Designing a waste management strategy for tropical developing countries

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- This policy brief investigates the impact of informing households on segregation benefits and promoting waste management awareness.
- We find that an information campaign along with kerbside collection of inorganics can encourage households to segregate at source.
- However, in the case of providing plastic bags in addition to information campaign and kerbside collection, we see a fall in the percentage of households segregating once plastic bags run out.
- Dustbins along with information campaign and kerbside collection have a sustained effect in changing households' behaviour in comparison to plastics bags.

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The waste management challenge

Waste management is a pressing issue in developing countries. With rapid urbanisation, increasing incomes, and increasing population density comes the issue of effectively managing municipal solid waste. Ineffective management leads to mountains of garbage in open dump sites, taking away precious land, contaminating air, water, and soil. These dumping grounds can become a breeding ground for diseases.

Developing countries still have a high organic content in their municipal solid waste. High temperatures in tropical developing countries such as Bangladesh and India imply that organic content can be processed easily if changes are made in disposal and collection systems. Waste disposal, currently unseparated at the household level, squanders away the advantage of high organic content and high temperatures for low-cost composting of organic waste.

Segregation at source and collection in a segregated manner are the first two steps to utilising the above-mentioned advantage. So, the question is: **how do we get households to start segregating at source and then sustain the behaviour?**

We conducted a study with 1,577 households in Mymensingh, Bangladesh. We design household-side interventions with different elements to promote better waste segregation at source. Table 1 gives the description of different treatment groups. In addition to the below, we also provided a kerbside collection service for inorganics to all treatment households.

Treatment groups	Description
Treatment 1	Information on how to segregate, kerbside collection
Treatment 2	Information on how to segregate, free dustbin provided, kerbside collection
Treatment 3	Information on how to segregate, plastic bags (provided one time), kerbside collection

We brought in a distinction between plastic bags and dustbins to understand whether households will be inclined to invest in some infrastructure to continue segregation once free plastic bags run out.

Given purchasing dustbins or plastic bags is not prohibitively expensive, we aim to understand to what extent the physical presence of the infrastructure is important for households' behavioural changes. For example, does having the tools (dustbin, plastic bags) readily available encourage a behaviour shift? How effective are both tools, and are they substitutable in creating a shift in waste segregation behaviour? Only dustbins have a high one-time cost as compared to plastic bags, and thus it may not be financially feasible for municipalities to invest in dustbins for households.

The project builds on earlier studies that look at drivers to encourage segregation at source. Nepal et al. (2023) found that providing information to households and street bins without segregated collection has no impact on households' waste segregation behaviour. Wadehra and Mishra (2018), on the other hand, find that providing information on how to segregate and even monetary incentives is unable to sustain changed behaviour. Wadehra et al. (forthcoming) provide a door-to-door segregated collection service for inorganics. However, they find that it is expensive to provide such a service.

In this study we provide a kerbside collection service for inorganics once the waste is segregated at the household level. Also, we seek to know how segregation at source impacts collecting inorganics, especially recyclables, at the collection centre. Is there an increase in the amount of recyclables collected, and is there a decrease in the cost of cleaning these recyclables?

Key findings

Overall, we find that all treatments have a positive effect on households' uptake of waste segregation behaviour. Providing some infrastructure (plastic bags or dustbin) to segregate at home has a greater effect on this behaviour. However, dustbins induce stronger behavioural changes than the plastic bags, and the effects of dustbins last longer than the effect of plastic bags.

> **Providing the infrastructure (plastic bags or dustbin) to segregate at home has a greater impact on household's uptake of waste segregation behaviour.**

Our results suggest that first many households are willing to take on waste segregation after learning how to do it as long as a kerbside collection service is provided. Second, a fraction of households can and need to be nudged into waste segregation. Our findings suggest the provision of simple and

inexpensive infrastructure (bins) in addition to the kerbside collection service are sufficient to sustain a behavioural change in waste management.

Policy implications

Comparing Nepal et al (2023) and Wadehra and Mishra (2018) with this study, we find that provision of kerbside collection service in addition to information has a sustained effect on waste disposal behaviour of households. Thus, providing a kerbside collection service for inorganics is essential to ensuring households segregate their waste at source.

Also, providing in-house infrastructure such as dustbins for inorganics can further nudge the waste segregation behaviour, but the nudged behavioural change is not sustained in the case of plastic bags, which are temporary in nature.

References

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