

## Factors Affecting the Classification of Domestic Solid Waste in Cho Moi District - Bac Kan Province

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**ABSTRACT:** This article studies factors affecting household waste classification in Cho Moi district, Bac Kan province. The author uses information collection methods, field surveys and statistical information processing methods. The results obtained: the volume of domestic solid waste generated in the whole district is about 38 tons/day. The study area includes 3 communes, of which Nong Ha commune has the highest volume of solid waste generated at 3.9 tons/day. The entire district has 1 garbage collection vehicle, so the collection truck comes to each commune twice a week. If the vehicle has a problem, there will be no other vehicle to collect it. The fee for household waste treatment is 4,000 VND/person/month. If they throw away trash, that household will pay. Women often sort trash more simply by keeping the items so they can sell the junk and add some money to the family. People under the age of 30 tend to know and care about waste classification more than other ages. The proportion of people who have never heard of waste regulations accounts for 60.48%, while those who clearly understand the regulations are 60.48%. determined to only account for 3.81%. When it was announced that they would be fined if they did not classify their trash, the people here were extremely calm because they believed that no one would know whose trash bag belonged to the pile and who would be fined.

### 1. INTRODUCTION

According to the 2019 national environmental status report, the total volume of MSW generated nationwide in 2019 increased by 46% compared to 2010 [8], specifically 64,770 tons/day. This means that a large amount of waste is generated each year and its increase is not expected [1] Although the source of household solid waste is large, only about 85% of it is waste. in Vietnam is being treated, but this MSW is treated mainly by landfill technology. It can be seen that landfilling will require a lot of land, which is both wasteful and seriously pollutes the land, water, and air environment, especially in large cities.

In Vietnam, the 2020 Environmental Protection Law has been introduced with many amended laws, especially on the issue of regulations on domestic solid waste such as: Clause 1, Article 75 of the Law on Environmental Protection 2020 regulates domestic solid waste. activities from households, Clause 1, Article 79 of the Law on Environmental Protection 2020 stipulates that the cost of collecting, transporting, and treating household solid waste will be calculated based on the mass or volume of waste generated instead of based on the amount of waste generated. The current "leveling" mechanism in addition to Clause 2, Article 77 of this Law stipulates: "Establishments collecting and transporting domestic solid waste have the right to refuse to collect and transport domestic solid waste of Households and individuals do not classify or use packaging according to regulations and notify the competent authority for inspection and handling according to the provisions of law, except in the case of households or individuals. Individuals use packaging of other domestic solid waste according to the provisions of Point c, Clause 1, Article 75 of this Law. Clause 2, Article 79 of this Law stipulates: "In cases where households and individuals do not classify or If classified incorrectly as prescribed in Points a and b, Clause 1, Article 75 of this Law, you must pay the price of collection, transportation and treatment services as for other household solid waste." to actively promote the classification of household waste at source.

Some studies by scientists around the world on household solid waste management issues include: "Influencing factors on the household-waste-classification behavior or urban residents:

A case study in Shanghai" [3] "Factors Influencing Household's Solid Waste Classification Management: The case of Hangzhou" [4], Factors Influencing Household Waste Separation

Behavior: Cases of Russia and Finland [5]; "Solid Waste Management Practices at a Private Institution of Higher Learning in Nigeria"[6] . Therefore, the author conducted the study "Factors affecting the classification of household solid waste in Cho Moi District, Bac Kan Province" to see the current situation and factors affecting waste classification. Living snakes, difficulties when implementing waste classification locally from habits, awareness to behavior.

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### 2. RESEARCH OBJECTS AND METHODS

#### 2.1. Research object

The research focuses mainly on household solid waste management and factors affecting the classification of household solid waste in Cho Moi district, Bac Kan province.

#### 2.2. Research methods

Methods of collecting documents:

The research team used the document collection method; synthesize and analyze data collected from reports and books, documents, and magazines related to the research. Methods of investigation, observation and survey in the study area:

The research team conducted field surveys in the study area, directly interviewed people living in the study area through designed questionnaires, and interviewed commune and district management officials about issues related to research to provide the most accurate research results.

According to the Slovin formula, the research team selected the number of households to interview as follows:

$$n = \frac{N}{1 + Ne^2} e = 0,09\%$$

in which: N number of households

n: Number of households to be investigated, e: Allowed error

According to the sample calculation formula above, the number of investigation samples n:

Dong Tam commune n = 70 households

Cao Ky commune n = 70 households Nong Ha commune n = 70 households Quantitative method:

The authors weighed the volume of household solid waste and the volume of each type of household waste of a number of households in the research area to calculate the volume of household waste per capita in the area and the living habits. People are used to using and classifying waste.

### 3. RESULTS AND DISCUSSION

#### 3.1. Some concepts

Waste is matter in solid, liquid, gas or other form discharged from production, business, service, daily life or other activities.

Solid waste is solid waste or sludge.

Ordinary solid waste is solid waste that is not on the list of hazardous waste and is not on the list of industrial waste that must be controlled with hazardous elements exceeding the hazardous waste threshold.

Domestic solid waste (also known as household waste) is solid waste generated in daily human activities. [2]

#### 3.2. Domestic solid waste management in Cho Moi district, Bac Kan province

Domestic waste is waste generated from production, business, service, daily life or other activities. Solid waste includes regular solid waste and hazardous solid waste. And solid waste generated in personal activities, households, and public places is collectively called domestic solid waste.

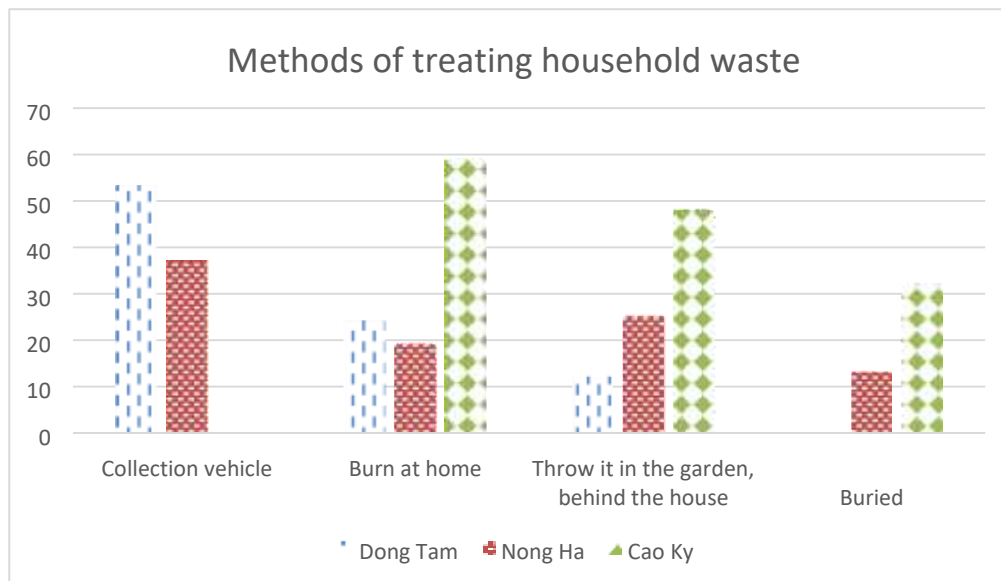
In Cho Moi district, the total amount of domestic solid waste in the district is estimated at about 38 tons/day. In Dong Tam commune, it is estimated about 2.5 tons/day, in Nong Ha commune it is about 3.9 tons/day and 2.8 tons/day in Cao Ky commune. In the district, there will be a garbage collection vehicle that moves to communes to collect theoretically twice a week, if the vehicle has no problems or problems. And with a frequency of once every 7-10 days in reality due to vehicle breakdown or other objective factors. There are communes that will pay a fee for garbage trucks to collect, but there are also communes or households in the commune that do not participate in paying the fee because they do not generate household waste or they treat it themselves. In addition, along the travel routes there is also a lot of waste thrown in the wrong place, partly due to no one managing it, the rest is due to the awareness and knowledge of the people here. This leads to an extremely difficult situation of household solid waste management here, making it impossible to obtain specific statistics as well as provide general policies and management methods for local communes.

In Cho Moi district, there is a waste collection vehicle that will collect household waste in communes in the area with a frequency of 2-3 times/week. These household wastes will be brought to the Cho Moi District Waste Collection and Treatment Board for classification and treatment. Environmental fee or fee for household waste treatment costs 4,000 VND/person/month. However, not 100% of communes and households choose to put household waste on collection trucks for treatment. There are also communes like Cao Ky commune where most of the household waste in this commune is treated by burning. and throw it in the back garden. Some people do not remember how much the household waste collection fee is because the fee is quite low. The fact that the garbage fee is equal to 4,000 VND/person/month regardless of the quantity or type of garbage has a very negative impact on people's waste classification behavior because whether it is organic, inorganic or recycled waste, If people throw away 1kg, 10kg or 100kg of household solid waste/day, they will only have to pay 4,000 VND/person/month.

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The way households in the commune handle household waste is shown in the following figure

**Figure 1. How to treat household waste**



From Figure 1, we can see that in Dong Tam commune, people here mostly choose the method of collecting and treating household solid waste by putting it on the district's centralized garbage collection truck. There are only a few households or households that pay garbage collection fees, but when encountering large types of waste or if the collector does not accept treatment, they will choose to burn or put it in the backyard.

Unlike Dong Tam commune, people in Cao Ky commune choose to collect household solid waste by bringing it to a centralized location in the commune and then burning the waste collectively. As for the waste that cannot be burned, they throw it in the back garden or bury it. In Nong Ha commune, only more than 50% of people here choose to collect household solid waste by putting it on the district's collection truck. The rest they burn, bury or throw in the backyard. According to people in the district, there are households that do not pay collection fees but still secretly throw garbage at the garbage collection area of households that pay fees, so the above table cannot be completely accurate and is only relative according to interview forms.

The factor of uneven waste collection methods makes synthesizing data very difficult as well as providing a general plan to manage waste classification behavior at the research site.

### 3.3. FACTORS AFFECTING CLASSIFICATION OF HOUSEHOLD WASTE AT SOURCE

#### 3.3.1 Gender factor

Gender is one of the important factors in life, especially gender imbalance greatly affects society as well as a country and a locality.

From population data by gender of communes in Cho Moi District, we can establish the following data:

**Table 1. Gender ratio at study sites**

	Dong Tam	Rate	Nong Ha	Rate	Cao Ky	Rate
Male	1295	50,3%	2017	49,6%	1443	50,2%
Female	1271	49,7%	2045	50,4%	1417	49,8%

Through table 1, we see that the ratio of men and women in Dong Tam, Nong Ha, and Cao Ky communes is nearly equal, without much difference. According to direct interviews, women in the family tend to be more interested in classifying household waste than men, partly because they are the ones directly cleaning and taking out the trash, so if the family has blankets, When farming, they will proactively keep leftover food. The woman in the family is also the one who picks up recyclable waste to sell to earn a small part of her family's income, for example: Plastic utensils such as plastic bottles, beer cans, coke, milk cartons, cardboard... that also help reduce waste outside.

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### 3.3.2. Age

Age is also one of the important factors affecting human behavior because age represents habits that are difficult to change. Using data from survey results, we have established the following table.

**Table 2. Age ratio in the study area**

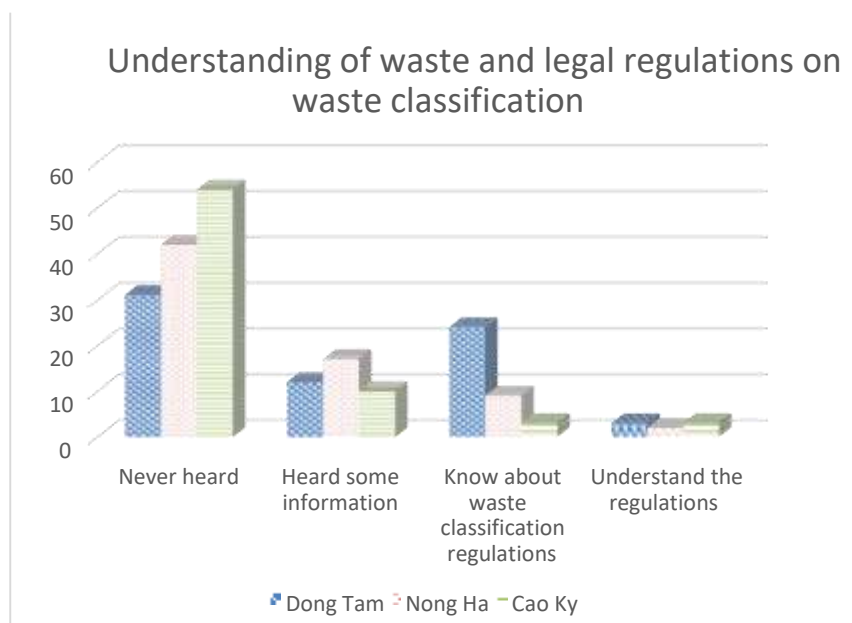
Target	Quantity (votes)	Rate (%)
<18	26	12,38%
18-30	63	30%
30-50	78	37,14%
50-70	28	13,33%
>70	15	7,14%

According to the table above, we can clearly see that among the number of interview questionnaires, people aged 30-50 accounted for the highest percentage, followed by people aged 18-30 and over 70 years old having the lowest percentage. People aged <18 and 18-30 tend to know and care about waste classification more than people of older ages. People in the age groups 30-50 and 50-70 years old think that paying money to garbage collectors and processors is already responsible for their household waste and how to treat, classify or do it. It's because the party receiving the money has to handle it. The ideology of people in this group is somewhat conservative due to old thinking, so it is difficult to convince them to change their waste classification habits.

### 3.3.3. Cognitive

From 210 interview questionnaires, we established a statistical table. From there we have the following chart:

**Figure 2. Level of knowledge about waste and legal regulations on waste classification**



From the data table above, We can see that the majority of people have heard of information about waste as well as legal regulations on waste. People here have not been informed or propagated about this issue. There are a few who accidentally hear it or hear it through TV or radio, but they don't pay too much attention. And only a few people understand clearly about waste and the legal regulations related to waste classification.

This is a very dangerous sign because when people do not know about waste as well as the legal regulations on waste classification, they will not understand the importance of classifying household waste at source, why must they? classify?, what if they don't classify, how will they be punished, how to classify.

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When interviewed about waste issues, most of them did not know what the author was talking about, when mentioning Decree 38/2015/ND-CP (on waste and scrap management) regulating organizations and individuals. People who generate household waste must be responsible for classifying waste at source in accordance with the purpose of management and treatment into groups (organic groups that are easy to decompose; groups that can be reused and recycled; and groups that have residual properties). again). Information that in case of not classifying waste at home, they can be handled for violations and the level of fine can be from 15-20 million VND (according to Decree 115/2016/ND-CP), they react. very surprising because according to them, only factories, workshops or urban companies that do not classify and treat waste are fined, but the amount of household waste they generate is not worth much at all and I also don't know who and which house threw it away to deserve punishment. When it was announced that they would be fined if they did not classify their trash, the people here were extremely calm because they believed that no one would know whose trash bag belonged to the pile and who would be fined.

According to interviews, information given from group, ward, and commune leaders is received and absorbed by people faster than television and radio. People here say that being informed about an issue by the village leader or commune leader makes them feel closer than getting information through newspapers, radio, or television. Information through newspapers, radio, and television also makes them aware, but it feels like it is still very far away and does not reach their interests, so they just skim over it and then quickly forget it.

### 3.3.4. Facilities

Facilities at the research site are extremely lacking. The whole district only has one garbage collection vehicle. If this vehicle has a problem, garbage can sometimes be collected once every 2 weeks. In the district there are almost no bins or bags for inorganic waste; bins and bags for organic waste; Boots, gloves and other specialized tools to classify household waste and discarded products at source. The trash here is entirely made up of people using household items such as paint cans, large cardboard boxes, plastic bags, sacks or anything that is no longer of use and can be used to store trash. With such facilities, it is difficult for people here to classify waste at source.

### 3.3.5. Local management policy

#### Policy in Vietnam

The 2020 Environmental Protection Law has been introduced with many amended laws, especially regarding regulations on domestic solid waste such as:

Clause 1, Article 75 of the Law on Environmental Protection 2020 regulates household solid waste from households, Clause 1, Article 79 of the Law on Environmental Protection 2020 stipulates that the costs of collecting, transporting, and treating household solid waste will be calculated based on the mass or volume of waste generated.

Clause 2, Article 77 of this Law stipulates: "Domestic solid waste collection and transportation facilities have the right to refuse to collect and transport household solid waste from households and individuals that do not classify or use proper packaging and notify the competent authority to inspect and handle according to the provisions of law, except in cases where households and individuals use other domestic solid waste packaging as prescribed in Point c, Clause 1, Article 75 of the Law. This".

Clause 2, Article 79 of this Law stipulates: "In cases where households or individuals do not classify or classify incorrectly as prescribed in Points a and b, Clause 1, Article 75 of this Law, they must pay the collection service price. , transported and treated like other household solid waste."

#### Local policy

Currently, the locality has not issued any policies to encourage people here to classify waste at source.

People here have not yet been disseminated knowledge related to this issue. While this is one of the extremely important factors affecting people's decision to classify household waste at source.

## 4. SOLUTION

- Promote the propaganda movement on waste classification, apply media education to residential groups through women's associations, youth unions, and elderly associations.
- Promulgate policies and sanctions consistent with relevant legal documents to promote positive factors related to people's waste classification behavior.
- Call for more investment capital from the province, the State or the private sector.
- Build additional collection points, provide garbage storage and transportation equipment.
- Coordinate with the management board to provide training to improve environmental management capacity, especially household solid waste management.
- Enhance learning from neighboring provinces on waste issues and waste classification at source.

### 5. CONCLUSION

Through research and investigation in the area, the situation of household waste collection here still has many limitations such as the number of garbage collection and transportation vehicles in the district is too small (specifically 1 vehicle), people does not participate in paying for garbage collection and treatment but still throws household waste into "spontaneous" landfills.

- The percentage of inorganic waste in the study area is very large, people here do not have the habit or awareness of using durable, environmentally friendly products.
- Environmental pollution not only affects people's health but also causes negative consequences for many aspects of the countryside. Environmental pollution reduces local agricultural productivity, directly negatively impacts socio-economic development activities, causing significant economic losses and leading to environmental conflicts in the region countryside.
- Awareness about waste as well as legal regulations related to waste classification in the locality is still very little paid attention, people here have hardly heard of it or only know it briefly.
- Propaganda work on waste classification here has not been widely deployed. There have only been a few small propaganda sessions taking place in schools, but they have not created much spread.
- The management of household waste here is still weak due to the living conditions of the people here. Not 100% of households participate in paying for waste collection and treatment, so the management It is also very difficult for management to control the amount of waste as well as come up with appropriate measures.
- Women often tend to be more aware of garbage classification than men, because they are often the ones in charge of household chores.
- The fee for collecting and processing household waste in the area is still quite low to motivate people to pay attention to the type of household waste they throw into the environment.

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