



ReCycling: Creating markets from waste

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- This policy brief explores findings from a field experiment that introduces bicycle taxi drivers as intermediaries for recyclable waste collection in Quelimane, an expanding city in Mozambique.
- Household recyclable waste separation has increased significantly, and there has been a shift towards the new disposal channel.
- Cyclists gained new income from waste collection without crowding out taxi earnings; their improved outside option allowed them to raise the price per taxi ride.
- Neighbours of treated households were less likely than the control group to separate recyclables, despite being more aware of the programme. This demonstrates that even as information spreads, behaviour only changes where access exists.
- Treated households contributed significantly less to a threshold public goods game for joint recycling collection, suggesting that private market creation may crowd out communities' capacity for self-organised collective solutions.

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Policy motivation

Sub-Saharan African cities are urbanising faster than waste management infrastructure can expand. Global municipal solid waste generation is projected to increase from around 2,100,000,000 t in 2020 to 3,800,000,000 t by 2050, with the fastest growth occurring in rapidly urbanising low- and middle-income regions (Cook et al., 2026; UNEP, 2024). In Quelimane, Mozambique's fourth-largest city (United Nations, 2024), population growth has increased demand for urban services, while waste collection capacity has struggled to keep pace.

Like many cities in developing countries, Quelimane has a formal waste collection system, but the agency responsible for service provision is chronically underfunded. Only 16% of households report receiving regular waste collection. This is not due to an absence of downstream demand. Recyclable materials such as plastic, metal, and cardboard have established market value (Cook et al., 2026), and private buyers already operate in the city, purchasing recyclable materials for resale to processing centres. However, these buyers source almost exclusively from restaurants and supermarkets. Households, despite generating the bulk of the city's waste, are largely absent from this market.

Evidence suggests that the primary constraint is access rather than awareness. Private recycling buyers are typically located on the outskirts of the city and offer relatively low prices. For most households, the time and effort required to transport materials and complete transactions outweigh the expected returns. Bicycle taxi drivers face a different set of incentives. Periods of low demand between rides create idle time that generates no income, making waste collection a potentially attractive supplementary activity. Quelimane's extensive network of drivers, who already travel through residential neighbourhoods daily, was therefore well positioned to bridge the gap between households and recycling buyers.

Overview of the research

To test whether reducing access barriers can increase household recycling, I partnered with the Municipality of Quelimane to implement the programme “*ReCiclar com Quelimane*” (Recycling with Quelimane).

The programme connected households to existing recycling markets through bicycle taxi drivers. A total of 554 drivers were recruited across 62 bicycle taxi stops in the city. To participate, drivers had to have worked in Quelimane for at least one year and have at least one regular household client with whom they were already in frequent contact. Each cyclist was then asked to refer up to three of these regular clients, resulting in a study sample of 998 households.

Rather than creating new connections, the programme leveraged existing relationships between households and cyclists.

Participating households were encouraged to separate recyclable waste at home and contact their assigned cyclist when materials were ready for collection. Cyclists collected recyclables and delivered them to a recycling depot, where they received payment based on the quantity collected. Importantly, households were not paid for their recyclables, and survey data indicate that cyclists did not compensate households for the waste they collected. By leveraging an existing network of transport providers, the programme reduced the time and effort households faced in accessing recycling markets while creating an additional income opportunity for cyclists.

The evaluation randomly assigned cyclists and their associated households to one of three groups:

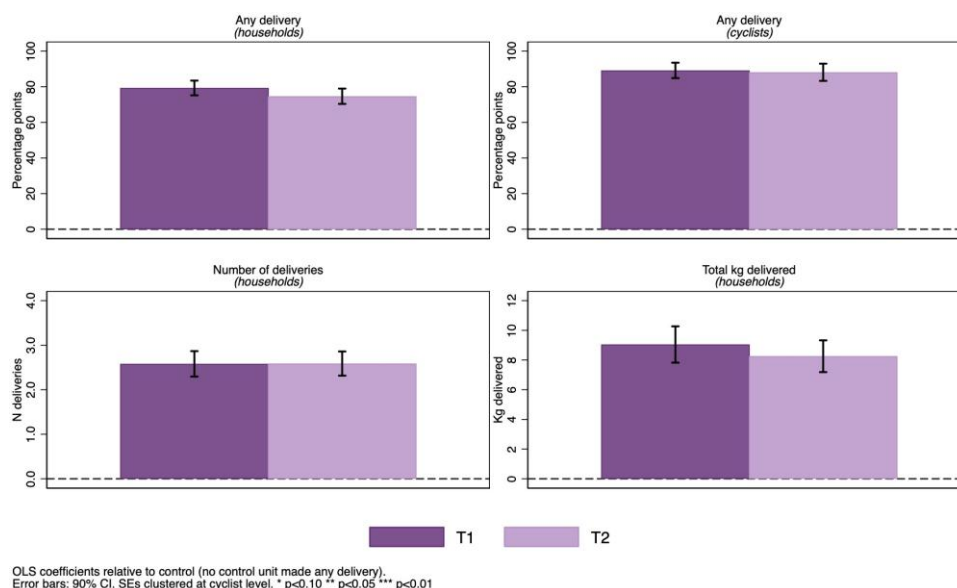
- Control group: No intervention.
- Basic treatment (T1) – Market access: Households received information on waste separation and access to an assigned cyclist who would collect recyclables on request.
- Social treatment (T2) – Market access plus social recognition: Households received the same intervention as in T1, along with a visual thermometer displayed outside the home that showed cumulative recycling progress. Households that completed the thermometer were also publicly recognised through a community banner, adding a social visibility component.

For each participating household, the nearest neighbouring household was also identified and surveyed throughout the study. These households did not receive any intervention and were used to measure potential spillover effects.

Main findings

Unlocking an untapped household recycling market

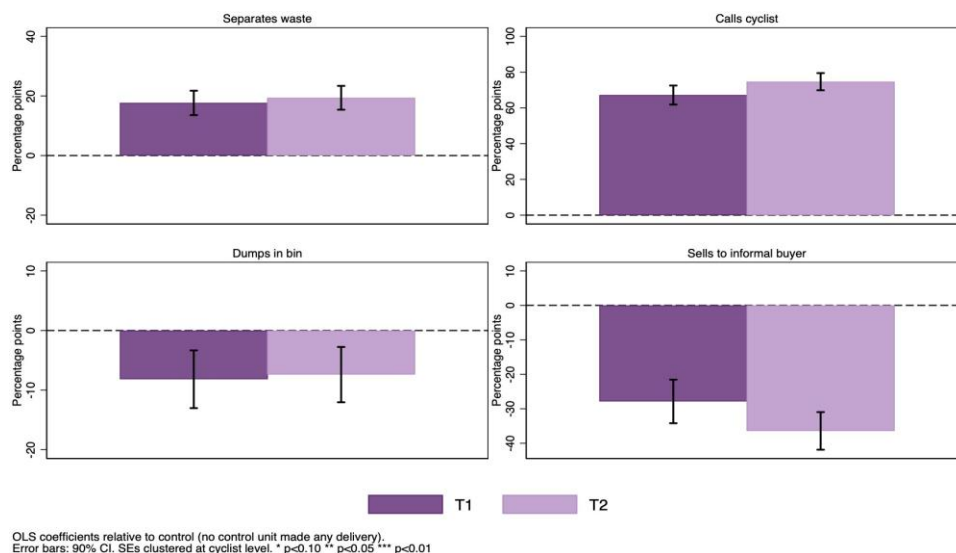
By endline, 79% of households in T1 and 75% in T2 had completed at least one recycling collection, with an average of 2.5 collections and 9 kg of recyclables per household over the study period. On the supply side, 89% of treated cyclists completed at least one collection. Together, these figures suggest that a functioning household recycling market can emerge quickly when access barriers are reduced.

Figure 1: Market participation

Households increase separation and change how they dispose of waste

Treated households were substantially more likely to participate in the recycling system. Relative to the control group, the share of households requesting a cyclist pickup increased by 67 percentage points in T1 and 75 percentage points in T2. Households were also more likely to separate recyclable waste, with increases of 18 percentage points in T1 and 19 percentage points in T2 from a control-group baseline of 80%.

These behavioural changes largely reflected a shift away from existing disposal channels. Treated households were significantly less likely to dispose of recyclables in communal waste bins or sell them to informal waste collectors. The decline in sales to informal buyers was particularly pronounced among T2 households, suggesting that the programme's social visibility component strengthened engagement with the intervention.

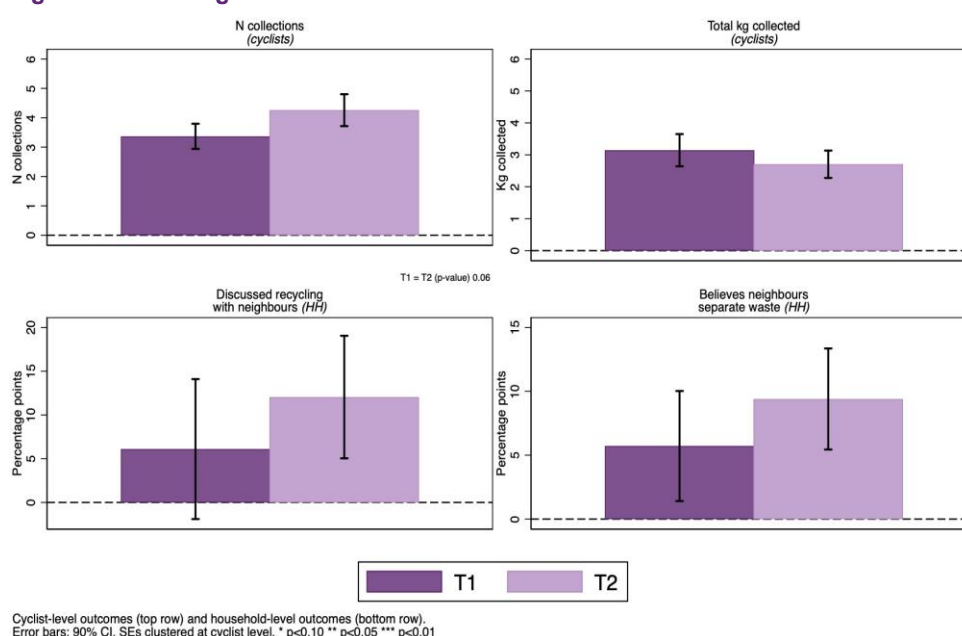
Figure 2: Waste disposal behaviour

The social signal changed the engagement pattern

The social visibility component affected how households and cyclists engaged with the programme. T2 cyclists completed significantly more collections than T1 cyclists—4.3 compared with 3.4 collections on average—but delivered a similar total weight of recyclables. This suggests that the thermometer encouraged more frequent interactions with the recycling system without increasing the overall volume collected.

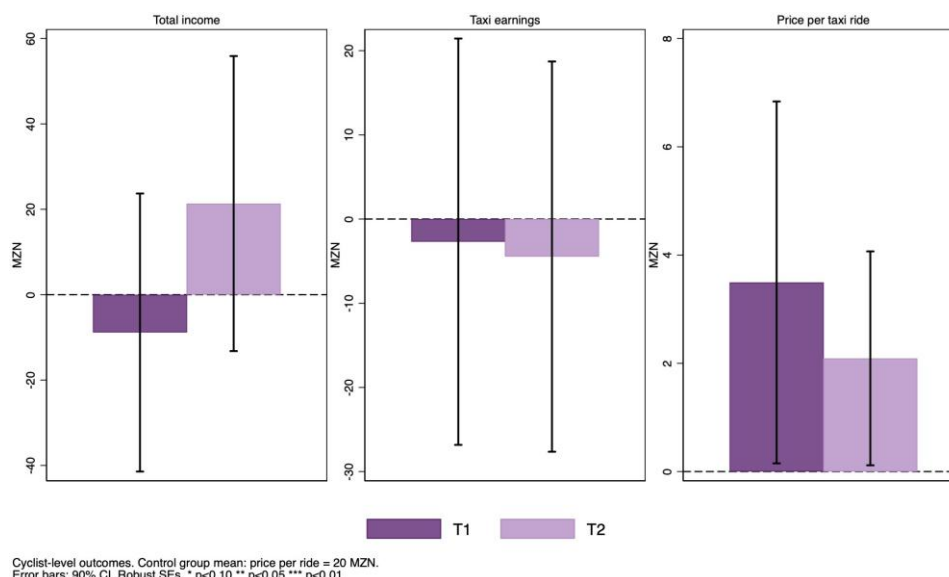
In other words, the social signal changed the frequency of participation rather than the quantity of recyclables mobilised. Beyond collection behaviour, T2 households were also significantly more likely to discuss recycling with their neighbours and to believe that their neighbours separated waste, suggesting that the visibility component helped promote wider social diffusion of recycling practices.

Figure 3: Social signal



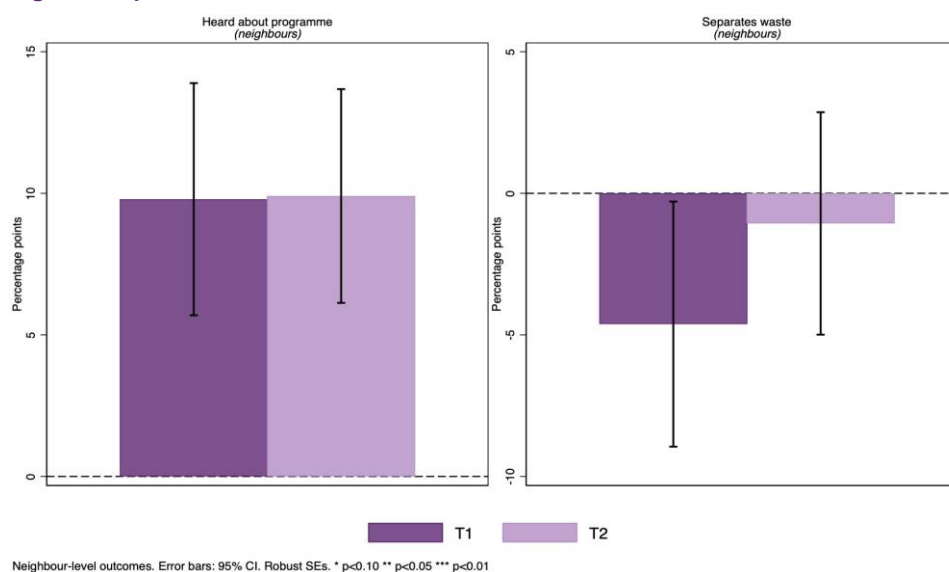
Cyclists gained bargaining power

The programme did not significantly increase cyclists' total income or earnings from taxi services. However, treated cyclists charged significantly higher fares per trip—around 3 MZN more in T1 and 2 MZN more in T2, relative to a control-group average of 20 MZN. This pattern is consistent with an improved outside option: access to an alternative source of income made cyclists less willing to accept lower fares. While the programme did not increase overall measured earnings during the study period, it appears to have strengthened cyclists' bargaining position in the labour market.

Figure 4: Earnings and bargaining power**Information spread, but access remained essential**

Information about the programme spread beyond participating households. Neighbours of treated households were around 10 percentage points more likely to have heard about the programme than neighbours in the control group, confirming that information travelled through local social networks.

However, information alone did not translate into greater recycling. Neighbours of T1 households were 4.6 percentage points less likely to separate recyclable waste than control neighbours. This decline was smaller among neighbours of T2 households, suggesting that the programme's social visibility component partially offset this effect. Together, these findings indicate that awareness alone is insufficient to increase recycling when households lack access to the collection service.

Figure 5: Spillovers

Policy implications

These findings offer three lessons for policymakers seeking to improve waste management in rapidly urbanising low-income cities:

- **Reduce transaction costs, not just information gaps.** Households were willing to separate recyclable waste once collection became convenient. Information campaigns alone are unlikely to generate substantial behaviour change if households still face high costs of accessing recycling markets. Expanding convenient collection services may therefore be more effective than investing in awareness campaigns alone.
- **Leverage existing informal transport networks.** Informal workers such as bicycle taxi drivers are already embedded in residential neighbourhoods and often have spare capacity between jobs. Integrating these workers into recycling value chains can expand collection services at relatively low cost while creating an additional income source that strengthens their bargaining position in their primary occupation.
- **Expand access at the community level.** Information about the programme spread beyond participating households, but awareness alone did not increase recycling among neighbours who lacked access to the collection service. Where possible, programmes should be rolled out at the neighbourhood level or accompanied by clear communication about future expansion to avoid leaving informed households without a means to participate.

Overall, the findings suggest that improving access to recycling services may be more effective than relying on information campaigns alone. By reducing the transaction costs households face and leveraging existing informal transport networks, cities can expand recycling participation without directly subsidising households or building entirely new collection systems.

References

- Cook, E., Ionkova, K., Bhada-Tata, P., Yadav, S., & Van Woerden, F. (2026). *What a waste 3.0: Global snapshot of solid waste management toward circularity until 2050* (Urban Development Series). World Bank. <https://doi.org/10.1596/978-1-4648-2309-1>
- United Nations. (2024). *World urbanisation prospects 2024: Summary of results*. United Nations, Department of Economic and Social Affairs, Population Division.
- United Nations Environment Programme. (2024). *Global waste management outlook 2024: Beyond an age of waste: Turning rubbish into a resource*. United Nations Environment Programme.