

Research the content and design of some communication products on classifying domestic solid waste at source in Thai Nguyen city, Thai Nguyen province, Vietnam

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Abstract

Thai Nguyen city is the administrative center of Thai Nguyen province. The amount of domestic solid waste generated in the city in the period 2017 - 2022 increased from 67,525 tons/year to 73,365 tons/year. In 2020, the project of classifying domestic solid waste at source in Thai Nguyen city for the period 2017 - 2020 ended, about 50% of domestic implemented domestic solid waste classification at source. In 2022, Thai Nguyen province changed the way of classifying domestic solid waste. The goal of this study is to guide the community in classifying domestic solid waste at source according to new regulations, thereby forming habits in protecting the environment and classifying domestic solid waste at source appropriately. Propaganda content on domestic solid waste classification is implemented according to Decision No. 23/2022/QD-UBND of the People's Committee of Thai Nguyen province. Propaganda activities for classifying domestic solid waste at source can be widely carried out through many different communication channels with flexible implementation time according to each method and target group. To improve effectiveness, propaganda activities on classifying domestic solid waste at source in Thai Nguyen city need to be organized more frequently and for many different target groups. At the same time, the work of organizing and implementing domestic solid waste classification at source needs to be carried out synchronously (from classification, collection to treatment).

Keywords: Domestic solid waste, Classification of domestic solid waste at the source, Environmental Protection, Thai Nguyen City.

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I. INTRODUCTION

Environmental pollution is of concern on a global scale because of its direct effects on human health, not only the current generation but also future generations. Environmental pollution is becoming increasingly serious due to many reasons, including increasing amounts of domestic solid waste and inappropriate classification and treatment of domestic solid waste [1, 2].

Domestic solid waste is increasingly putting more pressure on environmental management in Vietnam. The total amount of domestic solid waste in Vietnam's urban areas in 2019 was about more than 13 million tons/year, accounting for about 55% of the total amount of domestic solid waste generated nationwide [3, 4]. In Vietnam, domestic solid waste classification has been implemented in some large cities such as Hanoi, Da Nang, Hoi An, Da Nang and many other localities.

Thai Nguyen city is the economic, political, educational, medical and tourism center of Thai Nguyen province and the northern midland and mountainous region of Vietnam [5]. In recent years, Thai Nguyen city has had strong economic growth and people's lives have been increasingly improved. Along with that is an increase in the amount of domestic solid waste. Meanwhile, currently, Da Mai landfill - the city's solid waste burial area - has nearly reached its maximum capacity. The Da Mai solid waste treatment plant invested in and built in Tan Cuong commune requires waste classification at source. The project to classify domestic solid waste at source in Thai Nguyen city for the period of 2017 - 2020 has been implemented but many problems still exist.

Currently, the classification of domestic solid waste in Thai Nguyen city still has some shortcomings. First, people do not clearly understand how to classify domestic solid waste because there have been changes compared to the Project on classifying domestic solid waste at source in Thai Nguyen city in the period of 2017 - 2020. Second, people do not clearly understand how to classify domestic solid waste. 2 is because people are not properly aware of the importance of collecting and classifying domestic solid waste at source. Third, a part

of the people are not aware of the habit of classifying domestic solid waste at source. To protect the environment, limit the increase in domestic solid waste and its harmful effects, and save resources, it is necessary to take effective steps to change community awareness. A long-term and effective measure is to propagate awareness and change behavior for organizations, individuals and domestics. The goal of this study is to guide the community in classifying domestic solid waste at source, thereby forming good habits and behaviors in protecting the environment, managing and classifying domestic solid waste at source appropriately.

II. RESEARCH METHODS

Method of collecting, analyzing and synthesizing documents: This method plays an important role in this research. Data on volume and instructions for classifying domestic solid waste are collected from specialized agencies and the People's Committee of Thai Nguyen province; Law on environmental protection and related legal documents from the Government, Ministry of Natural Resources and Environment; Scientific works on the same research topic to compare and build an overview of the problem. The collected documents are analyzed, processed, and synthesized according to each aspect of the problem. The result of the method of analyzing and synthesizing documents is a complete and reliable database on the current status of generation and implementation of domestic solid waste classification in Thai Nguyen city. This is the basis for proposing content and designing a number of communication products to serve propaganda work.

Field investigation and survey method: This method plays a key role in collecting and verifying information about the implementation of domestic solid waste classification in Thai Nguyen city as well as the opinions of community. The area selected for survey is 3 wards: Phan Dinh Phung, Hoang Van Thu, Dong Quang. These are wards located in the center of Thai Nguyen city, with a large population and high and uniform community awareness.

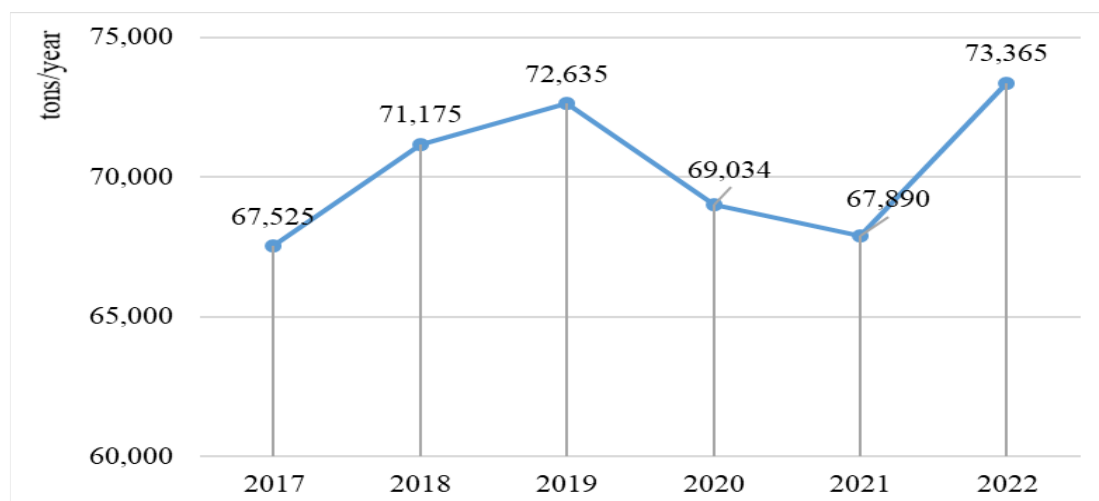
III. RESULT AND DISCUSSION

3.1. Current status of domestic solid waste classification at source in Thai Nguyen city

Thai Nguyen city is the administrative center of Thai Nguyen province. The amount of domestic solid waste generated in the city in the period 2017 - 2022 fluctuates in an increasing trend [6], shown in Figure 1. The amount of domestic solid waste in 2020 and 2021 decreased due to the impact of the covid-19 epidemic, economic activities and consumer demand of people decreased.

The People's Committee of Thai Nguyen city is the unit directly implementing domestic solid waste management in Thai Nguyen city. The main tasks of the City People's Committee include:

- + Develop a plan to organize the classification of domestic solid waste at source.
- + Develop and implement plans to collect, transport and treat domestic solid waste from households and individuals in the area; Allocate funds to support activities of collection, transportation and treatment of daily-life solid waste according to current regulations on decentralization of budget management.
- + Organize, deploy, guide, propagate and mobilize people to carry out domestic solid waste management, establish service prices for collecting, transporting and treating domestic solid waste in accordance with the situation. The actual situation in the area is presented to the Provincial People's Committee for consideration and decision.
- + Based on the actual conditions of the locality, sign a contract (or request the commune-level People's Committee to sign a contract) with a unit with the function of collecting and treating hazardous waste generated from daily activities of households. Households and individuals in the area are paid from the state budget.



Picture 1. Volume of domestic solid waste in Thai Nguyen city in the period 2017 - 2022

In 2017, the People's Committee of Thai Nguyen city implemented a project to classify domestic solid waste at source in Thai Nguyen city for the period 2017 - 2020. Accordingly, the City People's Committee fully prepared enough conditions to pilot the classification of domestic solid waste at source in 4 central wards (Phan Dinh Phung, Quang Trung, Tan Thinh, Dong Quang wards) such as:

- Distributed 71,200 brochures, 20,000 leaflets, hung 200 propaganda banners and posters, and conducted news broadcasts on television, radio and electronic information stations.

- Install 97 public trash bins, repair 200 trash collection vehicles, complete investment in building a trash treatment plant using incineration technology, and strengthen inspection and supervision of project implementation.

- Distribute trash containers (trash cans, plastic bags, stainless steel shelves) to 100% of households and small businesses (some new households that moved in did not receive them after making the distribution list).

- Coordinate and urge self-management groups in residential groups in the 4 central wards to pilot the project of regularly propagating, mobilizing and organizing inspection and urging the implementation of waste classification, Dispose of trash on time for households, businesses, and agencies. [7]

In 2020, when the Project ended, Thai Nguyen city residents were conscious of classifying domestic solid waste at the source. Over 80% of households know how to classify and know the color of plastic bags containing each type of waste. However, only about 50% of households classify domestic solid waste at source. The classification of domestic solid waste in the city still has some shortcomings:

- + On the market there are only black bags with a volume suitable for the large volume of waste generated, so using the correct color of bags has not been thoroughly implemented. Many business households with a large amount of waste do not use the correct tools and colored plastic bags according to instructions.

- + People encounter some difficulties in the process of classifying domestic solid waste at source: They do not fully remember how to classify waste; The house has little trash; small trash bins (business households with a lot of waste); Some households have not been given tools (bins, plastic bags) and have not previously received propaganda because they have just moved in; Staff does not clean up certain items (such as broken bottles, light bulbs, other bulky items: beds, wardrobes, tables, broken chairs, mattresses...); There are not enough bags, people don't know where to buy self-destructing bags; Because the house is cramped, it is difficult to classify, so if the garbage is left unburned for a long time, it will smell; Some types of waste are not listed in the Project's Manual for classifying domestic solid waste at source (used batteries, foam mattresses, aerosol cans, batteries, hair, needles).

- + Many households do not have orientation in managing domestic solid waste at source, especially have not implemented solutions to reduce the amount of domestic solid waste in general and single-use plastic waste in particular. This is also the general situation of many other wards and communes in the city.

On November 21, 2022, the People's Committee of Thai Nguyen province issued Decision No. 23/2022/QĐ-UBND regulating the management of domestic solid waste in Thai Nguyen province. It stipulates in detail the groups of subjects who must manage domestic solid waste in Thai Nguyen province, including:

Households and individuals living in Thai Nguyen province (including foreigners). outside); Agencies, organizations, production, business and service establishments, investors in construction and business of infrastructure of production, business and service zones, industrial clusters in Thai Nguyen province have Waste generated from daily life and office activities with a total volume of less than 300 kg/day can choose the form of domestic solid waste management such as households and individuals; Agencies, organizations, production, business and service establishments, investors who build and operate infrastructure in production, business and service zones, industrial clusters that generate daily solid waste ; Units and organizations participating in the collection, transportation and treatment of domestic solid waste in the province; other relevant organizations and individuals [8].

Thus, by the end of 2020, in Thai Nguyen city, about 50% of households have classified domestic solid waste at source according to the Project on classifying domestic solid waste at source in the city. Thai Nguyen period 2017 - 2020. In 2022, Thai Nguyen province will change the way of classifying domestic solid waste. This causes confusion and confusion for some households in classifying domestic solid waste at source.

3.2. Designing content and propaganda products for classifying domestic solid waste at source in Thai Nguyen city

Propaganda content on domestic solid waste classification is based on the classification according to Decision No. 23/2022/QĐ-UBND promulgating Regulations on domestic solid waste management in Thai Nguyen province. In which, domestic solid waste includes normal domestic solid waste, hazardous domestic solid waste and bulky domestic solid waste. After being classified, domestic solid waste is stored and processed according to the provisions of the Law on Environmental Protection 2020 and Circular 02/2022/TT-BTNMT [9, 10]:

Ordinary domestic solid waste (including domestic solid waste that can be reused and recycled; food waste; other domestic solid waste that does not contain hazardous elements, such as waste that can incineration, inert waste), of which:



Picture 2. Instructions for classifying domestic solid waste can be reused and recycled

+ Domestic solid waste can be reused and recycled: including metal, paper, plastic, cans, plastic bags, rubber, glass bottles... It is stored in green packaging and equipment. Households, individuals, and waste source owners can transfer (sell, donate) to organizations and individuals purchasing scrap and recycling facilities for recycling and reuse.

Nowadays, people have the habit of reusing some plastic bottles and cans. However, the community needs to pay attention to plastics containing different chemicals. They can cause many harmful effects to human health at different levels. Types of plastic waste often have symbols from 1 to 7 with the following meanings:

Number 1 - PET or PETE: Plastic bottles/utensils marked with the number 1 are items that can only be used once. If reused multiple times, it can increase the risk of dissolving heavy metals and chemicals used in the production process of creating these products.

Number 2 – HDP or HDPE: This is the type of plastic that is considered the safest to use. This type of plastic has a high density of polyethylene and does not emit toxic substances during use. HDP or HDPE is used to produce hard plastic bottles (children's toys, some types of plastic bags, milk bottles/bottles, juice bottles, detergent bottles, cooking oil bottles...).

Number 3 - PVC or 3V: PVC is a plastic made from polyvinyl chloride, soft and flexible, very toxic to the body. When decomposing PVC plastic, it releases cancer-causing chemicals into the air, water and soil. They are used to produce transparent food packaging, cooking oil bottles, toys and many other products. Toxic chemicals in PVC can be released at high temperatures, so scientists recommend only storing food or drinks below 810C.

Number 4 – LDPE: LDPE has low polyethylene density and is flexible. This type of plastic is commonly used in noodle boxes, frozen food boxes, shopping bags and cake crusts. This is also considered one of the safe plastics.

Number 5 – PP: Made from polypropylene, PP is usually white or almost transparent and is heat resistant. This type of plastic is used to produce plastic straws, cups for yogurt, coffee, syrup, chili sauce, tomato sauce, water bottles, medicine bottles... This is a durable, lightweight and safe plastic. , can be reused.

Number 6 – PS: PS (polystyrene) is a cheap and lightweight plastic, often used to produce fast food containers (styrofoam boxes), disposable drinking cups, egg cartons and picnic spoons, plates and knives. 1 time... This is a type of plastic that has the ability to release toxic substances, especially when heated or containing items containing strong acids or strong alkalis. Therefore, this type of plastic is not allowed to be used for long-term storage of food and drinks.

Number 7 – PC or no symbol: Invented after 1987, PC is a product of a mixture of plastics, including Polycarbonate and BPA – known as a carcinogen. As the most dangerous type of plastic, most PC is used in industry.

+ Food waste includes spoiled and leftover food; peels and discard parts of vegetables, tubes, and fruits; sugarcane bagasse, tea bagasse... They are contained in red packaging and equipment. Minimum collection frequency is once a day. After being classified, food waste is transferred to a facility with the function of collecting and transporting domestic solid waste; Food waste can be used as organic fertilizer and animal feed. In particular, encourage households and individuals in rural areas to make the most of food waste to make organic fertilizer and animal feed.



Picture 3. Instructions for classifying food waste

+ Other domestic solid waste includes waste that can be burned, inert waste, and does not contain hazardous elements. They are contained in white packaging and equipment. and transferred to a facility with the function of collecting and transporting domestic solid waste.



Picture 4. Instructions for classifying other domestic solid waste

+ Hazardous domestic solid waste generated in daily human activities belongs to the list of hazardous waste specified in Appendix III of Circular No. 02/2022/TT-BTNMT. This type of waste is contained in yellow packaging and equipment. Equipment must be safe, undamaged, tightly sealed and in hard packaging with tight lids to prevent waste from being lost to the environment. Hazardous domestic solid waste includes oil and fat other than those mentioned above, fluorescent tubes and other mercury-containing waste, paint, inks, adhesives and resins containing hazardous substances, used batteries, discarded electrical and electronic equipment other than those mentioned above containing hazardous components... They are transferred to a facility with the function of collecting and transporting domestic solid waste.



Picture 5. Instructions for classifying hazardous domestic solid waste

+ Bulky domestic solid waste includes large-sized discarded household items such as cabinets, beds, mattresses, tables, chairs or other similar items or tree stumps, trunks, branches... cannot be collected with regular domestic solid waste. Bulky domestic solid waste must be stored by households, individuals, waste source owners, and must not be thrown indiscriminately in public places, ponds, lakes, rivers, streams... causing environmental pollution. For bulky domestic solid waste, households, individuals, and waste source owners can transport it themselves to collection locations or transfer stations prescribed by the commune-level People's

Committee or agree on the cost themselves. fees to units that collect and transport domestic solid waste to provide collection services at source for this type of waste. Other types of waste, after being disassembled from bulky waste, are classified as domestic solid waste.



Picture 5. Instructions for classifying bulky domestic solid waste

3.3. How to carry out communication on classifying domestic solid waste at source in Thai Nguyen city

Propaganda activities for classifying domestic solid waste at source can be widely carried out through the following communication channels:

- + Mass media: Television, newspapers, radio.
- + Internet and social networking applications such as website, facebook, zalo, tiktok...
- + Propaganda in neighborhood group meeting programs.
- + Propagate to students at schools in the city.
- + Propaganda at each household through social organizations in communes and wards such as Youth Union, Elderly Association, Veterans Association, cultural, arts and sports clubs...
- + Use leaflets guiding the classification of domestic solid waste (distributed to households), hang instructional posters in public areas, agencies, offices, and schools.

In particular, in Thai Nguyen city there are 10 universities and colleges with a large number of students. Among them, there are 3 schools offering training in natural resource management and environmental science. This is an important human resource that can be used for communication work on classifying domestic solid waste at source. After being trained, students from universities will coordinate with neighborhood group officials, Youth Union officials and social organizations of the ward to propagate to each household. Propaganda content focuses on the issue of classifying domestic solid waste at source, and mobilizing people to reduce the amount of domestic solid waste as well as the amount of single-use plastic waste.

Propaganda implementation time is flexible according to different methods and target groups:

- + Communicate on mass media in the evening or early morning, and carry out long-term activities to remind the community how to classify domestic solid waste.
- + Carry out propaganda for pupils and students of schools in Thai Nguyen city. Propaganda activities can be organized quarterly or combined with students' extracurricular activities, flag-raising hours at the beginning of the week, extracurricular activities, and experiential activities. This propaganda activity is very consistent with the policy of the Ministry of Education and Training and the Ministry of Natural Resources and Environment on bringing environmental protection education content into the system of educational establishments.

+ Launch a propaganda campaign to classify domestic solid waste for youth union members, and at the same time organize the collection of recyclable waste to sell to raise funds for volunteer activities and environmental protection in residential groups. , wards.

+ Integrate propaganda content into activities of social organizations such as the Elderly Association, Veterans Association, Women's Association...

+ Launch collaboration on holidays and traditional days of industries, agencies, business units...

3.4. Orienting solutions to improve the effectiveness of propaganda and classification of domestic solid waste in Thai Nguyen city

Survey results in 3 wards in the city center (Phan Dinh Phung, Hoang Van Thu, Dong Quang) show that: People currently do not clearly understand how to classify domestic solid waste according to the new instructions of the Committee. People of Thai Nguyen province. Many households requested the City People's Committee to increase propaganda and guidance on garbage classification and raise awareness of domestic solid waste management at source, especially for children (students).

In order for propaganda work to ensure effectiveness, the work of organizing and implementing domestic solid waste classification at source needs to be carried out synchronously (from classification, collection to treatment), avoiding the situation of collection and treatment. General management of all types of domestic solid waste (because this causes disagreement among the community, leading to a situation where the community does not classify); There is inspection, supervision and strict handling of violations such as illegal dumping of bulky household waste, improper classification or no classification...

+ The first, properly classify at source: In order for domestic solid waste to be properly classified, propaganda work needs to be organized regularly and extensively to all subjects (people, social organizations, students). , student...). The government and specialized agencies regularly inspect and supervise closely. In particular, it is necessary to strictly enforce penalties for cases of improper disposal of waste, failure to do so, or disobedience in classifying domestic solid waste at source. In addition, to ensure proper classification of domestic solid waste at source, collection and treatment units need to do it synchronously, to avoid forming oppositional thoughts in the community due to classification but The authorities do not collect them separately, they still dump them in one place without proper treatment.

+ The second, correct collection: It is necessary to focus on improving quality and increasing investment in the collection system (collection vehicles - separate collection and transport vehicles for different types of waste, trash bins at waste areas). public areas, protective equipment...). Garbage collectors refuse to collect garbage from households that do not classify or classify incorrectly. Garbage collection should be carried out in the following direction: Collect each type of garbage separately, according to days of the week. The collection process needs to ensure thorough collection of waste in public places, avoiding littering on collection and transportation roads.

+ The third, effective treatment: Research forms of household waste treatment that meet economic, social and environmental efficiency criteria. Carry out reasonable and synchronous post-collection waste treatment. Strengthen coordination between implementing units - people - collection units - treatment units.

To improve the effectiveness of propaganda work, the forms of implementation proposed above need to be carried out synchronously, regularly and extensively. In addition, information technology can be applied to propaganda and mobile messaging to remind families to do so. In particular, the People's Committee of Thai Nguyen city needs to increase financial resources for propaganda programs for people and students at schools...

In addition, it is possible to increase propaganda to plastic bag production and business establishments in the area, supermarkets, traditional markets and units that use a lot of plastic with the content of replacing input materials. (increase the use of used plastic bags as raw materials), replace plastic bags with environmentally friendly bags, and do not give plastic bags to customers.

IV. CONCLUSION

Thai Nguyen city is the administrative center of Thai Nguyen province. The amount of domestic solid waste generated in the city in the period 2017 - 2022 increased from 67,525 tons/year to 73,365 tons/year. The People's Committee of Thai Nguyen city is the unit directly implementing domestic solid waste management in Thai Nguyen city. In 2017, the People's Committee of Thai Nguyen city implemented a project to classify domestic solid waste at source in Thai Nguyen city for the period 2017 - 2020. In 2020, the project ended, the city's residents Thai Nguyen has consciously classified domestic solid waste at source. Over 80% of households

know how to classify and know the color of plastic bags containing each type of waste. However, only about 50% of households classify domestic solid waste at source.

In 2022, Thai Nguyen province will change the way of classifying domestic solid waste. This causes confusion and confusion for some households in classifying domestic solid waste at source. Survey results in 3 wards in the city center (Phan Dinh Phung, Hoang Van Thu, Dong Quang) show that: People currently do not clearly understand how to classify domestic solid waste according to the new instructions of the Committee. People of Thai Nguyen province. Many households requested the City People's Committee to increase propaganda and guidance on garbage classification and raise awareness of domestic solid waste management at source.

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Propaganda activities for classifying domestic solid waste at source can be widely carried out through many different communication channels. Propaganda implementation time is flexible according to each method and target group.

To maintain and improve effectiveness, propaganda activities on classifying domestic solid waste at source in Thai Nguyen city need to be organized more frequently and for many different target groups. At the same time, the work of organizing and implementing domestic solid waste classification at source needs to be carried out synchronously (from classification, collection to treatment).

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