

The Path of Urban Waste Classification and Management: A Case Analysis of Xiaogan City, Hubei Province

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Abstract: Uses a combination of questionnaire surveys and field interviews to study the current situation of domestic waste classification and governance in Xiaogan City. Then explore the existing problems, such as the government-led mechanism needs to be improved, the ability of residents to participate is insufficient, and the ability of market regulation is limited; Based on the above problems, combined with the actual situation of Xiaogan City, it puts forward countermeasures and suggestions such as improving the construction of government-led mechanisms, improving the participation ability of residents, and enhancing market regulation capabilities, so as to provide strong support for the in-depth development of urban garbage classification and governance in Xiaogan City.

Keywords: Urban garbage, Garbage classification, Multi subject particip.

1. Introduction

In 2017, the State Council issued the Notice of the General Office of the State Council on Forwarding the Implementation Plan of the Domestic Waste Classification System of the Ministry of Housing and Urban Rural Development of the National Development and Reform Commission, which listed 46 cities nationwide as key cities for domestic waste classification. Subsequently, other small and medium-sized cities also actively carried out domestic waste classification work [1]. In 2018, Xiaogan City started the pilot work of domestic waste classification, and issued the Overall Implementation Plan of Xiaogan City for Domestic Waste Classification in 2019. However, as the municipal domestic waste classification management is at the exploratory stage, there are still many problems.[1]

Therefore, this paper takes the classified treatment of urban domestic waste in Xiaogan City as the research object, and theoretically studies the problems existing in the classified treatment of domestic waste in Xiaogan City, and puts forward corresponding countermeasures and suggestions, which greatly enriches the relevant research on the classification of garbage in small and medium-sized cities in China, and provides the corresponding theoretical basis for solving the difficult problem of "garbage siege" in small and medium-sized cities; In practice, it is conducive to helping Xiaogan City to explore a feasible way of classified treatment of domestic waste, and promoting Xiaogan City to further promote classified treatment of domestic waste, so as to realize the green transformation of the development mode and build a "pollution-free city" [2]

2. Study on the Current Situation of Urban Domestic Waste Treatment in Xiaogan City

Xiaogan City, as an important part of Wuhan City Circle, has more than 4 million residents and produces 3400 tons of domestic waste every day, facing the dilemma of garbage

siege. In 2018, the city launched the pilot work of waste classification to achieve waste reduction, recycling and harmless treatment[3]

2.1. Construction of Government Working System

Xiaogan City implements the Party and government leadership responsibility system. The municipal government has taken the lead in establishing a leading group. The group leader is the main leader of the municipal government, the deputy group leader is the deputy mayor in charge of urban management and environmental protection and health, and the group members are the main heads of various departments. The leading group will set up the office in the Urban Management and Law Enforcement Committee, which will be responsible for the classification of domestic waste in the main urban area. The sub district offices and communities are the specific implementation units [4]. Xiaogan City is exploring the establishment of a municipal, district, street and community four level linkage domestic waste classification system that "focuses on blocks and combines them" . [5]

2.2. Garbage Supporting Facilities Placement

In terms of domestic waste recycling facilities, 32 recycling booths have been built in the main urban area of Xiaogan City, and 1000 kitchen garbage cans, 1600 classified garbage cans, 100 sets of three category metal garbage cans, 35 sets of four category metal garbage cans and 200 waste cardboard recycling boxes have been installed and replaced. In terms of domestic waste transport facilities, Xiaogan City currently has 54 dedicated transport vehicles for domestic waste classification, including domestic waste collection services on 10 main roads in the urban area. In terms of domestic waste disposal facilities, there are currently 7 landfills and 1 comprehensive waste treatment plant in Xiaogan City. The domestic waste comprehensive treatment plant, namely Xiaogan Vein Industrial Park, is mainly responsible for the treatment of urban and surrounding domestic waste, including landfill and incineration. The treatment plant can handle 1500

tons of garbage per day, 550000 tons per year, and the maximum annual power generation can reach 200 million kilowatt hours, helping Xiaogan City to maximize the use and reduction of domestic garbage [6].

2.3. Investigation on Residents' Participation in Household Waste Classification

The questionnaire covers the whole downtown area of

Xiaogan City, and the respondents cover all kinds of people. A total of 207 questionnaires were sent out, 201 valid questionnaires were recovered, with an effective recovery rate of 97.1%. The age distribution of the sampling results of the samples is mainly concentrated in the age stages of 15-30 and 30-55, accounting for 96.02% in total. Residents of these two age stages have a clear understanding of the classification and disposal of domestic waste in Xiaogan City, which can more objectively reflect the survey results [7].

gauge	option	Number of people	proportion
Gender	male	84	41.79%
	female	117	58.21%
Age	6-15 years old	2	1%
	15-30 years old	102	50.75%
	30-45 years old	36	17.91%
	45-60 years old	58	28.86%
	Over 60	3	1.49%
Is it necessary to classify domestic waste	yes	188	93.53%
	no	6	2.99%
	indifferent	7	3.48%
Understanding of domestic waste classification methods	know	81	40.30%
	Know something	100	49.75%
	know of	16	7.96%
	Not at all	4	1.99%
Promotion of domestic waste classification in Xiaogan City	Regular publicity	60	29.85%
	Publicity in place	54	26.87%
	Little publicity	81	40.30%
	No publicity	6	2.99%
Ways to acquire knowledge of domestic waste classification	Community advocacy	137	68.16%
	Family or friends	85	42.29%
	network	159	79.10%
	TV or radio	101	50.25%
	School education	51	25.37%
Willingness to participate in urban domestic waste classification	nothing loath	100	49.75%
	Quite willing	85	42.29%
	unwilling	8	3.98%
	indifferent	8	3.98%
Habits of household garbage classification	Classified	60	29.85%
	Occasional classification	89	44.28%
	Few classifications	38	18.91%
	Never classify	14	6.97%
Participation in activities related to the classification of community domestic waste	Every time	24	11.94%
	Frequent participation	45	22.39%
	Occasionally	86	42.79%
	Never participate	46	22.89%
Satisfaction with garbage classification in their communities	perfect contentment	34	16.92%
	Generally satisfied	106	52.74%
	dissatisfied	52	25.87%
	indifferent	9	4.48%
What do you want to know about the classification of domestic waste	Classification	100	49.75%
	Classification significance	32	15.92%
	Terminal disposal	67	33.33%
	indifferent	2	1%
Evaluation of domestic waste classification facilities in your community, school or work unit	Very perfect	19	9.45%
	perfect	79	39.30%
	imperfect	90	44.78%
	Extremely imperfect	13	6.47%
Difficulties encountered in the classification of urban domestic waste in Xiaogan City	Incomplete supervision mechanism	173	86.07%
	Supporting facilities can't keep up	168	83.58%
	Poor publicity	116	57.71%
	Insufficient government investment	74	36.82%
	other	5	2.49%
Improvement Measures for Classified Treatment of Urban Domestic Waste in Xiaogan	Improve the regulatory mechanism	110	54.73%
	Increase publicity	161	80.10%
	Improve garbage sorting collection and terminal treatment equipment	169	84.08%
	Increase capital investment	92	45.77%
	other	6	2.99%

3. Study on the Problems of Classified Treatment of Urban Domestic Waste in Xiaogan City

3.1. The Government Leading Mechanism Needs to Be Improved

3.1.1. Incomplete Supporting Facilities

According to the eleventh question of the questionnaire, it is a survey of facilities related to the classification of domestic waste in residential communities. 9.45% of the residents think that the supporting facilities in the residential community are very perfect, 39.3% of the residents think that they are relatively perfect, and 51.25% of the residents think that the facilities related to the classification of domestic waste are not perfect. Xiaogan City was criticized by the Central Ecological Environment Supervision Group in September 2021 due to the long-term accumulation of leachate in the landfill and the prominent environmental risks. The reason for this problem is that the lack of waste incineration facilities leads to the load operation of the landfill and the serious backlog of filtrate.

3.1.2. Incomplete Regulatory Mechanism

According to the 13th question, in the survey of what problems residents think are existing in the classified treatment of domestic waste in Xiaogan City, 32.83% of residents think that the regulatory mechanism is not sound, which is the most frequent option among all listed problems. The main body of Xiaogan municipal domestic waste classification supervision is Xiaogan Municipal Urban Management and Law Enforcement Commission, which not only supervises whether enterprises, residents and other different objects have standardized the disposal of domestic waste generated, but also supervises a series of processes of domestic waste classification, including source classification, middle end transportation and end disposal. There is a lack of separation.

3.2. Insufficient Participation Capacity of Residents

3.2.1. Low Recognition of Domestic Waste Classification

According to the third question, in the survey on the classification of household garbage, 59.7% of the residents did not know the classification method of domestic garbage in Xiaogan City or only slightly understood it. This reflects that in daily life, residents fail to actively understand the classification methods of domestic waste in Xiaogan City. In the process of classifying kitchen waste, residents often mix it with contaminated paper towels, plastic bags and other sundries, which leads to difficulties in recycling resources and increases the burden of community workers.

3.2.2. Lack of Domestic Waste Classification

According to the seventh question, in the survey of residents' garbage classification behavior, only 29.85% of residents have the habit of garbage classification, 44.28% of residents occasionally classify garbage, 18.91% of residents rarely classify garbage, and 6.97% of residents never classify garbage. Therefore, residents lack garbage classification behavior in daily life. Most residents occasionally classify domestic garbage. Few residents have the habit of classifying domestic garbage and insist on daily classification.

3.2.3. Low Enthusiasm to Participate in The Activities of Household Waste Classification in The Community

According to the eighth question, the survey on residents' participation in activities related to household waste classification held by the community was conducted. According to the survey results, only 11.94% of the residents participate in the domestic waste classification activities held by the community every time, 22.39% of the residents often participate, 42.79% of the residents occasionally participate, and 22.89% of the residents never participate. From this point of view, most residents participate in activities related to household waste classification held by the community at will, and few residents insist on participating in relevant activities.

3.3. Market Regulation Ability Needs to Be Improved

3.3.1. Inadequate Enterprise Participation

According to Hu Mouxia, the Municipal Urban Management and Law Enforcement Commission, there are 34 environmental sanitation industry companies registered in Xiaogan City. Due to poor operation, 10 enterprises have been cancelled, and 24 environmental sanitation enterprises have survived. Among them, 14 enterprises are mainly engaged in selling environmental sanitation equipment and vehicles, 7 enterprises provide garbage collection and transportation services, and 3 enterprises are responsible for providing disposal services. Therefore, Xiaogan City has the problems of insufficient market-oriented operation of environmental sanitation industry and low participation rate of enterprises.

3.3.2. Inadequate Technological Innovation of Enterprises

At present, Xiaogan Municipal Domestic Waste Incineration Power Generation Project is relatively complete. The project is mainly participated by Hanlan Co., Ltd., and there are three production lines in terms of waste treatment capacity, which can handle 1500 tons of domestic waste per day. However, compared with Guangzhou Venous Industrial Park, which has more developed treatment technology, there are still deficiencies. The daily treatment capacity of each production line in the industrial park is up to 1800 tons. In addition, Chengdu Venous Industrial Park has developed a water purification agent. Through the purification of the agent, the sediment and particles in the raw water, as well as bacteria and heavy metals that cannot be seen by human eyes, have been eliminated, while Xiaogan Enterprises obviously lack similar innovation spirit.

4. Analysis on Improvement Strategy of Classified Treatment of Urban Domestic Waste in Xiaogan City

4.1. Improve the Construction of Government Leading Mechanism

4.1.1. Improve the Security Mechanism

Perfect dropping facilities, transportation facilities and terminal facilities are the important basis for ensuring the classification and treatment of garbage. In terms of placement facilities, after reasonable planning and layout, the number of garbage bins or garbage bins should be increased, and garbage bins with good quality and clear identification should be set up, and those that do not meet the conditions should be updated in a timely manner. In terms of transportation, we will

increase the number of transportation vehicles in the new urban area, intelligently manage them, and adopt the "Internet + door-to-door recycling" mode to reduce resource waste. In terms of terminal facilities, during the "13th Five Year Plan" period of Xiaogan City, it is estimated that five waste incineration projects will be built, and only two will be built at present, so the construction and operation of waste incineration projects should be accelerated.

4.1.2. Improve the Regulatory Mechanism

Whether the supervision mechanism is perfect or not is not only the responsibility of the relevant departments, but also an important factor in evaluating the effectiveness of domestic waste classification and treatment. Improve government supervision, further clarify the division of responsibilities of relevant departments according to the "Three Determinations" plan and the work responsibility statement; We should also establish a liaison platform between departments, strengthen the working contact between departments, and focus on the coordination and cooperation between departments. Third party assessment shall be introduced to supervise communities, collection and transportation units and disposal enterprises by introducing enterprises, social organizations, residents and other third party subjects. We will improve social supervision, establish a sound news and public opinion supervision mechanism, timely disclose the uncivilized and illegal problems in the classification and treatment of urban domestic waste, and urge them to correct them immediately.

4.2. Improve the Participation Ability of Residents

4.2.1. Strengthen Publicity and Education

Although Xiaogan Municipal Government vigorously promoted the classification of domestic waste, the effect was not ideal. Therefore, Xiaogan Municipal Government should adopt corresponding publicity methods according to different groups of people to enhance residents' awareness of classification. Innovate publicity methods, establish a platform in the community that can attract residents to communicate, and innovate the publicity media. Include garbage classification in primary and secondary education

The school is encouraged to organize students to carry out field investigation from the source classification to the end treatment of domestic waste, so that students can have a vivid impression of it.

4.2.2. Improve Reward and Punishment Measures

It is far from enough to improve the residents' classification awareness by propaganda and education alone. We must also improve the residents' reward and punishment measures to restrict the residents' classification behavior and make them form a good classification habit. Improve incentive measures, and promote the "point system" implemented in Yunmeng County, Xiaogan City by building a point exchange platform and cooperating with shopping malls and supermarkets. Improve punishment measures. By establishing "environmental protection personal credit file", the illegal garbage disposal behavior and punishment of relevant personnel and enterprises can be reported to the public credit information management platform open to the society according to relevant laws and regulations.

4.2.3. Establish A Team of Supervisors

According to the interviewers, the allocation of street and community supervisors in the garbage classification work in

Xiaogan City is not in place, and there is a lack of normalized guidance. However, at present, residents of Xiaogan City have not formed the habit of classification, and their understanding of garbage classification is not thorough enough, which is difficult to classify accurately. Therefore, the construction of community supervision is more urgent.

4.3. Enhance Market Regulation Capability

4.3.1. Open the Market and Introduce Social Capital

The classification of domestic waste is inseparable from the participation of social capital. On the one hand, the government should open the solid waste disposal market, formulate corresponding preferential policies and compensation measures, guide social capital to participate in the construction of urban waste classification, and encourage market financing by means of sole proprietorship, joint venture, etc. On the other hand, we should guide the society to participate in investment and actively guide social and private funds to invest in the urban waste classification or disposal industry to achieve the goal of public development.

4.3.2. Actively Cultivate Market Players

In order to realize the market regulation function of waste classification and treatment, it is necessary to attract market participants with independent legal personality. On the one hand, it can cultivate state-owned enterprises and expand the main participants; Under the guidance of the government, it is also possible to establish a group of professional large-scale state-owned enterprises engaged in the classified collection, transportation and recycling of domestic waste, implement industrialized operation, gradually change the current situation of excessive levels of waste treatment management and market segmentation, and improve the operating efficiency of the waste treatment industry. On the other hand, support social forces to participate in domestic waste treatment, and give support in policies such as taxation and site use, so as to reduce the burden of waste classification companies. At the same time, we should strengthen the supervision and evaluation of enterprises to prevent market failure.

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