections from residents due to environmental pollution.

The lack of regulatory documents in the field of construction waste management, the lack of compliance of existing landfills with sanitary and hygienic requirements and environmental standards, and the insufficient and incomplete study of construction waste by local scientists.

References

1. United Nations Environment Program (UNEP). (2021). Global Waste Management Outlook.
2. World Bank. (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050.
3. European Commission. (2020). Circular Economy Action Plan.
4. Kaza , S., Yao, LC, Bhada -Tata, P., & Van Woerden , F. (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. World Bank.
5. Geyer, R., Jambeck , JR, & Law, KL (2017). Production, use, and fate of all plastics ever made. Science Advances, 3(7), e1700782.
6. Zhang, Y., & Wang, Y. (2019). Waste management in China: A review of the current situation and future prospects. Waste Management, 95, 1-10.
7. Mazzanti , M., & Zoboli , R. (2009). Waste generation, waste disposal and recycling: A comparative analysis of EU countries. Ecological Economics, 68(12), 2908-2919.
8. Baldé , CP, Wang, F., & Kuehr , R. (2015). The Global E-waste Monitor 2014. United Nations University.
9. Jenkins, RR (1993). The Economics of Solid Waste Reduction: The Case of the Massachusetts Bottle Bill. Journal of Environmental Economics and Management, 25(2), 160-179. Link
10. Rogers, D. B., & McDonald, S. (2009). The role of recycling in the sustainable development of the packaging industry: A case study of the UK. Resources, Conservation and Recycling, 53(11), 628-635. Link
11. Thompson, RC, Swan, SH, & Moore, CJ (2009). Our plastic age: A global assessment of the impact of plastic pollution on marine life. Marine Pollution Bulletin, 58(7), 1000-1002. Link

12. EPA. (2021). Advancing Sustainable Materials Management: 2021 Fact Sheet. Environmental Protection Agency. Link
13. Kumar, S., & Singh, R. (2018). A review on waste management and recycling in India. Waste Management & Research, 36(4), 321-330.
14. García , J., & Pineda, M. (2019). Recycling of plastic waste: A review. Journal of Cleaner Production, 229, 1235-1249.
15. Kumar, A., & Singh, SP (2019). Technological advances in waste management. Environmental Science and Pollution Research, 26(4), 3282-3290.
16. Wang, Y., & Zhang, Y. (2020). Current status and challenges of waste recycling in China. Waste Management, 102, 1-5.
17. Meyer, A. (2020). Plastic waste and recycling: A global overview. Journal of Environmental Management, 261, 110228. Link
18. Pérez, JM, & González, M. (2019). Circular economy and sustainable development: The role of waste management. Resources, Conservation and Recycling, 146, 194-203.
19. Ritchie, H., & Roser , M. (2020). Waste Management. Our World in Data.
20. OECD. (2018). Improving Recycling Markets: A Focus on Plastics.