Case Study 1.9

Eco Dabao: Testing a Reuse System in Singapore's Central Business District



Singapore : Central Business District

WWF Involvement: 2024 – September 2026 (including programme development phase and Piloting phase from April – September 2026)

Focus Area: Reduction

PSC Approach: Behavioural Change; Reuse

Systemic Intervention:
City Systems & Planning; Systems & Infrastructure; Knowledge Strengthening; Strategy Development

Background

Singapore generates substantial volumes of takeaway packaging waste every year, much of which originates from daily food consumption habits. While reusable packaging solutions have existed in closed environments such as offices, schools and events, there has been limited testing of an open-loop, district-wide reuse system operating across multiple buildings, tenants and food outlets.

Key Lessons Learned

- **Start with the food outlets, not the buildings**
  - Food and beverage (F&B) operators hand out the containers every day, so their buy-in shapes the whole experience. Simply making reusable containers available is not enough – staff also need to encourage customers to try them, including during busy lunch periods. Engaging individual food outlets from the get-go helps build a stronger sense of ownership and allows for more lead time, whereas property partners for placement of a return station can come later.

- **Convenience and density drive participation** – *drawing from merchant feedback and implementation, consumers are significantly more likely to participate when borrowing and return processes are simple, visible and integrated into existing routines. Reuse systems should focus as much on convenience and user experience as on environmental messaging.*
  - Customers who used Eco Dabao valued being able to return containers at any station rather than the outlet and found the microwave-friendly containers convenient for reheating meals, while those who held back cited the added effort of finding a participating outlet and return point and hygiene concerns as deterrents.
  - Concentrating outlets and return points within a smaller area first can make reuse the easy choice. A sustainable option is more likely to be adopted when it is also the easiest option available.

- **Reuse systems require ecosystem thinking**
  - Success depends not only on consumer behaviour but also participation from technology partners, logistics providers, property owners, food vendors, and funders – infrastructure and operations play critical roles in enabling participation. A reuse system is only as effective as the network supporting it and will not succeed based on consumer behaviour alone.

- **Assess uptake alongside container availability**
  - Utilisation depends on having the right type of container at the right outlet at the right time. Regular stock take of container inventory by both the supplier and vendors are key to ensuring a smooth operational reuse system.

- **Pilots Generate Value Beyond Immediate Environmental Outcomes**
  - Implementation of this open-loop model generated practical insights into consumer behaviour, infrastructure placement, operational requirements, stakeholder engagement and system design, providing knowledge for evidence-based scaling of reuse systems in Singapore.



To explore how reuse systems could function at a larger scale within Singapore's urban environment, WWF-Singapore partnered with Muuse – an environmental services company – and Income Insurance to launch Eco Dabao (colloquial for 'Eco Takeaway'), Singapore's first precinct-scale return-and-reuse takeaway packaging system in the Central Business District (CBD).

Unlike outlet-specific reuse programmes, Eco Dabao was designed as a shared ecosystem spanning multiple food and beverage operators, office buildings and return locations. Consumers could borrow reusable food containers for takeaway meals and return them at designated return stations located across participating CBD locations, removing the need to return containers to the original point of borrowing.

Objectives

- Pilot Singapore's first district-scale return-and-reuse takeaway packaging system.
- Avoid 3,000 disposables in the CBD. Understand consumer adoption, usage and return behaviours in an open-loop reuse environment.
- Test the operational feasibility of a shared reuse ecosystem involving multiple stakeholders.
- Generate evidence and lessons to inform future scaling and replication efforts in Singapore.
- Build awareness and acceptance of reusable packaging among office workers, food vendors and building stakeholders.



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Key Successes

- **Demonstrated a Working Shared Reuse Ecosystem.**
  - Eco Dabao successfully brought together funders, property owners, food and beverage operators, logistics providers, and consumers within a single reuse system – this included a diverse network of stakeholders, including Income Insurance, WWF-Singapore, Muuse, five property locations, incentive partners, and consumers, along with nine participating food and beverage outlets, which grew to 13 outlets with none leaving the programme.
  - A reuse system allowing for the borrowing of Halal or non-Halal containers was established, where users could access this service using a QR code to either the Muuse app or web version, with no registration required.
  - Five Smart Return Stations were installed across the CBD where users could deposit their used containers by scanning a QR code. A rewards system for registered users was also set up to encourage borrowing and returning, with reward partners, including foodpanda, KFC, Kopitiam, Prefer Coffee, and Yindii.
- **Generated Measurable Impact and Valuable Real-World Behavioural Insights**
  - WWF-Singapore recruited property, F&B, and reward partners directly, and promoted the service through public events, workplace talks, on-site signage, and promoters, and an industry showcase. While participation cannot be attributed to any single activity, these efforts collectively increased visibility among office workers and building occupants.
  - During the piloting period from 22 April to 21 September 2026, **2,346 food and beverage packaging were avoided** using **1,122 unique containers**. The pilot achieved **899 total scanned borrows**, with a **92% return rate** (831 returns).
- **Early Signs of Behavioural Change**
  - 360 unique users borrowed containers from 13 F&B outlets, while 75 became repeat users. This group, around one in five users, accounted for 60% of user-linked borrows, with one user borrowing 35 times.



As very few vouchers were redeemed, largely due to technological challenges, this suggests that repeat use was driven mainly by personal motivation rather than incentives.

Key Challenges

- **Limited Consumer Awareness**
  - During Phase 1, WWF and Muuse introduced additional signage, workplace engagement sessions, promoters and outreach activations specifically because awareness and discovery emerged as recurring challenges during implementation. Despite communications and outreach efforts, many potential users were still unaware of the programme or encountered it only occasionally. Sustained visibility and repeated exposure are critical for behaviour change within busy urban environments.
- **Operational Constraints Among Small Vendors**
  - Many food vendors operate from compact premises with limited storage capacity. Managing reusable container inventory alongside daily operations created practical challenges that influenced participation and uptake.

- **Limited Vendor Preparedness and Consumer Awareness**
  - Property partners were secured first, then outlets were left with only about a month to train staff and adjust their workflows to allow for the reuse model, which was tight for preparedness.
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- **Operational Constraints Among Small Vendors**
  - Many food vendors operate from compact premises with limited storage capacity. Managing reusable container inventory alongside daily operations created practical challenges that influenced participation and uptake.
  - Additionally, container stock was allocated in response to outlet requests, and natural variations in demand sometimes led to short-term shortages of certain container types. As customers were not required to register their borrows and returns, it was also harder to anticipate when containers would come back into circulation. Building on this experience, the next phase will link every borrow to a user profile, carry out regular stock checks reconciled against system data, and allocate containers based on closely monitored local demand.

Resources

- Funding support from Plastic Solutions Fund (PSF), WWF's Plastic ACTion (PACT) initiative, and Income Insurance.
- Muuse provided the technology platform, reverse logistics system, cleaning, container redistribution, rewards platform and customer support.
- WWF-Singapore provided project management and stakeholder coordination.
- Participation from property owners and building managers.
- Engagement of food and beverage operators.
- 3,000 reusable cups, bowls, and food containers.

Enabling Factors

- Strong cross-sector collaboration between NGOs, businesses and property stakeholders.
- Existing concentration of office workers and food outlets within the CBD.
- Shared infrastructure allowing flexible container returns.
- Growing public awareness of waste reduction and circular economy solutions.



- Availability of an experienced implementation partner capable of managing logistics and sanitisation.
- Commitment from partners to continue testing and refining the model beyond the pilot phase.

Risks & Opportunities

Risk

- Continued reliance on external funding.
- Insufficient density of vendors, return points and active users to make reuse a convenient daily habit.
- Operational complexity in collection, cleaning, redistribution and stock management, including container availability and hygiene assurance.
- Changes in stakeholder participation over time, particularly as the vending-machine model remains exploratory and depends on locations, vendor acceptance and return arrangement.

Opportunities

- Muuse-led Phase 2, exploring vending machines so customers can pick up a container before choosing where to eat.
- Integration with additional buildings and food operators: Potentially in the existing Raffles Place zone, or the neighbouring Marina Bay zone within the CBD.
- Stronger digital integration and reduced onboarding friction: Integration between user accounts on the Muuse app and various reward partners to make redeeming of rewards more seamless.
- Development of evidence to support wider reuse strategies and policy discussions in Singapore: In support of Singapore Green Plan's pillar on Sustainable Living – A Green Citizenry That Consumes and Wastes Less.

For more information: Website: https://plastic-action.asia/transforming-fb-packaging/

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