

# Material Flow of single-use plastic of food packaging generated by retailers in Taiwan

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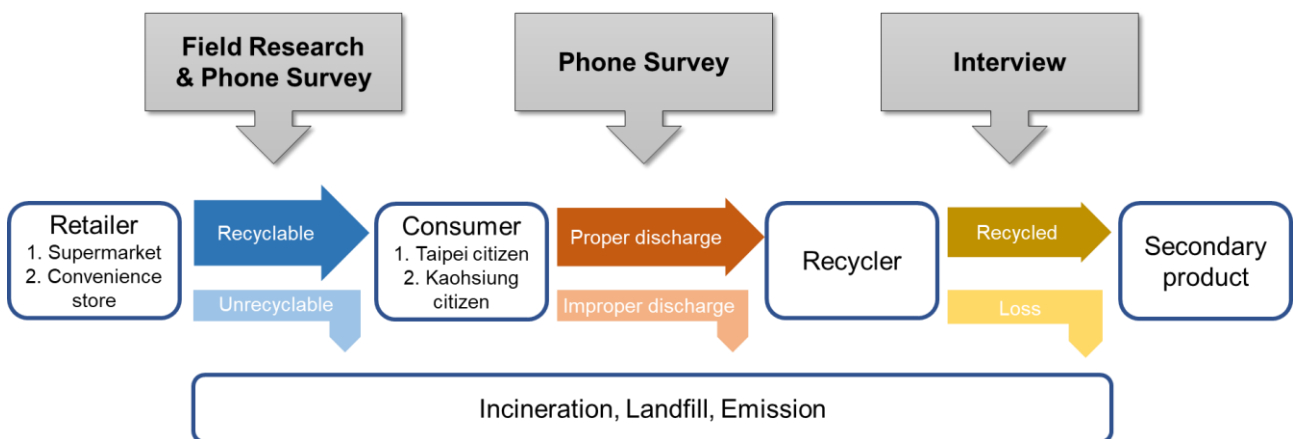
**Keywords:** plastic, food packaging, retailers, material flow, recycling

## INTRODUCTION

Among the worldwide plastic production, plastic packaging and containers are the largest application (Geyer, Jambeck et al. 2017). The increasing amount of food packaging generation in retailers and their improper discharge is causing environmental impact. However, the heterogeneous composition and the corresponding negative impact cannot be solved by any single contributor of the value chain of plastic (Chen, Ciacci et al. 2020). Therefore, this study aims to investigate the material flow of single-use plastic packaging generated by retailers in Taiwan.

## MATERIALS AND METHODS

We chose the chain supermarket brand and the chain convenience store brand with the highest number of stores in Taiwan as a research target (PX Mart Corporation 2020, Uni-President Corporation 2020). For the supermarket, we focused on the packaging of fresh food and ingredients. For the convenience stores, we focused on the packaging of cooked takeaway food. To study the flow of plastic packaging, we used three methods: field research, telephone surveys, and on-site interviews to collect information from retailers, consumers, and waste treatment plant managers in Taiwan, respectively.

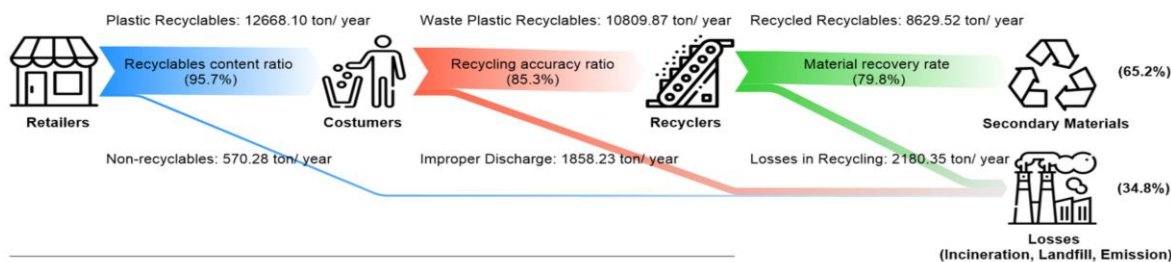


## RESULTS AND DISCUSSION

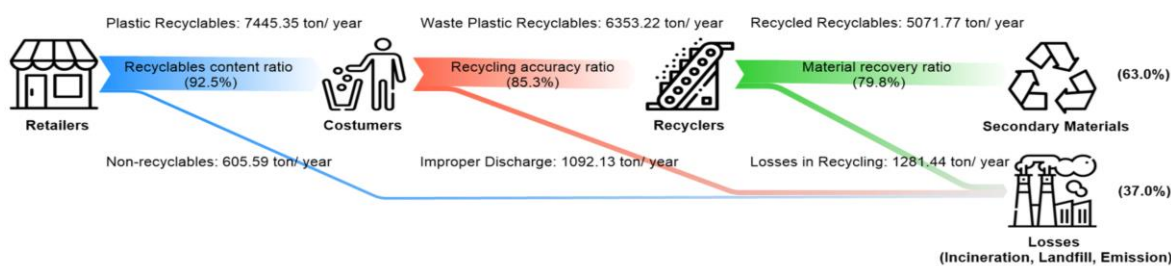
Overall, about 95% of the plastic packaging generated by the retailers in Taipei was recyclables, about 85% of the waste packaging accessed the recycling system correctly, and about 80% of this waste plastic was recycled. Though the ratios were high at each stage, the actual recycling rate of plastic packaging was the product of *recyclable content ratio*, *recycling accuracy ratio*, and *material recovery ratio* at each stage.

Therefore, only about 65% of the plastic packaging produced by the retailers was recycled each year, and nearly 35% was incinerated, buried, and discharged into the environment.

### Plastic Material Flow of Taipei Supermarkets



### Plastic Material Flow of Taipei Convenience Stores



## CONCLUSION

This work identified three ratios affecting the actual recycling rates of the single-use plastic packaging generated by retailers at different stages. The actual recycling rate of plastic packaging was the product of *recyclable content ratio*, *recycling accuracy ratio*, and *material recovery ratio* at each stage. The three ratios of different food items were also presented to identify the path of material losses in the flow and provide insights for recycling promoting strategies.

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