

## Garbage Classification

Robin Li<sup>1</sup>

<sup>1</sup> Keystone Academy, Beijing 101318, China

\* Correspondence: robin\_lwy@sina.com

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**Abstract:** Starting from late May of 2019, the Chinese government has started to enforce the garbage classification law in Beijing, which requires local citizens to mandatorily classify their trash in public places, such as schools and hospitals, and will gradually cover more areas. In July, the laws on garbage management were also implemented in Shanghai, with more cities following this footsteps. This chain of events has clearly demonstrated the determination of the Chinese government in dealing with garbage classification, which has long been a significant problem in China, in order to protect the environment and develop sustainable cities. This paper combines a variety of sources, including internet webpages and interviews, etc., to analyze different aspects of the laws implemented by the Chinese government in Shanghai and Beijing, including their benefits and problems, to finally form a prediction that the laws would not succeed or show evident effectiveness for these cities in the near future. This paper helps provide insights to the garbage classification policies, and advocates that citizens should wait patiently for the success of the laws, instead of bragging or criticizing them right away.

**Keywords:** garbage classification; laws; sustainability; Shanghai; Beijing; effectiveness

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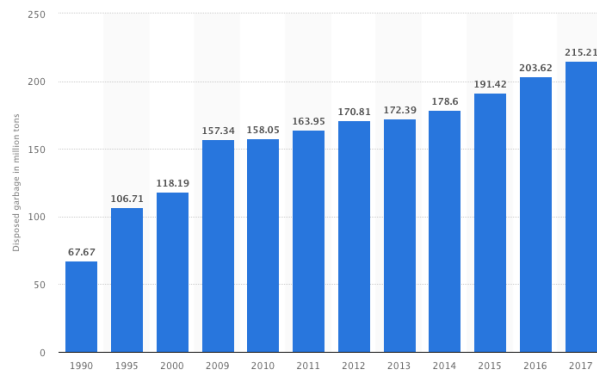
### 1. Introduction

China has surpassed the United States in becoming the largest trash producing country in recent years. According to a recent review on garbage in China, China produces 254 million tons of garbage a year, about a third of a kilogram per person per day, which is a third of the world's annual trash and garbage output (Hays, 2014). In recent years, the amount of disposed garbage in China grew in an even faster rate than the increase before. A graph showing the Amount of disposed garbage in China from 1990 to 2018 is shown in Figure 1. As can be seen in Figure 1, between 2014 and 2017, the amount of disposed garbage in China increased about 12 million tons each year. In contrast, the amount increased 15 million tons in total for the previous four years, between 2011 and 2014. Each urban dweller in China produces about a half ton of garbage a year (Hays, 2014). Specifically, in Beijing, 20 million residents generate about 18,000 tons a day in total. 85 percent of the trash produced in China goes to landfills (Hays, 2014). These statistics can provide some idea for the seriousness of the garbage management problem in China.

However, it takes a long time, or even forever, for some types of trash to biodegrade in soil. Some of the common types of trash, and the time it take for them to degrade are listed in Table 1. As can be seen in Table 1, it takes almost a hundred years for the package of chips and other similar types of package used for delivery to degrade in soil. It takes 500 years for the plastic bottles to degrade in soil. Moreover, the

glass bottles and glass cans would perhaps never degrade at all. These are all very common types of trash that people discard in their everyday lives. If these trash are buried in landfills without being classified, they would never disappear, occupying the limited land space in the country. This is one of the problems that China is currently facing: the lack of space for landfills. Furthermore, China’s municipal garbage sorting largely relies on scavengers and workers at sanitation stations, who collect the trash from the garbage bins. As the market value of food scraps is much lower than recyclable trash such as paper and plastic, both the formal and informal sectors are reluctant to thoroughly sort food waste without financial incentives (Liu, 2017). Since food scraps comprise 50 to 70 percent of China’s municipal solid waste, this becomes a great barrier that inhibits China from sorting garbage successfully (Liu, 2017). There are many more problems caused by the lack of management of garbage, such as air pollution, water pollution, etc. In order to improve these problems, garbage classification is necessary. As a result, China started its first formal attempt to demand mandatory garbage classification domestically this year, in 2019.

**Figure 1:** Amount of disposed garbage in China from 1990 to 2017 in million tons (Statista, 2019).



**Table 1:** The time it takes for different types of trash to biodegrade in soil (Administration office of Changsha, 2019).

Type of trash	The time it takes for it to degrade in soil
Tissue paper, paper bags, newspapers, etc.	1 month
Clothes made of cotton, paperback, etc.	6 months
Package of chips	70—80 years
Plastic bottles	500 years
Glass bottles, glass cans	Perhaps never

## 2. Basic Regulations of Garbage Classification

The central government has set a list of detailed laws in Beijing and Shanghai. Here are some most important and basic ones. Household waste in the cities is now required to be sorted into four categories:

wet garbage (household food), dry garbage (residual waste), recyclable waste, and hazardous waste (Zuo & Yan, 2019). Rubbish bins that were previously taken all types of household waste are removed from buildings. Instead, residents need to visit the designated trash collection stations to dispose different types of waste during designated periods of the day (Zuo & Yan, 2019). Waste transporters are then asked to use classified vehicles to transport the garbage in order, and have the right to refuse to carry the trash if it is misclassified. (Zuo & Yan, 2019). Moreover, companies and organizations who disobey the new rules could be fined 50,000-500,000 yuan (US\$7,000-70,000), while individual offenders risk a fine of 50-200 yuan (Zuo & Yan, 2019).

Overall, the new rules showcase the two main goals: to clearly separate waste for a more effective recycling process, and to place tighter restrictions on the waste output of businesses and government departments.

### 3. Benefits

Garbage classification could solve a variety of problems. Firstly, waste sorting could help cut the time and money China devoted to the process of burying the garbage. After sorting, recyclable waste can become a resource, kitchen waste is composted to be turned into fertilizer, and hazardous waste such as batteries can be processed in specific ways. The other types of waste, classified as dry refuse, will be burned (Yan, 2019). This helps not only develop a much more convenient process of managing trash, but also reduce the waste dramatically by reusing recyclable materials that are thrown away. A number of items made of a variety of materials, such as glass, steel, plastic, cotton, can all be recycled and reused. The amount of recycled object and the amount that is saved is shown in Table 2. If these laws are successfully implemented, a large quantity of raw materials would be saved, which helps solving multiple problems, such as the lack of resources, pollution due to manufacturing, etc. Also, space for landfills can be saved, because more materials would be used repeatedly, and less materials would be thrown away into landfills after being only used once.

**Table 2:** The items saved through recycling different amounts of objects (Administration office of Changsha, 2019).

Amount of object that is recycled	What can be saved
1 ton of used glass	Can generate 2,000 glass bottles with 500g-volume
1 glass bottle	Can save the energy to light a bulb for 4 hours
1 ton of used steel	Can generate 0.9 ton of quality steel; can save 1.6 ton of iron minerals
1 ton of cans	Can generate 1 ton of quality aluminum; can save 20 ton of aluminum ore
1 ton of used plastic	Can save 6 ton of oil
1 ton of used paper	Can save 300 kg of timber; can save 12 – 17 trees
1 ton of used clothes	Can generate 0.99 ton of quality cotton; can save 0.8 ton of raw material of cotton

In addition, the implementation of these laws also has potential economic benefits, as it creates more jobs and business opportunities. For instance, a new service - rubbish throwing service - is becoming common in Shanghai, as well as in Beijing (Zuo & Yan, 2019). It offers services to visit homes, collect waste, and throw it into the right bin at a designated time for citizens (Zuo & Yan, 2019). One man who runs a rubbish throwing service charges 30 yuan a month for those living on the ground and first floors, 40 yuan for those on the second and third, and 50 yuan for the fourth and fifth (Zuo & Yan, 2019). In this way, the garbage classification laws have provided man as such opportunities of employment, as is the same with a lot of other individuals.

Overall, the garbage classification laws benefit the society in many aspects, both economically and environmentally. There is no doubt that these laws will be able to help solve the current problems to some extent, if they are executed as what is expected.

#### **4. Problems**

Beside the potential benefits that come with the laws, the problems that arise from these regulations should be examined as well. Until now, the regulations have been implemented for more than 5 months in Beijing, and 4 months in Shanghai. Despite some positive results that were shown, complaints and criticisms composed the majority among people's reactions. In the interview I conducted in September 8, a resident who has lived in Beijing for 16 years since he was born described what he has witness: "Everyone learn from the news that garbage classification has started, but there is no actual change. It was advertised that garbage classification should have started in public places, but the fact is that the hospitals and the schools are exactly the same as before. There is still that single garbage bin in my school and in the hospital near our house. I just threw all my trash into that bin, and I was never fined for doing that." (Han, 2019). This is only one example from the citizens that the change after the laws is very slight, or even negligible. It is certain that the laws were not strictly executed. Also, even though the punishments are listed clearly in the laws, people are not monitored strictly enough, since it would be so difficult to arrange law enforcement in every corner within such a big city, or identify who the person is after he or she is caught by the camera. As a result, there is no practical solution to fine citizens for their misbehavior.

This problem in Beijing could be easily attributed to the fact that the garbage classification laws in Beijing has just started implementing them; however, in Shanghai, where the laws have been implemented longer, and people are monitored a lot more strictly, different problems still emerged. Since this is the first time that the Chinese government officially puts forward laws on garbage classification, most citizens have neither acquired professional knowledge on garbage classification, nor developed even the simplest habits of doing it. (Zhang, 2019) Consequently, they often misunderstood the requirements, and could not follow them correctly. In this case, when too many people violated the regulations, the government could not fine each and every one of them, causing some of them to push their luck, and continuously do the wrong thing. This would only be resolved when more people have successfully developed habits of classifying trash in the future, which is going to be a long and difficult process, because people are only forced to classify their garbage right now. When they lose their enthusiasm someday, it is hard to say whether they would maintain what they are doing currently.

Moreover, the system of garbage classification is not mature yet. According to Lihua Zhang, a WWF worker, some cleaners and rubbish trucks mix the waste when they collect it, despite residents being asked to throw different types of trash in different bins (Zhang, 2019). As a result, the trash goes to landfills with all the types mixed together again, which counteracts the efforts people put in classifying.

## 5. Conclusions

Because of the various benefits that garbage classification has, it is definitely reasonable and necessary for the Chinese government to set up such regulations about garbage classification, starting in Beijing and Shanghai. However, people should be aware that these rules would not show effect immediately. It is normal that people need some time to develop their habits of garbage classification, and that some loopholes may still exist in the current operation system of garbage classification, as this is the first time they have ever been exposed to this new concept. Japan took an entire generation to implement its waste sorting system effectively, so people in China should not have the expectation that such an initiative will succeed in a short time period. Consistency is the key for them, that is, to form their habits of garbage classification someday without the need of mandatory regulations. That is the point when China succeeds in garbage classification, and it is worth waiting.

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