

Caiwei Huang

19/Sep/2022

Eat Sustainably: Food Waste in China

Food waste, specifically the discarding of food at the consumer stage, has become a major problem across the world, and it seems ironic that, in a world where there is excess food to be wasted, part of the world continues to starve. The accumulation of food waste not only contributes to starvation, but also decreases economic productivity, contributes to greenhouse gas emissions, and exacerbates climate change. China, the most populous country in the world, produced 81 million tons of food in 2018 alone, representing 38 percent of global production (China Power Team). However, in the city of Beijing alone, unconsumed food makes up the largest percentage of the 18,000 tons of domestic garbage produced per day (Watts). Even though China is known for its large-scale food production and for the effort that the government puts into eliminating starvation, the issue of food waste is badly in need of attention, as 17 to 18 million tons of food is wasted each year, enough to feed 30 to 50 million people (Liu). To cope with these environmental, social, and economic problems, the government should adopt policies to reduce the amount of food wasted at individual and household levels and to recycle the food waste.

One of the most terrifying trends observed is that food waste often increases with growing wealth in a population; such is the case in China. This problem can be traced back to the 1950s. China welcomed a round of economic and population growth due to the successful Five-Year Plans and the opening of trade with foreign countries. However, in 1958, the Great Chinese Famine hit and the government came up with the Great Leap Forward to deal with the crisis. The Great Leap Forward was launched by Mao Zedong in order to transform China from an agrarian economy to an industrial society through forming communes. However, this policy adopted poor agricultural techniques that led to inefficient distribution

of resources and over-reported grain production, leading to the death of about 30 million people (Hasell and Roser). In the forty years after the famine, China invested most of its attention on large-scale capital investment, supported by domestic savings and foreign investment, and rapid growth in productivity. This transformation led to higher economic efficiency which increased resources for investment, and in turn, boosted the GDP to about 1.211 trillion US dollars in 2000 (Data Commons). With this increase in the economy came an improvement in living conditions and life expectancy. The government started making policies that focused on public health, food nutrition, and infant care, as well as increasing food imports of seafood, soybean, and pork from places such as the United States and South America (Bandyopadhyay et al.). The increase in public wealth led to the overflow of resources, and more specifically, waste of food in the consumer stage.

One previous attempt to address the problem of food waste was the Clean Plate policy issued in August 2020 by President Xi Jinping, who highlighted that the COVID pandemic rang the bell on food waste and that China had to "maintain a sense of crisis about food security" (BBC). The campaign introduced a system in restaurants where a group of customers must order one dish fewer than the number of customers, which was also called the "N-1" system (BBC). Along with this system, the government also made progress in regulating Mukbang, which is live streaming of people eating large amounts of food. Some policies involved deleting the videos of such live streamers and banning them from live streaming or uploading Mukbang videos, as well as removing their videos if they included waste of food. These strict policies have faced many criticisms and setbacks since Mukbang is extremely popular on video sites like Tiktok, Douyin, and YouTube, and that generosity, especially when welcoming friends and inviting them to have meals together, is a traditional virtue that is buried deep in Chinese culture and cannot be easily eradicated. In 2015, around 17 to 18 million metric tons of food were wasted annually in China. (Liu). However, in 2021, one year after the implementation of the program, the amount of food that China wasted annually rose to around 20.3 million annually (UNEP). Though this data could be inaccurate since it is rated "very low confidence" by UNEP, it insinuates how the policy did not help with

the crisis and the extent to which the issue of food waste is developing in China. Two factors that could explain why this policy did not function as expected are the failure in the actual carrying out of the process and the fierce resistance from the public. In actually carrying out the process, individual businesses took the policy as "advising diners to order N-1 dishes" instead of "limiting diners to ordering N-1 dishes", and so the policy remained as a line in the government banners rather than a law to practice in daily life.

A successful South Korean attempt that reduced food waste and increased the percent of food waste recycled from 2% in 1995 to 95% today is a plan incorporating biodegradable bags and automated bins (Sheldon). Introduced to South Korea in 2014, the bags only cost 6 US dollars a month for a family of four people. These bags are usually made of starch, sugarcane, or wheat (Ecology Center), and can therefore be easily decomposed or reused. Families use these bags specifically for food waste and bring them to designated automated bins for the waste to be recycled. These bins are equipped with a scale as well as a Radio Frequency Identification system, allowing them to collect mass waste, calculate prices, and charge citizens' IDs (Secon). 6000 of these automated bins were implemented in Seoul in 2014. The waste generated by the automated bins is later used in the making of bio-gas, bio-oil, and fertilizer. The 6-dollar bag charge also covers 60% of the operational fee, allowing the system to have low maintenance costs (Sheldon). With this plan, South Korea was able to increase the amount of food waste recycled from 2% in 1995 to 95% today (Sheldon).

The same technology can be introduced to China because of the similarity between the two countries and the available technologies in China. In the distribution stage, the biodegradable bags will be available in supermarkets so that people can easily buy them during grocery shopping. After that, bags containing the food waste will be collected and carried by unmanned vehicles. Unmanned cars and buses were integrated into the Chinese public transportation system as early as 2020 and are widely used in the delivery of food, packages, and natural resources (China Daily). These vehicles are completely automated

and are usually the size of a normal 5-seat car, used most frequently inside a community or on a college campus. They are usually owned by private companies that need to transfer resources and use electricity as fuel. Thus, unmanned vehicles can be used in transporting food waste to the automated bins.

In terms of disposing of the food waste, automated bins will be able to decompose food waste along with the biodegradable bags so that minimum time and resources are used at this stage. In South Korea, these bins are placed throughout the city so that people can easily reach one close to where they live. In China, after unmanned vehicles collect and send bagged food waste to a centralized area within a community, for example, in the landfill, the automated bins will receive food waste through the back of the cars, and the food waste, along with the biodegradable bags, will be composted. In a city like Shenzhen, with a population of 12.8 million in 2022 (World Population Review) and about 30 thousand communities, an estimated 120 thousand bins will be needed (idongde). These facilities will be placed on an open, centralized site in each community, allowing them to be fueled by solar power.

As for the monthly payment for the bags and the automated bins, established apps like WeChat Pay, Alipay, and Apple Pay will be incorporated, so that citizens can pay for using the automated bins through their phones. This strategy is especially helpful during a pandemic because it reduces contact among people and the risk of spreading the virus. Another approach would be to incorporate the fee for the biodegradable bags into the management tax that people are required to pay each month, making the charge less "visible".

However, the actual implementation of this strategy might meet setbacks since it is difficult to change people's living habits and to overcome the lack of infrastructure in remote areas. People have gotten used to simply sorting their trash and dumping it in the centralized bins on their way to work or before going on a walk. It was a simple, fast, and cheap process. It will take the government significant time and effort to convince these people to implement this plan. A way to deal with this issue is by

holding information sessions about sustainability and the benefits of recycling food waste, thus increasing awareness about this issue and making people more receptive to this plan.

Food waste has existed on the planet for a long time, and it certainly requires considerable effort, resources, and time to solve this problem. Implementing biodegradable bags and automated bins can be a difficult process since it involves the cooperation of multiple departments and the entire world. Making efforts to convince people in rural areas and to build infrastructure to allow for communication and transportation in these areas can also be difficult. But solving the problem of food waste has a significant long-term effect on the world. With a decrease in food waste comes a decrease in pollution, an increase in economic productivity, a slowing down of global warming, and an extended life for the entire human race.

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