Research on the status quo and countermeasures of Municipal solid waste classification in Fuzhou

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Abstract. Since Fuzhou started garbage sorting, it has achieved certain results. However, there are still many problems in the specific implementation process. Starting from the analysis of the status quo of domestic waste classification in Fuzhou City, the article analyzes the main problems existing in the current domestic waste classification work in Fuzhou, such as residents' awareness of waste classification needs to be improved, waste classification hardware facilities are not perfect, etc., and on this basis, corresponding The countermeasures will play a positive role in further promoting the garbage classification in Fuzhou.

Keywords: Garbage classification, Environmental protection, Countermeasure research.

1. Introduction
With the continuous development of my country's urbanization, more and more people are shifting from rural to urban areas, bringing rapid economic development, but also increasing the amount of urban domestic waste, which has a greater impact on the living environment of urban residents. In order to improve the quality of my country’s urbanization development and create a good living environment, in March 2017, the General Office of the State Council issued the “Implementation Plan for the Domestic Waste Classification System”, proposing to take the lead in implementing mandatory classification in 46 cities across the country. One of the pilot cities for the classification of domestic waste, starting from May 2019, it will fully implement the classification of domestic waste. As of the end of 2019, Fuzhou has significantly improved in the evaluation rankings of the Ministry of Housing and Urban-Rural Development and entered the top ten in the country. The comprehensive promotion of waste classification is of great significance for improving resource utilization efficiency and building an environment-friendly society.

2. Status of Domestic Waste Classification in Fuzhou
Fuzhou has six districts (including Changle District) under its jurisdiction. However, since Changle District has only started to implement household waste classification in July 2020, compared with the other five districts (Gulou District, Taijiang District, Cangshan District, Jin’an District), Mawei District is late, so the relevant data only includes five districts. According to statistics, there are 3,382 communities in Fuzhou. As of June 2020, a total of 4,860 garbage sorting houses (kiosks), 42 boutique environmental protection houses, 21 environmental protection stations, 4625 staff and 5002 monitoring probes have been built. See Table 1 for the specific number of districts built. In general, the Fuzhou...
Municipal Government has paid more attention to the construction of waste sorting infrastructure and invested more in waste sorting hardware facilities.

### Table 1. Construction and staffing of waste sorting hardware facilities in five districts of Fuzhou

| District | Refuse Sorting House (Kiosk) | Staffing | Probe Boutique Green House (Block) | Environmental Protection Courier Station (Block) |
|----------|------------------------------|----------|-----------------------------------|-----------------------------------------------|
| Gulou    | 1625                         | 1621     | 1623                              | 16                                            |
| Taijiang | 711                          | 765      | 1056                              | 3                                             |
| Cangshan | 1232                         | 891      | 1109                              | 9                                             |
| Jin’an   | 923                          | 1066     | 923                               | 11                                            |
| Mawei    | 369                          | 282      | 291                               | 3                                             |
| **Total**| **4860**                     | **4625** | **5002**                          | **42**                                        |

From the perspective of working mode, the classification of domestic waste in Fuzhou City adopts the "three-end and four-fixed" model. The so-called three-end refers to front-end classification, mid-end collection and transportation, and back-end disposal. Fixed-point collection, fixed-person supervision, positioning monitoring; mid-end fixed enterprise, fixed vehicle, fixed time limit, fixed location; back-end fixed-point inspection, fixed factory disposal, fixed process, fixed responsibility supervision. The specific approach is shown in Table 2.

### Table 2. The specific practices of the "three ends and four fixed" model of waste classification in Fuzhou

| Items                          | Provision                                      | The specific practices                                                                 |
|--------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------|
| The front-end classification   | Fixed timed delivery                           | Specify the specific time period for domestic waste in the designated community, and residents can only put it in within the specified time |
| Fixed spot collection          |                                                | Accessories garbage sorting house (kiosk), residents can only put it in a fixed place   |
| Fixed personnel supervision    |                                                | The garbage disposal point sends a sorting manager to supervise the disposal and open the bag for inspection |
| Fixed location monitoring      |                                                | Garbage sorting house (kiosk) is installed and monitored and brought into unified supervision |
| The middle-end collector       | Fixed designated enterprise                    | Check the access conditions of garbage collection and transportation enterprises and implement standardized management |
| Fixed designated vehicle       |                                                | Unified requirements for the configuration of garbage collection and transportation vehicles, installation and positioning, and full monitoring |
| Set a time limit               |                                                | Designated garbage collection and transportation routes and time limits                |
| Set a good spot                |                                                | Designate the garbage collection and transportation point of the community, and stipulate the length of time the garbage can stay at the collection and transportation point |
| The back-end disposal          | Fixed spot inspection                          | Carry out inspections on garbage collection and transportation vehicles, only compliant vehicles can enter the garbage disposal site |
| Fixed factory disposal         |                                                | Different garbage is transported to different treatment plants for disposal            |
| Standardization process        |                                                | Specify the disposal methods and procedures for different types of garbage            |
| Responsibility supervision     |                                                | Different types of waste disposal are supervised by different regulatory agencies     |

In terms of inspection and supervision, the Fuzhou City Management Committee will publish the monthly work status of each district on its website, and publish the assessment score sheet and work statistics table of the five districts. At the same time, it will randomly select 100 communities for evaluation and selection. Out of the "top ten and ten poor" community, and report the specific points deduction situation. On the whole, the evaluation system is relatively transparent and fair. Quantitative rankings can increase the enthusiasm of each district and clarify the directions for improvement.
In short, although Fuzhou's waste classification has not been implemented for a long time, it has achieved certain results. From the perspective of the government, it pays more attention to waste classification. However, it is still in the initial stage of continuous exploration and there are still many problems to be solved.

3. Analysis on the Problems Existing in the Classification of Domestic Waste in Fuzhou

3.1. Residents' awareness of garbage classification needs to be improved
Judging from the data reported by the Fuzhou City Management Committee, some residents' awareness of garbage classification needs to be improved. Some residents will mix kitchen waste with other garbage when sorting. This is mainly because some residents themselves do not understand the importance of garbage sorting. In actual life, they think that sorting is more troublesome, and young people are usually busy with work and do not have time. And energy to learn specific classification methods, although there are certain punishment measures, but still have a fluke mentality, feel that the possibility of punishment is unlikely. For the older residents, although the time is relatively sufficient, the learning ability is relatively poor, and it is not clear how to classify, especially some residents with relatively low education.

3.2. The waste sorting hardware facilities are not perfect
Judging from the current hardware facilities for waste sorting, the relevant government departments have invested a lot, but they still need to be further improved. Some communities do not yet have relevant supporting facilities. Especially for old communities or communities without real estate, the original management of the community is rather chaotic, and the space is limited. There is no place to build a special garbage sorting house. The garbage cans can only be placed in the public area near the community, which is relatively more complicated. It is not easy to monitor.

3.3. There are regulatory loopholes in actual implementation
Fuzhou's current implementation of the "three-terminal four-fixed" work model is generally more reasonable in design, but in the actual implementation process, it will encounter some regulatory loopholes. For example, although the community that implements garbage classification is equipped with supervision and management personnel to supervise the bucket, the bag opening inspection will not be carried out during the period of centralized disposal, and the mixed disposal of residents cannot be detected in time, and it is prohibited from the source. And from the actual operation point of view, although some communities have built garbage sorting houses and installed monitoring probes, they cannot avoid the problem of residents putting them in the wrong time. If many residents miss the opening hours of the garbage sorting houses, they still choose to put the garbage directly in the garbage. At this time, the door of the classification house, because there is no supervision by the administrator, it is impossible to ensure whether it is classified in accordance with relevant regulations. Although the surveillance probe can capture relevant images, it cannot realize the identity of the publisher, and relevant punishment measures cannot be implemented in time.

3.4. Incentive mechanism is not perfect
At present, the incentive system for residents in Fuzhou's garbage classification method is not perfect, and more needs to rely on the conscious compliance of residents. In terms of punitive measures, most of the punishments for enterprises are fines, generally more than 10,000 yuan, and the punishment is relatively large, while the punishment for individual residents is relatively light, mostly ranging from 50 to 200 yuan. The lack of incentive mechanism, coupled with the small punishment, the residents have insufficient motivation for garbage classification, which is one of the reasons why some residents do not consciously carry out garbage classification.
4. Countermeasures and suggestions

4.1. Increase publicity and enhance residents’ awareness of waste classification
First, Judging from the current garbage classification publicity, offline publicity such as theme publicity activities, household publicity, and volunteer activities are the main ones, and there are fewer online publicity activities for young people. It is recommended to combine online and offline to carry out publicity work in a variety of ways, targeting different age groups, using different methods for publicity. It is recommended to strengthen home-school cooperation and hold more practical activities or garbage sorting competitions. On the one hand, it can strengthen the education of students and form a good habit of garbage sorting from an early age. On the other hand, it can also allow parents of students to participate and set an example. Improve parents' awareness of garbage sorting.

4.2. Improve hardware facilities, develop and promote intelligent hardware
For communities with incomplete hardware facilities, relevant hardware facilities should be improved as soon as possible. It is recommended to increase investment in the research and development of intelligent waste sorting hardware, such as designing and promoting trash cans that can automatically realize sorting, intelligent voice prompts for waste sorting related hardware facilities, etc. In addition, it is recommended that communities establish residential face recognition near trash houses The collection system, on the one hand, is conducive to the public security management of the community, on the other hand, it can also put garbage into real-name management through intelligent identification.

4.3. Strengthen supervision and inspection
The government should strengthen the supervision and management of waste sorting, and strengthen the training and random inspection of waste sorting managers. For areas where the implementation of garbage classification is not effective, it is necessary to strengthen supervision and inspection, notify units and individuals that do not follow the regulations to classify garbage, clarify punishment measures, and provide relevant classification guidance. For the phenomenon of mis-delivery, special delivery points should be appropriately set up according to the actual situation, or the residents should be reminded in time through the intelligent reminder system, and patrols should be strengthened to prevent the phenomenon of mis-delivery that is not as required.

4.4. Develop targeted incentive programs to improve residents' enthusiasm
For different types of residents, it is recommended to set up a variety of incentive programs to choose from. For example, “Environmental Protection Star” and other honorary titles can be assessed within the community or in the school, and certain comprehensive quality points can be awarded. For office workers who are usually busy at work, certain credit points will be awarded, which can be used to reduce the waiting time in administrative service centers, hospitals and other offices.

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