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Effects and Issues of Discontinuing Free Distribution of Plastic Shopping Bags in Japan



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Jun Kobayashi*¹, Keiichi Ikeda²

¹Faculty of Nutrition, University of Kochi, 2751-1 Ike, Kochi, Kochi 781-8515, Japan; ²Faculty of Pharmaceutical Sciences, Hokuriku University, 3 Ho, Kanagawa-machi, Kanazawa, Ishikawa 920-1181, Japan.

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ABSTRACT

A plastic shopping bag is a type of shopping bag distributed at the cash register to store products purchased in shops. In Japan, plastic shopping bags have not been distributed freely since July 2020, and it is now recommended that shoppers either be given these for a fee or bring their shopping bags. Reasons for this include the harm that dumping plastic products, including shopping bags, into the ocean, does to marine life or that it is an action to control the depletion of petroleum resources. However, it remains doubtful whether charging a fee for plastic shopping bags is effective. In this paper, after considering the problems with plastic products, we will focus on plastic shopping bags and examine the advantages and disadvantages of abolishing the free of charge. Our results show that to achieve the above objectives, it was considered necessary to limit the use of more plastic products and expand the operation of material or chemical recycling.

INTRODUCTION:

A plastic shopping bag is a bag made of a material such as polyolefin. It is distributed at cash registers in shops such as convenience stores and supermarkets to help shoppers carry the products they purchased. In Japan, the free distribution of plastic shopping bags at retail stores ended in July 2020, and paid distribution or use of eco-bags is now recommended. An eco-bag is a bag or basket that consumers bring to carry away their shopping and is also called a “my bag” or a reusable bag. The origin of this practice comes from the fact that dumping plastic products, such as plastic shopping bags, into the ocean is harmful to marine organisms. Furthermore, as the petroleum resources used as the raw materials to create the bag will be depleted in the future, the practice of using reusable bags can also be regarded as an action to enable oil to be available continuously for as long as possible¹⁾. To date, several plastic shopping bags have been distributed easily²⁾. As they are considered garbage immediately after a shopping trip is complete, they have a low utility value compared to other plastic products and are thus easily considered a waste of oil. We have long thought that it is a good idea to reduce the number of plastic shopping bags used and we reported earlier on how to achieve this³⁾. However, at present, there are situations wherein some people continue to use plastic shopping bags even if they are charged for them and the alternative “eco-bag” is itself a petroleum product. If the “eco-bag” is also petroleum, its use would be meaningless. In this paper, after discussing the disposal and recycling of plastic products, we will explain the advantages and disadvantages of charging for plastic shopping bags and present an opinion on the contribution of plastic shopping bags to solving plastic-related problems.

Marine pollution by plastic products and methods of recycling waste plastic

First, we will discuss the problems with all plastic products, not just plastic shopping bags. Plastics are now the raw material used to produce many daily necessities and have a wide variety of uses (Fig. 1)^{1, 4)}. Many of the latter are easily discarded, and as result plastic products account for a relatively large proportion of general waste at 12%⁵⁾. Although is not a problem only in Japan, such garbage is not properly disposed of via incineration; therefore, it is dumped into the ocean and a high proportion of wreckage that washes up on coasts consists of plastic products⁵⁾. The effects of plastic on marine life have also been recognized in recent years, and there are roughly two main types of effects. The first is when marine animals accidentally as food. Plastics have accumulated in the internal organs of marine organisms and birds that swallowed plastic shopping bags by mistake, and doing this may cause them to

suffocate^{1,4}). The second is when the components of the decomposition products of plastic—which might be eroded by seawater or sunlight—may threaten the survival and reproduction of marine organisms¹). Therefore, it has been suggested that to reduce the amount of plastic dumped in the ocean, less waste should be produced, or dumping should not occur.

As mentioned earlier, plastics are made from petroleum; however, petroleum resources are considered scarce worldwide. For this reason, it is considered necessary to reduce the volume of plastic products produced, particularly those that become garbage quickly and to change to products made of different materials (for example, paper). However, it is also true that some plastic products, once manufactured, are recycled (Fig. 2)^{1, 4}). However, there are some problems with this recycling; for example, most of the methods used for this purpose in Japan are based on thermal energy, which acts as an aid to combustion for waste disposal, and burns and consumes plastic until it is no longer considered this material^{4,6}). Regardless of whether or not thermal recycling is a legitimate recycling method, in some situations active effort is not being taken to reduce oil consumption because the recycling rate is high. Currently, the amount of recycling possible in Japan—including this thermal recycling—has reached its limit. The export and recycling of waste plastics overseas were considered, however, this material has been refused acceptance in other countries due to limits in their capacity to dispose of waste and recent environmental pollution⁵). Therefore, it is now time to consider improving the efficiency of waste disposal in Japan and further increasing the recycling rate therein. Given these circumstances, plastic shopping bags have attracted much attention as they are a plastic product that is used daily before quickly becoming garbage; therefore, their free distribution is no longer possible.

Advantages of abolishing free shopping bags or charging for them²

Here, we explain the merits of abolishing free bags and charging for them. The first is that this reduces soil and marine pollution. Japanese consumers use the second-largest amount of plastic products, such as containers and packaging, globally per capita. As the world's third-largest producer of plastics, they contribute to the global problem of marine plastic waste⁵). About half of the discarded plastic is “containers and packaging” and includes plastic shopping bags and PET bottles. If the former is charged for and their usage is reduced, this situation may be alleviated. However, there is a point of view that Japan has already advanced the effective use of plastic waste and that this has not had much impact on marine pollution. According to data from the Ministry of Economy, Trade, and Industry, the greatest

marine pollution issue is the cross-border marine outflow of plastic waste¹⁾. Therefore, charging for plastic shopping bags will allow consumers to “think about whether the bag is really necessary”. Such a measure could also “promote consumer lifestyle changes such as bringing eco-bags to stores and curbing the excessive use of petroleum products.”⁷⁾. In other words, instead of expecting a direct reduction effect from charging for bags, it has a strong meaning in terms of enlightening ecological thinking. However, the same data shows that an estimated 20,000 to 60,000 tons per year of plastic waste was generated on land in Japan and dumped into the ocean in 2010; this figure is significantly smaller than the highest amount of 13.2 to 35.3 million tons per year in China. Furthermore, according to the Plastics Waste Management Institute, the recycling ratio of waste plastics to total emissions in Japan was as high as 84% in 2018. In Japan, plastic waste—including shopping bags—are not often discharged into the sea; therefore, it is highly unlikely that marine pollution will be improved even if Japan makes efforts to reduce plastic bag pollution. Among the total number of man-made objects that reached the coast of Japan from 2015–2017 (3883.6 kg, 29580 L, and 13836 pieces in 2015–2017), the proportion of fishing gear was the highest (1122.2 kg, 7967 L, 2685 pieces). Apart from that, PET bottles (244.1 kg, 4414 L, 4622 pieces), the numbers of food containers such as lunch boxes and trays (30.5 kg, 219 L, 1012 pieces), plastics (other petrochemical products; 861.8 kg, 7495 L, 2015 pieces) is also relatively high. There are fewer food packaging materials (75.3 kg, 446 L, 143 pieces) such as plastic bags and confectionery bags⁴⁾. It may be better to reduce items other than plastic shopping bags.

Secondly, oil consumption will be reduced. In 2002, Japanese consumers used about 30.5 billion plastic shopping bags in one year; this is equivalent to approximately 300 per person per year. Assuming that approximately 20 mL of oil is used for each plastic shopping bag, approximately 600,000 kL of oil is used for in their manufacture annually. This figure may seem enormous; however, Japan’s consumes approximately 240 million kL of oil per year, which is only 0.25% of the global total. It is also important to note that not all oil is used in the manufacture of plastic shopping bags. Petroleum is used for various purposes after being separated and refined into many components such as petroleum gas, gasoline, naphtha, light oil, kerosene, and heavy oil. Plastic shopping bags are made from some of the ingredients that are made by further separating another ingredient, “naphtha.” That amount is only about 3% of the total⁴⁾. Even if the consumption of plastic shopping bags falls to zero, the consumption of oil itself is unlikely to decrease significantly.

Third, it is possible to suppress the generation of carbon dioxide when incinerating plastic shopping bags⁵⁾. As water and carbon dioxide are the most common elements generated when plastic shopping bags—again, made mostly of high-density polyethylene—are incinerated, the generation of carbon dioxide can be suppressed by reducing the number of plastic shopping bags available. There are some doubts about the relationship between global warming and the increase in carbon dioxide emissions, and it remains doubtful whether these will have any merit. As noted in the description of thermal recycling in the previous section, plastic bags are thin and generate a great quantity of heat that can during combustion, and this energy can be recovered efficiently. It is considered a good combustion improver in the incineration of combustible waste. Burning only kitchen waste requires extra crude oil as a combustion aid and thus wastes resources. For this reason, reducing the volume of bags produced due to there being a charge for them may be present a disadvantage for waste disposal. Also, it has been reported that eco-bags emit more oxygen dioxide than plastic shopping bags when incinerated. This gave the impression that the aim of reducing carbon dioxide is negated.

Finally, reducing carbon dioxide emissions is thought to improve eco-consciousness. The rationale for this is that in the UK, for example, about 90% of shoppers now buy their plastic shopping bags given the charge for plastic shopping bags that were previously distributed free of charge from October 2015. The number of plastic shopping bags is gradually decreasing from among the marine debris around the UK; furthermore, the number of people with eco-bags is increasing, not only in supermarkets but also on major fashion streets in London—thereby clearly improving eco-consciousness. However, it is premature to think that increasing the number of eco-bag users will lead to greater environmental conservation. This is because even if the number of eco-bag users increases, the number of plastic shopping bag users does not necessarily decrease. People who use plastic shopping bags as garbage bags are still likely to buy them separately.

Disadvantages of charging for plastic shopping bags²⁾

The first disadvantage is the burden on households of purchasing eco-bags and shopping bags and the corresponding decrease in motivation to do so. As plastic shopping bags that were previously given free of charge will be charged for, the financial burden of purchasing eco-bags and plastic shopping bags will increase. An eco-bag, once bought, can be used for a long time; however, even if one does not use an eco-bag, a plastic shopping bag can still be purchased for 2–10 yen per bag; therefore, it does not seem to be a heavy burden. The

decrease in purchasing motivation caused by reasons such as "have to buy a plastic shopping bag," "don't have an eco-bag," and "forgot to bring an eco-bag," is a larger issue than the financial problem. This may be a disadvantage. In terms of appeals, eco-bags are often distributed as free corporate gifts. There is also a harmful situation in which excess eco-bags are immediately thrown away as garbage.

The second disadvantage is the fear of increased shoplifting and the increased burden of related countermeasures. Although this is not limited to this situation, many retailers have had to close their stores due to shoplifting and financial difficulties; many stores throughout Japan are suffering from shoplifting or closing in the red. Shoplifting will increase at the same time as the spread of thick eco-bags, whose contents cannot be seen, and there is a possibility that stores will be burdened with the enhancement of crime prevention measures.

The third disadvantage is the high possibility that the number of plastic bag purchasers will not eventually decrease. As plastic shopping bags are also very easy to use as garbage bags³⁾, some people buy one—even if they are charged—for a few yen. Another view is that even if the number of people who use plastic shopping bags decreases, the number of people who purchase garbage bags separately will increase; therefore, the consumption of similar bags will not ultimately change. Even after considering the opinions of other consumers, many people buy plastic shopping bags even if they are charged a fee— and even if they do start using eco-bags, they buy garbage bags separately.

Finally, it is doubtful whether a reduction in the consumption of plastic shopping bags due to a charge being levied on them will really lead to environmental conservation. Plastic shopping bags account for only about 2% of all plastic waste. For this reason, one viewpoint is that even if the number of plastic shopping bags can be reduced by raising consumer awareness by charging for them, it will not have a significant effect on environmental conservation. From the perspective of environmental protection, a greater focus should be placed on reducing the number of PET bottles and other plastic waste generated.

A mechanism to continue distributing plastic shopping bags

As previously noted, the free distribution of plastic shopping bags was abolished in Japan in July; however, there was a loophole in this and some bags were able to be distributed free of charge. The bags subject to the charge are those made of plastic—not paper or cloth—with a thickness of 50 μm or less, and its shape must include a handle. It was decided that free

samples could not be placed in such bags—only purchased products could⁸⁾. Furthermore, if the bag itself was a part of the purchased product, or if it is one that held duty-free items or those specified by other laws and regulations, then it was excluded from the abolition. Also, the bag must be declined by the consumer. Instead, the government believes that thicker bags can be used repeatedly, similar to how an eco-bag would be used, and the use of plastic shopping bags is thus being curbed; however, but it is unclear whether consumers will think this way. Furthermore, as paper bags are not covered by the charge, some shops have switched to providing these. This may lead to another global environmental problem, however—an increase in atmospheric carbon dioxide concentrations due to the promotion of logging²⁾. In addition to the above, bags with a 100% marine biodegradable plastic content are not charged for because they are considered as contributing to solving the problem of marine plastic waste. Similarly, bags with a biomass material content of 25% or more are not included because they are thought to contribute to global warming countermeasures⁸⁾. Therefore, these can be continued to be distributed freely. Retailers are often worried about consumers refraining from shopping because they are more concerned about bringing their bags than the cost of buying bags. We also believe that even if something is expensive for a store, it is still likely to choose a policy of distributing free bags. If so, the distribution will continue.

CONCLUSION:

The advantages and disadvantages of discontinuing the free distribution of plastic shopping bags are described along with the current situation regarding plastic waste and recycling. Reducing the number of plastic shopping bags indeed saves the petroleum resources used to make the product. However, the consumption of plastic bags accounts for a small proportion of the total plastic usage, and it seems necessary to reduce the usage of items other than plastic shopping bags. In 2020, the spread of the COVID-19 is a problem in many countries. In California, in the United States, free plastic shopping bags are being used again at supermarkets and other places because eco-bags are not clean and may cause COVID-19 infections. Furthermore, in Japan, the Ministry of Economy, Trade, and Industry have noted that “the spread of the new corona virus infection may be a headwind” regarding the distribution of plastic shopping bags at retail stores for a fee⁹⁾. Given this, consumers may ultimately choose to use disposable bags for hygiene considerations, even if they must pay a fee. This has made it very difficult to verify the effect of reducing the number of plastic

shopping bags. To solve this issue, it is necessary to focus on recycling after use and the repeated use of resources via material and chemical recycling.

As noted by the Ministry of Economy, Trade, and Industry, the reduction of plastic shopping bags is only the starting point for reducing the consumption of plastic products and creating an eco-consciousness²⁾. If one agrees with this, they might think that they should consider replacing or using the reduction of plastic bags in combination with other plastic products. The proportion of PET bottles is high, as a single species, in plastic waste (Fig. 3)⁴⁾. Plastic products account for 65.8% of the material forming marine debris, but the ratio of PET bottles is the highest single-species item among these⁵⁾. The most common thing that Japanese people consider marine debris are PET bottles (74.2%), followed by plastic shopping bags (67.3%), styrofoam (63.1%), and bottles/cans (55.8%)⁹⁾. Given this, we conclude that aiming to reduce the usage of PET bottles instead of or in combination with plastic shopping bags. We would like to consider this in the future.

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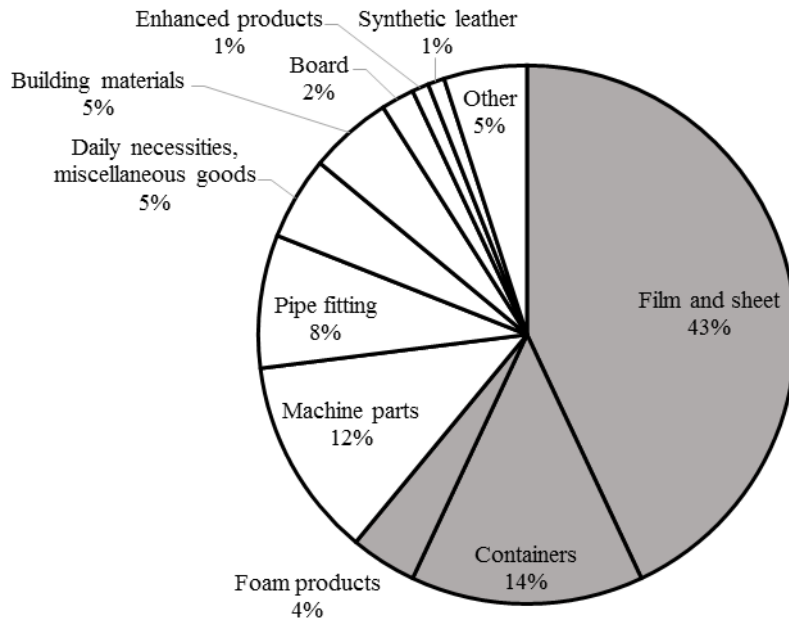


Figure No. 1: Plastic items produced in Japan

Total production of plastic items in Japan is 5,740,000 tons as of 2019.

Films and sheets, containers, and foam products are mainly disposable plastic.

Based on data in reference 4).

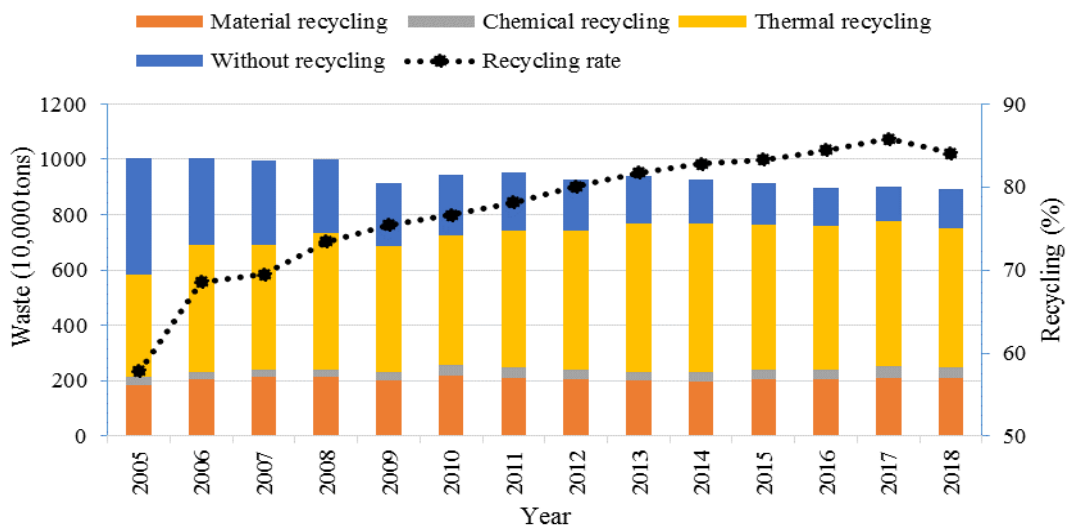


Figure No. 2: Total waste plastic emissions and recycling rate

Material recycling is a method of recycling plastic to create new products.

Chemical recycling is a method of chemically decomposing plastic into a raw material monomer and using it again to manufacture another product.

Thermal recycling is a method of using waste plastic as a cement source or fuel for waste power plants. Based on data in reference 4).

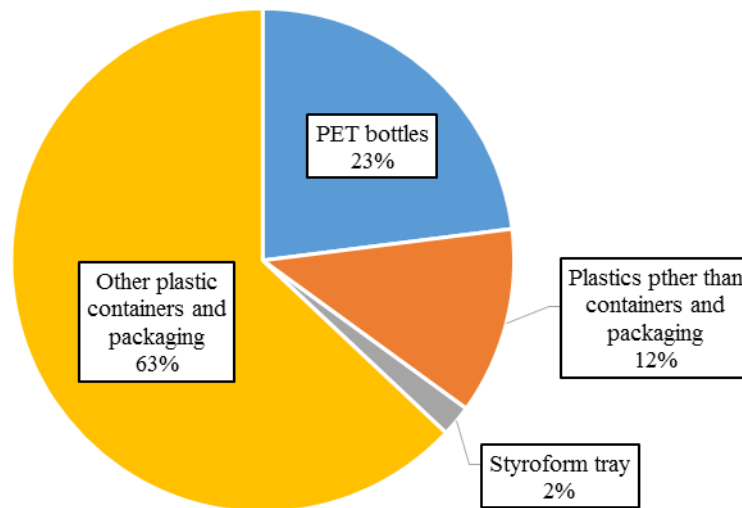


Figure No. 3: Ratios of different types of plastic waste to the total

Composition analysis of the breakdown of plastics in the garbage (wet weight ratio) discharged at garbage stations. Based on data in reference 4).