Enhancing solid domestic waste management in Vietnam

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Abstract: ***Solid domestic waste management poses a critical challenge for authorities at all levels encompassing central and local government agencies, organizations, businesses, and the general public. Despite the availability of various policies and regulations in the field, issues persist due to rapid socio-economic development, inconsistent legal frameworks, and insufficient public awareness. These factors contribute to increasing problems such as waste accumulation, inadequate decomposition, environmental pollution, and public discontent. Failure to address these challenges effectively could severely affect ecological health and undermine green, clean, and sustainable development objectives.***

Keywords: *Policy; solid domestic waste; environmental pollution; law; resources; state management.*

1. Introduction

According to the Government's 2023 Environmental Protection Report, Vietnam generates approximately 67,877 tons of solid domestic waste daily, with urban areas contributing around 38,143 tons and rural regions about 29,734 tons. Major cities are notable contributors, with Ho Chi Minh City producing approximately 10,000 tons per day, Hanoi over 7,000 tons, and Da Nang exceeding 1,000 tons (Government, 2024). In response to the rapid increase in waste generation, the Party, State, and local authorities have enacted numerous directives, guidelines, and regulations for waste management and disposal. Public awareness of solid domestic waste has also been improved with various local and public solutions for sorting and disposal. Despite these efforts, challenges persist in effectively managing and disposing of domestic waste. This issue has become increasingly complex, necessitating a unified approach from the entire political system and active participation from the public, particularly local communities, thereby strengthening the legal framework for addressing these challenges.

2. Current situation of solid domestic waste

Solid domestic waste refers to refuse generated from daily human activities (Government, 2022). Its

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sources include households, commercial establishments, service areas, hospitals, offices, and public service spaces. Solid domestic waste can be classified into three categories: (1) Recyclable and reusable solid waste (such as plastics, paper, fabric, leather, and wood); (2) Biodegradable organic waste (including fruit peels and animal remains); and (3) Hazardous and bulky non-biodegradable solid waste (such as plastics, rubber, nylon, herbicides, and batteries).

In recent years, the rapid pace of socio-economic development has led to the expansion of various sectors, including production, commerce, services, and industrial zones. This growth has resulted in increased waste generation. Non-biodegradable materials such as plastics, televisions, computers, microwaves, plastic bags, and toxic residues from such stuff as herbicides and food preservatives pose significant environmental risks if not properly sorted and disposed of. Improper management of these wastes can adversely affect soil, groundwater, air quality, and human health, thereby threatening sustainable development.

Solid domestic waste, mostly from households and predominantly in form of food waste, often generates unpleasant odors when disposed in landfills, especially under hot and humid conditions. The vast amount of daily waste, coupled with inconsistent public awareness regarding waste collection, sorting, and disposal, has led to widespread indiscriminate and careless disposal practices. This problem is evident across various regions, from rural to urban areas, including coastal zones and remote locations, with particular severity in densely populated areas, tourist spots, and beaches, etc. Non-biodegradable and hazardous waste significantly contributes to environmental pollution, negatively impacting public health and living conditions. This situation poses a substantial challenge for authorities at all levels.

Improperly disposed plastic waste accumulating in canals, ponds, fields, and vacant lands near residential areas can obstruct water flow, lead to anaerobic decomposition, emit foul odors and discolored water, and severely damage aquatic ecosystems. Additionally, while waste collection efforts often focus on residential areas, public spaces should be more frequently noticed. Markets, bus stations, ports, and parks are commonly littered with diverse types of waste. Beyond household waste, industrial zones, industrial clusters, and craft villages also contribute significantly to daily waste generation. Industrial waste, which is low in organic content, is challenging to decompose naturally and can persist for extended periods. Inadequately managed industrial waste can pollute soil, disrupt soil biota, and contaminate groundwater.

Currently, the majority of collected solid waste is handled by the following methods: 71% is landfilled, 16% is processed in composting plants, and 13% is incinerated. According to the Environmental Protection Report 2023 by the Ministry of Natural Resources and Environment, the waste collection and treatment rate stands at approximately 96.6% in urban areas nationwide and around 77.69% in rural areas, with landfills accounting for about 64% of the treatment methods. Nationwide, there are approximately 1,322 solid waste treatment facilities, including 381 incinerators, 37 composting lines, and about 904 landfills (Ministry of Natural Resources and Environment, 2023). Overall, the existing waste treatment methods in Vietnam are outdated, lack uniformity, and lead to inefficient use of land resources. Additionally, some regions still employ manual incineration

methods, resulting in significant pollution and environmental damage.

To address the issue of solid domestic waste, the Vietnam Communist Party and the State of Vietnam have issued various policies and legal documents, such as Resolution No. 24-NQ/TW dated June 3, 2013, from the 7th Plenum of the Central Committee (Term XI) on actively responding to climate change, enhancing resource management, and protecting the environment. The resolution sets the important tasks of "sorting waste, especially household waste, at the source. Enhancing waste collection, promoting recycling, and minimizing landfilling."

To realize the sustainable development goals, the 12th Central Committee of the Communist Party issued Conclusion No. 56-KL/TW on August 23, 2019, to continue implementing the 7th Central Committee's Resolution (Term XI) on actively responding to climate change, enhancing resource management, and environmental protection. It mainly emphasizes "sorting waste, especially household waste, at the source, enhancing collection capacity, promoting recycling, and minimizing landfilling. Focus on treating hazardous and medical wastes. Implement appropriate policies to further encourage businesses to invest in treatment of solid waste and sewage. Thoroughly address pollution issues at landfills surrounding big cities to prevent public grievances and complaints due to landfill pollution."

In 2020, the National Assembly passed the Law on Environmental Protection. The management of household solid waste is addressed explicitly in six articles (Articles 75 to 80), which detail the classification, storage, transfer, and treatment of household solid waste, as well as the costs associated with collection, transportation, and treatment, and the remediation of pollution at landfills to encourage source reduction and classification of household solid waste. Furthermore, the Law expands the responsibility of producers and importers to include the recovery and recycling of discarded products and packaging.

Following the 2020 Law on Environmental Protection, the Prime Minister has issued several documents, such as Directive No. 41/CT-TTg dated December 1, 2020, on urgent solutions to strengthen solid waste management. The directive clearly outlines the responsibilities of ministries, sectors, and localities in managing household solid waste.

On January 21, 2021, the Government issued an action program to continue implementing Resolution No. 24-NQ/TW of the 11th Central Committee on actively responding to climate change, enhancing resource management, and protecting the environment. The program includes targets such as treating 90% of urban household solid waste by 2025, sorting waste at the source, and establishing a synchronized waste collection and treatment system.

The National Strategy for Environmental Protection until 2030, with a vision to 2050 (approved by the Prime Minister's Decision No. 450/QD-TTg dated April 13, 2022), outlines the primary task of reducing, collecting, reusing, and recycling household solid waste through development and application of shared economic models, digital platform-based businesses, and rental services and encourages investment in building modern recycling facilities.

The 15th National Assembly has also issued several resolutions on socio-economic development, such as Resolution No. 32/2021/QH15, dated November 12, 2021, on the socio-economic development plan for 2022, and Resolution No. 16/2021/QH15, dated July 27, 2021, on the five-year socio-economic development plan (2021-2025), which set goals for collecting and treating 90%

of household solid waste and addressing 100% of polluting establishments. The Ministry of Natural Resources and Environment and provincial and municipal authorities have also issued various legal documents on this issue.

Local party committees and governments have similarly issued numerous directives and plans to improve household waste management, resulting in notable progress across most localities. Several provinces and cities, including Ho Chi Minh City, Hai Phong, Thua Thien Hue, Bac Giang, and Thanh Hoa, have launched extensive programs for sorting household solid waste. Additionally, some provinces have developed local action plans for managing marine plastic waste and have implemented effective models for reducing plastic waste. For instance, Ha Long (Quang Ninh) has adopted a model that excludes plastic products in marine services and tourism, Do Son (Hai Phong) has introduced a whale model to manage plastic waste, and Phu Quoc (Kien Giang) and Sam Son (Thanh Hoa) are participating in urban plastic reduction programs. Many provinces and cities have also created and executed master plans for 2021-2030, with a vision to 2050, including infrastructure development for collecting and treating household solid waste. At a broader level, the Prime Minister has approved several regional plans, such as the Northern Key Economic Region Solid Waste Management Plan and the Dong Nai River Basin Solid Waste Management Plan, both extending to 2030.

3. Limitations and challenges in solid domestic waste management

Despite the achievements, the management and treatment of solid waste still face numerous following limitations and challenges:

Firstly, some localities need more detailed regulations for managing household and individual solid waste. Methods and fees for waste disposal are often unreasonable, leading many families and individuals to evade proper waste collection, sorting, and treatment. Consequently, waste is often illegally dumped in remote areas, resulting in unsanitary and highly polluting makeshift dumps. Additionally, some localities need to provide necessary equipment for storing and transporting sorted waste, undermining the effectiveness of citizens' sorting efforts.

Secondly, there remains a lack of specific mechanisms for incentivizing recycling activities, waste utilization, and energy recovery from treatment processes. There is also an absence of clear guidelines on preferential policies, investment support, and post-treatment product consumption. Mechanisms to promote socialization of solid waste collection and treatment are insufficient, failing to attract resources for household solid waste management.

Thirdly, the current models of solid waste management and treatment still have many shortcomings, such as centralized treatment models relying heavily on landfill technology, incineration without heat recovery, composting technology, and others. The technologies used by environmental companies are complex due to such factors as dependence on funding, technical infrastructure, transportation conditions, and densely populated areas. In rural areas, decentralized collection, transportation, and treatment models are commonly applied, with landfills that are not hygienic, leading to groundwater pollution. Even household "self-treatment" models, such as composting for gardening, vermiculture for animal feed, and biogas systems, also have drawbacks like surrounding environmental sanitation issues, residual toxic substances in soil and groundwater, and air pollution.

Fourthly, the overproduction of single-use plastics, electronic devices, refrigerators, and air conditioners, and the prevalent habit of

using plastic and nylon bags among the population have significantly contributed to the daily increase in household solid waste.

Fifthly, funding for environmental sanitation activities in localities needs to be increased. There are no specific policies to support businesses in the environmental sanitation sector, which hinders the advancement and adoption of science and technology in waste sorting and collection. Although programs for source separation of waste and waste treatment projects have been implemented, they tend to fade quietly after a short period.

4. Proposed solutions for solid domestic waste management

To effectively manage and treat solid domestic waste while ensuring sanitation, minimizing environmental pollution, and achieving socio-economic benefits, the following measures should be prioritized:

First, it is crucial to further widely disseminate the 2020 Law on Environmental Protection and its guiding documents in practical contexts. Efforts should be made to strengthen the dissemination of legal documents, directives, resolutions, and plans from the Party, State, ministries, and local authorities. This will help raise awareness among the public, businesses, and production facilities about environmental protection and health safety related to household and other types of waste. Fostering environment-friendly lifestyles among individuals and communities is essential for effective waste management.

Second, it is essential to enhance mechanisms, policies, and laws in the field. Attempts should focus on developing and refining comprehensive frameworks for sorting, collection, treatment, and recycling of household solid waste, with an emphasis on promoting a circular economy. Special attention must be given to creating technical guidelines for waste collection, transportation, and treatment after sorting and establishing standards for incinerators, landfills, and other waste treatment facilities. Additionally, technical guidelines should be developed for upgrading landfills and mitigating environmental pollution at existing ones. The government should also encourage adoption of circular economy models within businesses and factories by supporting investments in technology and equipment for waste treatment and recycling and by attracting private enterprises to invest in enhancing solid waste management infrastructure.

Third, stricter regulations should be enforced on producing plastic goods, nylon bags, and other non-biodegradable materials. Technical standards and regulations should also be developed and issued for products containing nanoplastics and nylon to reduce the production and use of non-biodegradable bags, packaging, and other items. Additionally, the production and use of environment-friendly alternatives, such as paper bags and plant-based packaging, should be promoted.

Fourth, new technologies for solid waste treatment and recycling should be developed. It is essential to invest in, research, and collaborate internationally to adopt advanced and less harmful technologies, such as Japan's Circulating Fluidized Bed (CFB) incineration technology, which converts thermal energy into electricity, and Belgium's enzyme-based biological recycling technology, which transforms used PET plastics into high-quality recycled plastics.

Fifth, landfills should be constructed to adhere to stringent safety standards. Although plans outline technical and environmental sanitation requirements, these standards are frequently not implemented rigorously. Many landfills continue to be situated too close to residential areas, failing to meet technical

criteria and resulting in significant environmental pollution. Consequently, it is essential to establish and enforce rigorous criteria and standards for landfills. Transparent and detailed information about landfill operations must be provided to the public to facilitate their active involvement in monitoring environmental safety and sanitation. Furthermore, efforts must be directed toward planting trees around landfills to enhance the surrounding environment.

Sixth, international cooperation in solid domestic waste management must be actively promoted. Countries such as Japan, Australia, the UK, France, and Singapore are leading examples of waste collection, treatment, and recycling. Their experience should be studied, and partnerships should be formed to leverage advanced technologies. Efforts should be made to attract international organizations and businesses to collaborate, support, and invest in solid waste management activities.

Seventh, the capacity of local governments and mass organizations must be strengthened to organize better and engage the community, businesses, and households in waste collection, sorting, transportation, and treatment. Mechanisms need to be established to provide both material and moral support, encouraging mass organizations, communities, and individuals to participate in developing and enforcing policies and laws related to solid domestic waste management. This approach will help ensure a safer and more sustainable living environment.

5. Conclusion

The projected increase in household solid waste, driven by population growth and economic development, highlights the urgent need for effective waste management strategies. With ever-rising consumer demands, inadequate solid domestic waste management increases the risk of severe consequences in various aspects, particularly amid global climate change efforts.

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