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Legal Issues of Effective Management of Household Waste

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Abstract
The article provides analytical data on the main environmental problems in cities around the world today and the role and place of legal instruments in solving them. At the same time, the coordination of waste-related activities in settlements, ie the processing of solid and domestic waste, effective ways of their utilization have been studied on the basis of advanced foreign experience. In addition, the situation with household waste in cities and villages of the country was analyzed on the basis of current legislation and official sources, and relevant proposals and recommendations were developed to address the existing problems.

Keywords
Settlement, City, Environmental Problem, Waste, Legal Remedy, Greening.

Introduction

According to the United Nations data, by 2024, the world population has exceeded 8 billion and is projected to increase by another 2 billion by 2050, More than half of the global population lives in cities, and the number of urban agglomerations continues to grow. (Population of the world and countries) According to UN estimates, by the mid-21st century, the urban population will increase by an average of 200,000 people daily, with seven out of ten individuals residing in urban areas. (Dushkova et al, 2016) These indicators reflect the escalating anthropogenic impact on the natural environment, highlighting the critical need to ensure citizens' rights to a favorable environment, which largely depends on the protection of urban, rural, and other settlements (Stasi, 2023).

It is important to emphasize that while efforts have been made in recent years to ecologize certain sectors of economic activity in our country, and organizational and legal conditions for transitioning to sustainable development have been established, many environmental protection challenges in cities remain unresolved. The complexity of legal regulation in this area lies in the

need for legislation to both guide the behavior of participants in environmental relations toward socially acceptable directions and address socio-economic problems set out in planning documents (Rogowska, 2023).

Despite the creation of a legal framework for regulating waste-related relations in our country, waste management in settlements cannot yet be considered sufficiently efficient. Specifically, the systems for initial waste sorting, separate collection by type, neutralization, disposal, reuse, and recycling of household and industrial waste with high volumes of valuable components remain underdeveloped. Additionally, mechanisms for monitoring waste, maintaining waste generation records, certification, and implementing state cadastres for waste disposal and recycling sites have not been fully established.

Although penalties for waste-related violations, such as dumping construction and household waste in public areas, roadways, or burning waste without specialized equipment, have been intensified, the number of fines imposed on legal entities remains disproportionately low. Furthermore, during the COVID-19 pandemic, the collection, storage, and disposal of medical waste generated by healthcare facilities across the republic have become one of the most urgent challenges (Toporov, 2019).

What positive experiences can be observed in developed foreign countries regarding the coordination of waste management in urban areas? It should be emphasized that the experience of foreign countries, particularly in the field of waste management, is of great interest. In many developed countries, waste regulation is a key priority of national environmental policy.

Methods

The research methodology of this study is based on a comprehensive legal and comparative analysis of waste management policies in various countries to assess the effectiveness of legal instruments in addressing urban environmental challenges. A qualitative research approach was employed, utilizing document analysis as the primary method. Official legal documents, policy frameworks, and environmental regulations were reviewed to determine the strengths and gaps in waste management legislation in Uzbekistan and globally. Additionally, international best practices, particularly from Germany, France, Italy, the USA, and China, were analyzed to identify innovative and effective legal frameworks that could be adapted to the local context (Naumov, 2023). The study incorporated case studies to evaluate the impact of different legislative measures on waste reduction, sorting, recycling, and disposal.

Data was gathered from government reports, legislative acts, and authoritative environmental studies. Furthermore, statistical analysis of urban waste management indicators was conducted to assess the effectiveness of existing regulations. The research also examined economic incentives, penalties, and regulatory mechanisms used to enforce compliance with waste management laws. A comparative assessment was conducted to highlight the variations in regulatory approaches and their respective successes in promoting sustainable waste management. The findings were synthesized to propose policy recommendations tailored to Uzbekistan's legal framework, aiming to enhance urban waste management efficiency (Chatterjee, 2022). The methodology ensures an

objective evaluation of legal measures, incorporating interdisciplinary insights from environmental law, urban planning, and public policy. This approach provides a holistic understanding of waste management challenges and legal solutions that contribute to sustainable urban development (Deepika, 2024).

Results and Discussion

For example, in Germany, a system for sorting and deep recycling of waste has been in place since the late 1980s. In designated areas, at least three separate bins are mandatory: one for food waste and plastics, another for packaging and cartons, and a third for paper and cardboard. Glass containers are disposed of in publicly placed bin. (Czechowski et al, 2014) Beverage containers can be returned to special collection machines (Pfandautomats) installed in stores, where the deposit included in the product price is refunded. In this way, the government uses economic incentives to increase consumer responsibility in waste management.Large waste items (e.g., furniture) must be delivered to designated waste facilities. Clothing is donated to charities, while batteries are collected in special bins at stores (M'Ikiugu et al, 2011).

In Germany, household waste sorting is the responsibility of citizens, while the state oversees proper disposal in public bins. In Germany, the penalties for violating waste disposal rules vary by federal state. For example, failing to sort waste properly or dumping it in unauthorized locations can result in fines ranging from €30 to €75, while leaving large waste items (e.g., wardrobes, refrigerators) in public areas can result in fines ranging from €50 to €2,500. If the violator cannot be identified, the costs of removing the waste are shared among all residents of the affected area. Each German household pays an annual waste management fee ranging from €150 to €300, depending on the size of the city (Zhou, 2021).

Germany generates approximately 41 million tons of waste annually (500 kg per capita), with 60–80% recycled or incinerated for energy, and the remainder sent to landfills. (Dunn, 2007) Notably, 15% of industrial raw materials come from recycled waste. The waste recycling sector generated €70 billion in revenue in 2019, employing 250,000 people.

However, one of Germany's biggest challenges in waste management is excessive consumerism. According to environmentalists, the volume of disposable waste (e.g., single-use utensils, napkins, and packaging) has grown so rapidly in recent decades that society failed to recognize the problem in time. According to the Nature and Biodiversity Conservation Union (NABU), disposable plastic cutlery is discarded twice as often, and cups six times more frequently than before. Experts advocate intensified ecological advocacy and social advertising to address this. Additionally, Germans waste 7 million tons of edible food annually, according to a study by Stuttgart University (Papenov et al, 2019).

Germany's strategic urban development plans are based on public participation and cooperation between the government, businesses, and civil society. This inclusive approach is recognized as a positive model for urban planning and waste management (Ilyina, 2015).

In France, waste sorting has long been practiced. Garbage bin lids are color-coded: white for glass, yellow for recyclable materials (which must be placed in the bin without plastic bags, or

municipal services will refuse collection), and brown for non-recyclable waste. Expired pharmaceuticals, including pills, packaging, and thermometers, must be returned to pharmacies to prevent toxic substances from contaminating the environment (Astriani, 2021).

In France, to enhance public competence in waste sorting and assist in understanding sorting principles, Paris has implemented an "electronic assistant" system. These assistants are positioned on top of waste bins and guide users by scanning waste items to indicate the correct bin for disposal.

In France, protecting settlements from waste is not only an ecological but also a political priority. Within the European Union, plastic recycling is identified as a key challenge for preserving ecology. Notably, in May 2018, the European Commission adopted regulations to replace harmful plastic materials with sustainable alternatives. However, France lags behind neighboring countries in this regard; according to Eurostat data, France recycles only about 25% of its plastics, which is half the rate of Germany and the Netherlands. It is important to note that the use of single-use plastic bags is banned in France, and the country plans to transition entirely to recyclable materials by 2026. Annually, France generates approximately 2.3 million tons of waste, with an average of 50% being recycled (Mahrouk, 2022).

In France, the concept of socially responsible consumption has become widespread in recent years. This concept is based on four core principles: democracy, social utility, shared resources, and collective benefit. For instance, in Paris, 15 specialized centers have been established under this approach to collect, repair, and resell various products, categorized by sectors such as textiles, cardboard, sports equipment, toys, and household appliances. However, not all waste can be recycled, which is why France operates approximately 130 waste incineration plants for non-recyclable materials. The byproducts of incineration, such as ash, are used in road construction, while the generated heat is utilized to warm nearby residential areas. Some incineration plants employ advanced underground technologies, eliminating smoke and odor emissions.

In France, as in most countries worldwide, the majority of waste volume originates from large corporations. To enhance corporate accountability, the government has implemented a system of substantial fines alongside incentives.

Specific penalties include: €35 for violating waste disposal rules, €70 for street littering, and €150 for illegally dumping large items (e.g., furniture), along with vehicle confiscation. Municipal services provide free specialized transport for proper disposal of bulky waste upon request.

Additionally, in France, to ensure efficient urban planning, each region is required to have prospective urban development plans spanning 10–20 years.

In Italy, waste sorting regulations have been introduced in many cities. For example, in Rome, waste is separated into paper and cardboard, plastic and metal, organic waste, non-recyclable waste, and glass. Each waste type has designated bins, and collection is scheduled for specific days of the week.

Waste collection fees vary by city and are determined by local administrations. In most cases, fees are calculated per capita, ranging from €150 to €600 per year, with an average of €300 per household. Larger families pay higher fees compared to single-person households. Instead, large-

scale waste (e.g., furniture) is handled by private companies for a fee, while municipal services collect specific items like washing machines, wardrobes, and mattresses free of charge.

Despite the strict regulations, waste disposal issues persist in Italy, especially in Rome, where garbage bins frequently overflow, and collection is often delayed. This problem worsens in summer due to high temperatures. However, some regions, such as Sardinia, have developed efficient waste recycling systems. The island operates several modern waste processing plants, and 39 such plants exist across the country. In 2017, Italy recycled 18% of its waste, generating 4.5 million MWh of electricity and 2 million MWh of heat energy.

In Italy, certain regions are implementing measures to support and incentivize innovative technologies and startups in waste recycling. Additionally, the country has introduced partial restrictions on plastic bag usage, with large supermarkets and chain stores transitioning to bags made from recyclable materials, while markets still permit conventional plastic bags.

In the USA, a comprehensive system to combat waste-related environmental issues in settlements is in place. Notably, the U.S. generates 250 million tons of household waste annually. In New York City, each resident produces 11.33 kg of waste per week (7.25 kg at home and 4.08 kg at workplaces).

Waste sorting and collection rules are set by local authorities. The fine system encourages residents to dispose of waste correctly in designated bins (paper, glass, plastic, etc.). For example, in New York, large apartment buildings have waste collection stations on each floor, equipped with detailed sorting instructions.

However, the disposal of bulky waste (e.g., old tires, furniture, household appliances) remains a significant challenge. In the U.S., disposing of a single piece of furniture costs around $80, an old refrigerator $100, and a bathtub $130. Plastic waste remains a critical issue in U.S. cities. To address this, the federal "3 R" program (Reduce, Reuse, Recycle) is enforced, aiming to increase recycling volumes and reduce landfill numbers. Educational campaigns promote reusable items, proper sorting, and disposal. Under this program, Americans are required to purchase special bags for general waste, while tax incentives are provided for acquiring secondary raw materials or organic waste from designated centers.

The U.S. recycling industry is highly developed, with over 550 factories processing secondary raw materials. Additionally, over 1,000 plants specialize in converting household waste into compressed gas and biofuels. Currently, more than 1.5 million people work in the waste recycling sector, which generates over $250 billion annually. Over the past 30 years, the U.S. recycling rate has nearly tripled, exceeding 34%.

In China, extensive measures are being implemented to prevent pollution in settlements and promote sustainable use of natural resources. Since the late 1980s, China has prioritized environmental protection in cities, particularly by strengthening control over the environmental impact of industrial enterprises. The government introduced mandatory environmental impact assessments for industrial projects, requiring pollution prevention infrastructure to be designed, built, and operationalized alongside industrial facilities. This policy curbed the emergence of new

pollution sources. By 1995, 480 Chinese cities had implemented a waste declaration system for industrial emissions. Today, this system covers 77,000 industrial enterprises, while 240 cities enforce licensing protocols for waste discharge.

China takes a comprehensive approach to pollution control, addressing both sources of pollution and their consequences. For example, since the late 1980s, the government has carried out major environmental projects in Benxi and Baotou (to reduce air pollution) and Baiyangdian Lake and the Huaihe River (to clean water systems) (Environmental Protection in China (White Paper).

Specifically, since the end of 1995, the master plans of all 640 cities and 31,559 urban-type settlements in the country have been approved. According to the Law on Urban Planning, these master plans must include provisions for environmental protection. In many cities, the redevelopment of old urban areas includes the construction of modern, energy-efficient residential and industrial sectors.

In other words, China addresses environmental protection in settlements through two key approaches: combating industrial pollution and controlling household waste. Additionally, 52 cities in China have been designated as key areas for environmental protection, while 99 cities have been recognized as important cultural and historical heritage sites, where special attention is also given to environmental conservation.

To improve environmental conditions, China introduced a nationwide urban environmental monitoring system in 1989. Over 330 provincial cities have also adopted similar evaluation frameworks. This approach encourages local governments to take responsibility for environmental protection.

China has also developed eco-cities in cooperation with Japan. Notable examples include Guiyang, Chongqing, and Dalian (Gerberg, 2014).

It is important to note that the city of Yichun in Jiangxi Province announced its plan to become China's first eco-city as early as 1986. Later, in 2004, Guiyang, the capital of Guizhou Province, became the first Chinese city to transition to a zero-waste economy. By 2008, Shanghai and Baoding in Hebei Province were recognized as China's first low-carbon cities, actively promoting an environmentally friendly lifestyle.

Various green industrial zones have been established in China, contributing to environmental stability in urban areas. Austin Williams, in his book "China's Urban Revolution: Understanding Chinese Eco-Cities", highlights the role of these eco-cities in improving China's overall environmental situation. Additionally, Hebei Province is set to become a fully green technology zone by 2035.

Experts emphasize that the success or failure of humanity's efforts to create an ecologically sustainable economy largely depends on urban centers. Currently, in developing countries, over 600 million urban residents lack adequate housing, 30% do not have access to clean drinking water, and 1.1 billion people breathe air with pollution levels exceeding established sanitary norms. With rapid urban growth, the negative environmental consequences of urbanization are expected to increase. By 2025, more than half of the populations of developing countries will be living in cities

(Streltsov et al, 2012).

In this regard, numerous global efforts are underway to transition to a "green" industry—one that conserves natural resources, minimizes environmental harm, promotes low-waste or zero-waste production, and reduces reliance on traditional energy sources while prioritizing environmental protection.

In many countries, the key elements of the transition to a "green" economy include green construction and the use of resource- and energy-efficient technologies, modernizing cities with low-cost, sustainable technologies (*low-carbon cities*), implementing environmentally friendly transport systems, and developing smart waste management and recycling systems.

South Korea has officially recognized green technologies as a modern driver of economic growth and has adopted comprehensive government policies to support them. The green industry in South Korea is based on three main components: integrating environmental protection technologies into traditional industries, developing environmentally friendly initiatives aimed at preventing household and industrial pollution—which includes the use of ecological technologies, sustainable production tools, infrastructure, green construction, land development, and environmental consulting services—and expanding the use of renewable energy sources (Streltsov et al, 2012).

In recent years, the concept of "green cities" has gained widespread global recognition. For example, in Melbourne, Australia, the "Melbourne City Council Plan" has been adopted, based on principles such as "a city for people," "a creative city," and "a smart city." This document is further divided into five key strategic areas: the Bicycle Plan, aimed at developing cycling infrastructure; the CBD and Docklands Parking Plan, focused on improving urban parking spaces; the Road Safety Plan, enhancing traffic safety measures; the Pedestrian Movement Strategy, promoting pedestrian-friendly urban planning; and the Transport Strategy, optimizing public transportation systems.

Conclusion

In conclusion, drawing from international best practices, it is essential to improve the system and legal framework for environmental protection and rational use of natural resources in urban areas in our country. This includes fully implementing a categorized waste collection and disposal system, defining clear economic incentives for compliance, and encouraging environmentally responsible business practices among major enterprises. Additionally, it is crucial to review and differentiate the system of penalties for violations related to waste disposal, actively promote the concept of responsible consumption, and restructure waste recycling operations with the integration of modern technologies. Further steps should involve transitioning towards biofuel and energy production from waste, expanding public participation in urban planning, and accelerating the development of urban master plans with a 10- to 30-year perspective. A gradual shift towards the establishment of "eco-cities" should be considered in urban planning strategies, alongside strengthening the role of local authorities in environmental protection initiatives within settlements.

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