

ProSPER.NET 2022 Leadership Programme – Post-assignment

Zeroing MY Foodprint – Reflections

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Global commitment towards net zero carbon emissions by 2050 mandates the adoption of sustainable lifestyles to mitigate the detrimental impacts of climate change (*Net Zero Coalition, 2022*). Food waste (FW) would rank as the third largest emitter if it were a country where its degradation in landfills accounts for 8 – 10 % of the global greenhouse gas emissions (Wieben, 2017). Capturing these emissions will mitigate their impact while enabling the production of renewable biogas via anaerobic digestion as part of the circular economy for food (Woon *et al.*, 2021). Globally, 39% of FW is generated from the food service and retail sectors (UNEP, 2021), with this consumption stage having the largest carbon footprint compared to other stages in the food supply chain (FAO, 2013; Chauhan *et al.*, 2021).

In Malaysia, FW comprised ~45% of the 13.92 million tonnes of municipal solid waste disposed to landfills in 2018 (Omar, 2019). It also accounts for 23% economic loss in the Malaysian hospitality and food service industries (Papargyropoulou *et al.*, 2019). Although social practices of buffets and banquets significantly contribute to FW in these sectors (Papargyropoulou *et al.*, 2019), changing these practices would require long-term solutions and policies. Effective FW management in Malaysia is also challenged by the lack of waste separation at the source (Woon *et al.*, 2021) and sparse infrastructure for anaerobic digestion of FW with only a few pilot plants developed to date (Lim *et al.*, 2021). The green township of Bandar Sunway, under the municipal administration of Subang Jaya City Council, also faces these challenges. Currently, the CPR (compost, plant, reduce) initiative, launched in 2019 by the Sunway Group, promotes FW management from the three major hotels and 35 partners in Bandar Sunway with produced compost used for local landscaping (*From Food to Garden, 2020*). Nonetheless, a more effective system is required engage multiple local restaurants, *mamaks* (street-style food stalls) and other food service areas for effective FW separation and collection at the source.

Based on the lessons learnt during this programme, my group looked into the main sources of FW that cannot be reused/recycled and thus, cause significant landfill emissions. Approximately 75% of FW generated in Malaysia was considered inedible, such as fruit peels, bones, and leftover meals (Zainal, 2021). Therefore, my team proposed the project “Zeroing MY Foodprint” to promote a circular economy for food in Bandar Sunway, which also aligns with the Subang Jaya Low Carbon City 2030 Action Plan (Urbanice Malaysia and MBSJ, 2021). By employing suitable technologies with minimal environmental impacts and digitally tracking the journey of inedible FW for its effective management, we hope to minimise our foodprint and transition towards net zero (Figure 1).



Figure 1: Project “Zeroing MY Foodprint” with its 3 components proposed to engage various stakeholders for effective management and conversion of FW to renewable electricity

Anaerobic digestion of FW with subsequent conversion of biogas to electricity has the least environmental impact as compared to fuel generation (Woon *et al.*, 2021). Nonetheless, it also requires establishing an effective FW management process, which includes FW separation at the source (Woon *et al.*, 2021). Our proposed digital monitoring system will address this issue by letting us know how much, what type, and where the FW is generated. First, digital logs for the amount and composition of FW are automatically created at the source by adopting existing smart bin technologies, such as Kitro and Leanpath. Displaying the kilos of waste put in these bins can also nudge the consumers to reduce their leftovers. Second, we will connect these bins to available carbon footprint calculators (*Food Waste Calculator*, 2019) to account for emissions saved. Lastly, we will link these bins to existing “networks” of food service providers by partnering with local food delivery apps, such as Grab. This partnership will incentivise FW separation at the source by leveraging the established rewards systems in these apps. Additionally, we can adapt the mapping technology used by these apps to visualise the FW “hotspots” and facilitate its collection. By monitoring these areas, we can also plan for the required infrastructure of biogas plant. It is anticipated that engaging consumers through the familiar app interfaces will facilitate system adoption and indirectly raise awareness towards responsible food consumption. Based on the feedback received for this solution, the following reflections are to be considered for further project development and implementation:

- Potential issues with this project’s supply chain must be anticipated with an eventual reduction in FW volumes. The co-digestion of organic wastes (Lim *et al.*, 2021) could be developed to address this issue by collaborating with local researchers at universities, institutes and city council.
- Using specific food delivery apps to deploy the FW monitoring system may limit its accessibility and inclusivity. With the recent digitalisation of payment services in Malaysia, alternate solutions can be developed with e-wallets and local digital banking services having large user databases.

- The project monitoring plan must differentiate between the indicators for the project outputs vs outcomes. For project outputs, we will focus on quantitative indicators, including biogas/electricity generated, amount and composition of FW collected and reduced. For project outcomes, we could adopt the indicators established by the Sustainable Development Goals (United Nations, 2015), including renewable energy capacity and the food waste index. Furthermore, short-term and long-term indicators are required to measure the success of the project. Some short-term indicators could include the percentage of technology adoption by food service providers and the extent of consumer engagement in FW monitoring system. Contrarily, long-term indicators would include reduction in landfill usage by FW and its associated emissions.
- As behavioural changes are anticipated, dedicated monitoring indicators are required. For this, we could adapt the Grab super-app ecosystem through our proposed partnership. The behaviour indicators could include the number of Grab users engaged in the Grab challenges designed to encourage FW separation at source and its associated reward points awarded. Additionally, the annual “social impact report” generated by Grab app could give an overview of their contribution. By empowering consumers with these initiatives, sustainable lifestyles could become the norm for the residents of Bandar Sunway towards achieving net zero.

Following the implementation of our project in the food service sector, we anticipate that this project will expand to the household sector, which is known to globally contribute up to 61% of food waste (UNEP, 2021). Through our lessons learnt in this LP programme, we envision that a step towards net zero in our communities today may expand to the neighbouring localities and the nation in the future.

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