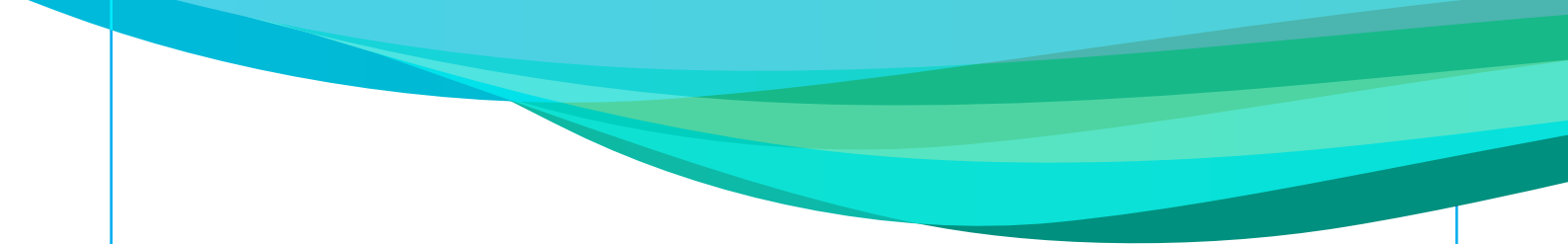




case study
MALAYSIA



Petaling Jaya's Assessment Tax Rebate Scheme
3R (Reduce, Reuse, Recycle) Initiatives:
Solving Plastic Pollution at Source



The SEA circular project – Reducing marine litter by addressing the management of the plastic value chain in Southeast Asia is implemented by the United Nations Environment Programme (UNEP) Regional Office for Asia and the Pacific and the Coordinating Body on the Seas of East Asia (COBSEA), with funding support from the Government of Sweden. SEA circular aims to reduce and prevent plastic pollution and its impact by working with governments, businesses, civil society, academia, and international partners. The initiative promotes market-based solutions and enabling policies to transform plastic value-chain management, strengthens the science base for informed decision making, creates outreach and awareness. The project leverages COBSEA's regional mechanism to tackle the transboundary challenge of marine litter in a harmonized manner.

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Disclaimer

The opinions expressed in this publication are those of the authors and contributors and do not necessarily represent the views of the United Nations or any of its affiliated organizations. The boundaries and names shown and the designations used in maps do not imply official endorsement or acceptance by the United Nations.

Acknowledgment

This case study was developed as part of the **SEA circular project - 'Reducing marine litter by addressing the management of the plastic value chain in Southeast Asia'** implemented by [United Nations Environment Programme \(UNEP\)](#) and [Coordinating Body on the Seas of East Asia \(COBSEA\)](#) with funding support from the Government of Sweden.

This case study on 'Petaling Jaya's Assessment Tax Rebate Scheme - 3R (Reduce, Reuse, Recycle) Initiatives: Solving Plastic Solution at Source' provides an overview how a local level government (the Petaling Jaya City Council) promotes waste separation at source through a combination of property tax incentives and a public-private partnership.

The project has been enabled and supported by the Ministry of Environment and Water (national focal point)

and Malaysian Green Technology & Climate Change Centre (implementing body).

The project was implemented by the Solid Waste Management & Public Cleansing Department of the Petaling Jaya City Council in collaboration with Nestlé Malaysia.

In addition, technical partners involved in the implementation of the project are TetraPak Malaysia, KPT Recycle and most importantly the residents of Petaling Jaya as well as the Circular Economy Club Petaling Jaya who organised the stakeholder consultations.

Editing was coordinated by Anthony Tan, Jacqueline Chang and Tobias Mangelmann, layout and design was coordinated by Dreamcatcher Advertising.

Foreword

Marine litter is a serious issue faced everywhere, and it is transboundary in nature. At the national and subnational levels, its presence and impacts on the environment and people are more visible and direct. A number of reasons cause marine litter, and one of them is leakage of debris to the ocean, including plastic litter. Apart from unpleasant sight, a more concerning issue about plastic is when microplastics, the very fine particles of plastic chemical substances, enter the marine food chain. While research is still steep in its impact on humans, as seafood consumers, humans need to be mindful of the potential harmful effects of micro-plastic in the food chain.

The good news is, we can proactively reduce the impact on marine environment. The Ministry of Environment and Water has implemented a project called “**Reducing Marine Litter by Addressing the Management of the Plastic Value Chain in Southeast Asia**” with the support from the United Nations Environment Programme (UNEP), Coordinating Body on the Seas of East Asia (COBSEA) and the financial assistance from the Swedish Government. I would like to take this opportunity to express our sincere

appreciation to these agencies and our local implementing partners that have supported us in this significant endeavor. We have produced several important outputs under this project, and I hope they will assist us in charting our way forward in managing marine litter issue.

One of the components of this study is to conduct a pilot project to better manage waste to reduce land-based plastic leakage. In this regard, I wish to appreciate Petaling Jaya City Council (MBPJ) in carrying out this pilot project, which looked into ways to encourage the circular economy pathway by implementing voluntary Extended Producer Responsibility (EPR).

I hope the findings, good practices, and lessons learned from this project have benefited MBPJ in supporting its sustainable waste management, specifically addressing plastic waste. Through this publication, this experience can be shared with wider stakeholders.

Thank you.

Dato' Sri Ir. Dr. Zaini Bin Ujang
Ministry of Environment and Water, Malaysia

Foreword

MBPJ is committed to achieving a circular city by 2030. This means that we must embrace multiple approaches and collaborate with various stakeholders. While The Petaling Jaya Assessment Tax Rebate Scheme for Eco Friendly House Owners provided financial incentives to inculcate behavioural change of residents in practicing 3R (reduce, reuse, recycle), the joint initiative on a door to door collection and recycling program with Nestlé Malaysia and its partners under the EPR concept inspired higher recycling participation rate in the gated and guarded neighbourhood, reaching more than 10,000 households and collecting over 200 tonnes of DMR materials over the last 6 months.

Implementation of this pilot and subsequent phases has accelerated MBPJ's target on recycling rate from 18% to 30%. Success of this collection programme requires well-designed and comprehensive planning, implementation, and communication actions. It is impossible for MBPJ to do it alone without full participation from the residents, continuous support from the

corporates and having an enabling environment. We recognize the lessons learned and further improvements required in making the recycling programme better. We acknowledge that extended producer responsibility (EPR) and circular economy concepts in Petaling Jaya are at its' infant stage and requires implementation to a wider area, smart management and sustainability plans for door-to-door collections and legislations support to grow.

I trust that our experiences in realizing the Council's recycling programme with one of the objectives of solving plastic solution at source as deliberated in this document will be able to outline some fundamental criteria to other local authorities intending to start similar initiatives. I thank Nestlé Malaysia, KPT Recycle Sdn Bhd and TetraPak for the great support and commitment in ensuring a successful recycling programme leading towards circular economy and EPR in Petaling Jaya. I would like to express my gratitude to the Ministry of Environment and Water (KASA) and SEA circular project for this opportunity to share our experience.

Tpr Sharipah Marhaini Binti Syed Ali

Deputy Mayor, Petaling Jaya City Council

As the world's largest food and beverage manufacturer and the largest FMCG company in Malaysia, we aspire to have a positive impact on all the lives we touch. We are committed to taking bold steps to address the fundamental environmental challenges the planet and mankind are confronting. We are, globally and in Malaysia, in an accelerated journey to reduce carbon emissions, cutting them in half by 2030 and achieving net-zero carbon emissions by 2050. We are also taking action to fulfil our vision that none of the packaging materials we use ends up in landfills or as litter. We believe in the value of meaningful action NOW and the contribution that large corporates like ours can play leading the way into implementing solutions with speed and scale. The replacement of over 200 Million plastic straws for sustainably sourced paper straws in 2020, or our commitment under Project RELeaf to plant 3 million trees from 2021 to 2023 are just examples of how we translate good intent into tangible action.

Malaysia is home to rich ecosystems and great biodiversity, but like in many other thriving societies, human development has had a profound impact on nature, and the proliferation of plastic waste leaking to oceans and

natural habitats is one of the most visible consequences, impacting also the quality of life of less privileged communities.

The paper we present today explains in detail our journey to establish an effective and efficient system to drive collection and sorting of recyclable materials in urban areas. In partnership with the Petaling Jaya City Council (MBPJ) we decided to launch a Door-to-Door Collection and Recycling Programme that after 9 months is proving that, with the right processes and guidance, Malaysians are most willing to engage into recycling efforts. To date, more than 20,000 households across six townships are participating in this initiative, with the programme recording close to 70% household participation and collecting over 225 tonnes of recyclable waste. The sky is the limit and plans to expand this programme to more communities are well underway!

All of us in Nestlé Malaysia are committed to bring about meaningful and tangible contributions to solve complex environmental challenges, with the ultimate objective of building a greener and more sustainable future for all.

Juan Aranols

CEO, Nestlé (Malaysia) Berhad

Table of Contents

Acknowledgment

Foreword

1	Executive Summary	8
2	Introduction	9
	2.1 <i>Petaling Jaya</i>	
	2.2 <i>Solid waste management and recycling in Malaysia</i>	
	2.3 <i>Recycling sector of Malaysia</i>	
3	Approaches for Solving Plastic Pollution at Source	11
	3.1 <i>Current Baseline Scenario at Pilot Sites</i>	12
	3.2 <i>New Approaches Applied at Pilot Sites</i>	
4	Intervention	13
	4.1 <i>Specific Solutions Identified and Applied</i>	
5	Initial Results and Early Impact	16
	5.1 <i>Immediate Observations after the Intervention</i>	
	5.2 <i>Changes Observed against the Baseline Scenario</i>	17
6	Improvements	18
	6.1 <i>Gaps and needs</i>	
	6.2 <i>Solutions</i>	
7	Way Forward: Sustainability and Upscaling	19
	7.1 <i>Replicability / Transferability of the Door-to-Door Recycling Programme</i>	
	7.2 <i>Sustainability Plans for the Door-to-Door Recycling Programme</i>	
	7.3 <i>Policies And Legislation</i>	20
8	List of Abbreviations	21

Table of Figures

Figure 1	Map of Malaysia and Petaling Jaya Source: Google maps	9
Figure 2	Tail-gate sorting	10
Figure 3	Overview of initiatives that qualify for tax rebate	11
Figure 4	Rebate Scheme Applications for Petaling Jaya	11
Figure 5	Rebate Scheme Applications for Ara Damansara, Bandar Sri Damansara	12
Figure 6	Approach to develop door-to-door collection scheme	13
Figure 7	Picture of simplified separation approach	13
Figure 8	Pictures of CEPA activities	14
Figure 9	Pictures of separation approach and collection truck	14
Figure 10	Process of collection and sorting	15
Figure 11	Primary Data on Monthly collection volume	16
Figure 12	Primary Data on Monthly participation rate	16
Figure 13	Waste composition since start of the programme	17

Executive Summary

The importance and order of priority of the **3Rs** (**R**educe, **R**euse and **R**ecycle) is well documented and understood. Firstly, households should **Reduce** the amount of resources they use. This should be followed by finding ways to **Reuse** products either through re-purpose or repair. Both **Rs** depend largely on the behaviour change of households, which the government can influence by creating awareness and conviction among consumers.

The third **R** is however more complex since it requires interactions between the producers of the products, the waste management sector, the government, consumers and other stakeholders such as informal waste sector collectors.

This case study focuses largely on **recycling and the role that the government** (Petaling Jaya City Council or MBPJ) as well as the **private sector** (Nestlé Malaysia and its partners) play to **formalize the recycling collection and increase the recycling rate in urban areas**. Some of the obvious barriers identified are the need to achieve long-term behaviour change but also to change the existing recycling system.

This document covers two specific initiatives addressing these problems. On the one hand, the Assessment Tax Rebate Scheme for Eco-Friendly House Owners in Petaling Jaya¹, which provides households the awareness and financial incentive to practice all 3Rs. On the other hand, the document describes the collaboration between MBPJ, Nestlé Malaysia and its partners introducing a dedicated door-to-door collection & recycling programme in gated and guarded areas structured as a voluntary Extended Producer Responsibility (EPR) scheme.

While the informal waste sector in Malaysia has demonstrated itself to be extremely resourceful in mobilizing high value recycling materials, such a system leaves behind less valuable materials in the mixed waste, which most often ends up in landfills, if not the environment. Early findings of the door-to-door collection & recycling programme demonstrate that a well-designed system and strong Communication, Education & Public Awareness (CEPA) approach can mobilize all types of recyclable materials at source in an efficient manner. In addition, this approach provides households with confidence in the system, increasing the participation rates, reducing the amount of recyclable waste going to landfill and providing a clean and well sorted feedstock for the local recycling industry.

The initial results demonstrate that a formal recycling collection infrastructure can be successfully implemented in Malaysia with social acceptance and strong participation by the residents and that an EPR Scheme can serve as an additional funding mechanism. This approach would make a great contribution towards the implementation of the upcoming Malaysia's National Marine Litter Policy & Action Plan 2021-2030.

So far, this approach has only been implemented in gated and guarded communities in Petaling Jaya i.e. middle to upper middle-income areas. More work will be needed to test and adjust this approach to the context and needs of other neighbourhoods. Although most local communities possess general knowledge on 3Rs, this knowledge must be transformed into action to promote community behavioural changes in practicing a more ecological minded lifestyle.

¹ An **Assessment Tax** is a local property tax determined by local authorities for residential properties and is payable in two instalments annually. This tax provides the income for local authorities to fund utilities such as waste management services amongst others. Please visit <http://www.mbpj.gov.my/en/citizens/e-services> for more information.

Introduction

2.1 Petaling Jaya

Petaling Jaya or commonly referred to as 'PJ' is a city within the administrative district of Petaling within the State of Selangor. PJ is located within the Greater Kuala Lumpur area and one of the most densely populated areas of Malaysia with a total population of over 772,763 inhabitants. The local government of Petaling Jaya is the Petaling Jaya City Council or Majlis Bandaraya Petaling Jaya - in short MBPJ - which has the responsibility to manage solid waste within the city limits.



Figure 1 : Map of Malaysia and Petaling Jaya
Source : Google maps

2.2 Solid waste management and recycling in Malaysia

Historically, management of solid waste and public cleansing in Malaysia was administered only by the various local authorities e.g. MBPJ. **The Solid Waste and Public Cleansing Management Act 2007 (Act 672)** was gazetted on 30 August 2007 with the objective to improve and delegate the responsibility for solid waste management and public cleansing to the Federal Government, which in return appointed regional waste management companies as long-term concession holders to provide solid waste management services.

However, only six states (Johor, Melaka, Negeri Sembilan, Kedah, Perlis and Pahang) and two Federal Territories of Putrajaya and Kuala Lumpur joined the Act (Act 672 States). The State of Selangor did not implement Act 672, thus the responsibility for solid waste management remains with the local government authorities such as MBPJ. In 2015, separation at source (SAS) was formally introduced in Act 672 States including a '2+1 collection system' whereby the mixed or residual waste from households would be collected twice per week while recyclable and bulky waste would be collected once per week. However, the volumes reported under the SAS operations in the Act 672 States are very small².

In 2016, **KDEB Waste Management Sdn Bhd (KDEB)**, a company wholly owned by the State of Selangor, was appointed to manage the domestic solid waste collection and public cleansing in Selangor including MBPJ. However, non-Act 672 States like Selangor did not introduce a dedicated collection service for recyclable waste but kept the door-to-door collection focused on mixed waste as well as gardening waste.

2.3 Recycling sector of Malaysia

Although the formal collection of recyclable waste has shown limited success, Malaysia has a very well-developed recycling industry with an estimated installed mechanical recycling capacity of more than 800,000³ metric tons per year for the main plastic grades such as polypropylene (PP), polyethylene terephthalate (PET), high-density polyethylene (HDPE) and low-density polyethylene (LDPE). However, the feedstock for this recycling industry is not mobilized through formal collection of post-consumer waste. Instead, the recycling industry relies largely on recyclable waste from commercial and industrial customers, imports and post-consumer waste mobilized by the informal waste sector. Improved collection of clean and well sorted post-consumer waste would be highly beneficial to the existing Malaysian recycling industry.

The informal waste sector includes a wide variety of collectors ranging from mixed junk yards, individual collection trucks (mainly focused on old paper and metals) and tricycle collectors, to street material pickers and landfill material pickers. In addition, the truck crews of the waste management companies such as KDEB often collect and separate recycling materials during the mixed waste collection rounds and market these materials on their own in order to increase their income.

² SWCorp (2019). *Kompendium Pengurusan Sisa Pepejal Malaysia 2019*

³ World Bank (2021). *Market Study for Malaysia: Plastics circularity opportunities and barriers*



Informal recycling collection by waste management crews (tail-gate sorting)

Figure 2 : Tail-gate sorting

While tail-gate sorting had been prevalent in many areas across Act 672 and non-Act States, it has been reduced over time especially in the Act 672 States due to the enforcement of stricter Standard Operating Procedures (SOPs) in the Act 672 States. In Selangor and the MBPJ area, this tail-gate sorting is still partly practiced.

In parallel, Act 672 States implemented a SAS policy to collect recyclable materials with a separate collection vehicle. However, the amount collected for recycling by the waste management companies only accounts for 0.04% of the total municipal waste in those states⁴. Compared to the official recycling rate of nearly 30%⁵ across all materials, this indicates that the majority of recycling materials is mobilized by the informal waste sector.

In Malaysia and Selangor, informal waste pickers contribute significantly to waste management and resource efficiency by collecting, sorting and trading recyclable waste materials. Organically grown informal sector activities are highly adaptable, flexible and able to respond quickly to demand-driven forces. Informal waste collectors and recyclers are capable to come up with adaptive strategies to access waste and circumvent barriers while at the same time integrating new systems as they emerge if they are given the opportunity to work closely with MBPJ and other City Councils collaboratively. These activities and enabling conditions for integration not only provide an income opportunity for employment in the overall informal sector (currently 7.9% share of the urban employment throughout Malaysia⁶), but if we target the informal waste sector out of that 7.9%, it will also serve the protection of natural resources and the environment by

recovering municipal wastes in a self-financing system thereby reducing operational waste collection and disposal costs for MBPJ⁷ and resulting in savings for MBPJ's overall waste management system.

However, the informal waste sector only focuses on materials that have a market value exceeding the cost of collection, transport, sorting and possible onward transport. As a result, the informal sector focuses on materials that have a high value, are easy to pick and/or have a high bulk density. Even high value plastic with low bulk density might not be mobilized and end up in the landfills. This trend is expected to continue, since a country like Malaysia and a city like Petaling Jaya have a comparatively high and growing GDP per capita (compared to other ASEAN countries). In such cases, the incentive and participation of informal sector participants tends to be lower⁸ and steps needs to be taken by municipalities and city councils to mainstream environment and economic advantages of informal waste sector integration as part and parcel of their waste management system.

Thus, MBPJ has to cope with significant amounts of recyclable material ending up in the mixed waste collection, which will ultimately go to the landfill. This causes additional cost for the City Council because of increasing collection volumes and tipping fees, i.e. MPBJ spends roughly 21% of its annual budget on waste management and public cleansing services including nearly 10% on waste disposal and land-filling alone.

Lastly, a wide range of non-governmental organisations (NGOs) are supporting the collection of recyclable goods both for environmental and charitable objectives, with the Taiwan Buddhist Tzu Chi Foundation (Tzu Chi) being the largest and best organized NGO. Tzu Chi operates a large number of permanent recycling centres, where households can drop-off nearly all recyclable materials. In addition, Tzu Chi also operates temporary recycling collection point on one Sunday every month. Both, Tzu Chi recycling centres and collection points also exist within the MBPJ area. Given the significant contribution by volunteers, Tzu Chi is able to collect a wide range of recyclable materials including low-value recyclables. It is against this backdrop that MBPJ has developed multiple initiatives to encourage residents to follow the 3R approach and improve the post-consumer collection of recyclables.

⁴ World Bank (2021). *Market Study for Malaysia: Plastics circularity opportunities and barriers* – Appendix 13.2

⁵ SW Corp (2021) and *The Star*

⁶ <https://www.statista.com/statistics/974044/informal-sector-share-of-urban-employment-malaysia/> and Tumin S.A.(2020), *Unregistered and "Invisible" Workers in Malaysia's Informal Sector*, Khazanah Research Institute

⁷ MBPJ (2020) *Circular Economy Solutions to Address Top 5 Challenges of Petaling Jaya* – IUC Asia Stakeholder Dialogue on 29 June 2020 where MBPJ's 2019 total costs for collection and disposal fees was RM35.5 million.

⁸ GA Circular (2019) *Full Circle: Accelerating the Circular Economy for Post-consumer PET Bottles In Southeast Asia*

Approaches for Solving Plastic Pollution at Source

Assessment tax rebate for eco-friendly house owners in Petaling Jaya

ENERGY	WATER	WASTE	TRANSPORTATION	BIODIVERSITY
<ul style="list-style-type: none"> • Solar heater application • Renewable energy sources (e.g. photovoltaic) • Energy savings through LED lights • Energy savings through 5-star electrical equipment • Roof insulation • Low electricity usage < 112kWh per person & month 	<ul style="list-style-type: none"> • Rainwater harvesting system installed • Wastewater recycling system installed • Low total water usage < 202 litres per person & day • Water saving appliances (reduce vol/min) • Installation of flush box of 6 litres or less 	<ul style="list-style-type: none"> • Waste composting/eco-enzyme making • Recycle (Separation of wastes) • Re-use (Items that can be reused) • Reduce of resources 	<ul style="list-style-type: none"> • Possession and use of hybrid/ electrical cars, electrical motorcycles, or NGV cars for work/ leisure • Use of public transport/ walking/ riding bicycles for work and leisure 	<ul style="list-style-type: none"> • More than 50% landed properties covered with soft landscaping/ greenery • Significant planting (Multistorey houses) • Green soft landscaping in front of house or planting perimeter of at least 2m.

Figure 3 : Overview of initiatives that qualify for tax rebate
Source : Adapted from MBPJ's website

The Low Carbon Green City Task Force (**LCGCTF**) of Petaling Jaya was established to develop action plans, policies and related programmes such as the rebate scheme. In 2011, Petaling Jaya City Council was the first local authority in Malaysia to introduce and implement the **Assessment Tax Rebate Scheme for Eco-Friendly House Owners in Malaysia (the rebate scheme)**. The rebate scheme is offered to house owners who take the initiative in making their homes more environmentally friendly in terms of energy, water, biodiversity, waste management or transportation.

Since the introduction of the rebate scheme, Petaling Jaya City Council has received the **"Green Apple Award" by The Green Organisation, London** and the United Nations Education, Scientific, Cultural Organisation (**UNESCO Learning City Award 2019**) for having shown exemplary progress and commitment to promote education and lifelong learning at the local level to promote an environmental friendly "green" lifestyle with respect to making Petaling Jaya a Low Carbon Green City.

Waste management and specifically the 3Rs only account for three out of the total 20 initiatives that a household can take. However, they are some of the easiest initiatives to implement since they don't require any upfront investments or structural changes to the building as in the case for solar heaters, photovoltaic systems or rainwater harvesting. Figure 4 provides a summary of the 10-year results in terms of yearly applications and rebates.

Year	Number of applications	Total rebate (MYR)
2011	49	18,184
2012	71	20,159
2013	106	32,602
2014	152	47,842
2015	148	43,664
2016	123	20,181
2017	76	20,740
2018	619	211,005
2019	849	237,687
2020	185	55,999
Total	2,378	708,063

Figure 4 : Rebate Scheme Applications for Petaling Jaya
Source : MBPJ's primary data as at Q2 2020 prior to commencing pilot project

In 2018 MBPJ started a pilot collaboration with a local recycling company, KPT Recycle Sdn Bhd (KPT) to introduce a separate collection of recyclable materials in Bandar Utama, a residential area within Petaling Jaya. This initiative resulted in a significant increase of rebate applications. However, this separate collection pilot by itself is not financially sustainable as explored in the following section. Thus, MBPJ explored new approaches to increase the 3R participation in other areas.

3.1 Current Baseline Scenario at Pilot Sites

As described in Chapter 2, the Malaysian post-consumer recycling collection depends largely on the informal waste sector. However, most middle- and upper-middle income communities in PJ are gated or guarded and don't allow informal sector collectors into their area for security & privacy reasons. Thus, a large share of the recyclable materials ends up in the mixed waste collection. NGOs like Tzu Chi operate multiple recycling centres and drop-off points in these areas, but they rely on the households bringing the pre-sorted materials to these locations. In addition, MBPJ provides designated recycling facilities such as the PJ Eco Recycling Plaza or the SS8 3R Centre (another PPP collaboration between MBPJ, F&N and Tetra Pak)⁹ in strategic locations, where drop-off bins are provided. However, like Tzu Chi, this approach requires residents to send in their recyclables to the respective drop-off locations.

Year	Ara Damansara	Bandar Sri Damansara
2011	4	0
2012	5	2
2013	6	1
2014	3	3
2015	1	1
2016	1	0
2017	6	0
2018	5	6
2019	0	5
2020	1	1
Total	32	19

Figure 5 : Rebate Scheme Applications for Ara Damansara, Bandar Sri Damansara
Source : MBPJ primary data as at Q2 2020

Given the informal nature of the existing recycling collection, it is close to impossible to establish a quantitative baseline in terms of recycling volumes, recycling rates or participation rates. However, based on the learnings from the Bandar Utama pilot, MBPJ identified two areas with significant gated communities that had historically shown a low number of applications for the

rebate scheme i.e. the number of applications in both areas were about 30% and 40% lower compared to other locations in PJ (Figure 5). These areas could benefit from a dedicated recycling collection similar to the Bandar Utama pilot. This has, however, demonstrated that the value of the recyclables could not cover the cost of collection, sorting and transport. Thus, MBPJ explored a new approach for these areas.

3.2 New Approaches Applied at Pilot Sites

Nestlé Malaysia Berhad is a subsidiary of Nestlé S.A. and has more than 100-year history in Malaysia. Globally, Nestlé has committed to make 100% of its packaging material reusable, recyclable or compostable by 2025. Such efforts need to be complemented with a recycling system that manages to collect all recyclable materials in an effective and efficient way.

An Extended Producer Responsibility (EPR) Scheme seems to be the most likely policy mechanism to support the development of such a recycling system in Malaysia¹⁰. The report also suggests that in the long-term, a successful EPR Scheme should be mandatory for all companies that put relevant packaging materials on the Malaysian market and that therefore, such an EPR Scheme will require an adequate legal basis, which the Government of Malaysia is actively considering right now. However, in the meantime, the private sector has the opportunity to implement voluntary EPR Schemes as a form of a Public Private Partnership.

In July 2020, Nestlé Malaysia and MBPJ decided to implement one of the first voluntary EPR pilots in those two areas. The main objectives for this approach were to maximize the collection of all post-consumer recyclable including metals, paper, plastic, used beverage cartons and glass. In addition, none of the materials should end up in a landfill, requiring responsible recycling solutions and alternative disposal options for non-recyclable materials. Lastly, since the introduction of such a system comes at a net cost, Nestlé Malaysia is committed to contribute a voluntary EPR fee covering the gap between the revenue generated by the recyclable materials and the cost of the recycling collection, transport and sorting.

⁹ Tetra Pak drop-off locations for used beverage cartons <https://www.recycle-easy.com.my/drop-of-point/>

¹⁰ WWF (2020). Study on EPR Scheme Assessment for Packaging Waste in Malaysia

Intervention

4.1 Specific Solutions Identified and Applied

In the case of the Bandar Utama project, MBPJ worked with a local recycling company, KPT Recycle Sdn Bhd, to organize the sorting and transport of the materials. For the new project Nestlé Malaysia and MBPJ partnered with KPT as well as with Tetra Pak Malaysia to carry out the project. While the Bandar Utama pilot provided an excellent basis for the planning of this project, the joint team followed a four-step process as illustrated below.

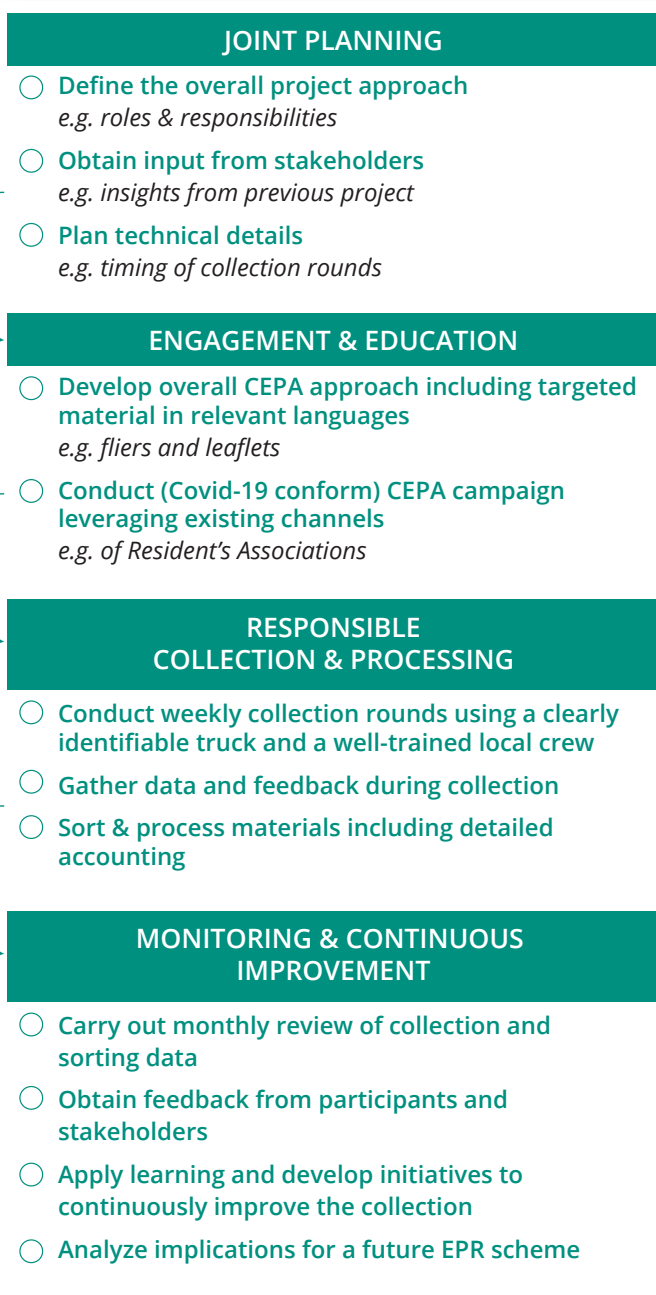


Figure 6 : Approach to develop door-to-door collection scheme
Source : Nestlé-MBPJ door-to-door collection pilot



Figure 7 : Picture of simplified separation approach
Source : Nestlé-MBPJ door-to-door collection pilot

The first step involved an intensive joint planning exercise to ensure that the new and separate recycling collection would be successful and accepted by the residents. Learnings from the previous Bandar Utama project as well as existing recycling collection in Act 672 States were included, as well as input from initial stakeholder consultations. This step included detailed planning of the collection routes to avoid overlaps with the existing mixed waste collection, technical decisions on the vehicle type, the use of MBPJ's dedicated 'Yellow Recycling Box' to be distributed to households who repeatedly participate in the recycling activity as well as the overall agreement to make it simple and convenient for the households to get started.

The second step was the engagement and education of the residents, which was unfortunately complicated by the Covid-19 limitations. In preparation for the engagement with residents as well as the Residents' Associations, a consistent set of communication materials was developed including fliers, presentations and banners. Collection truck bins also were equipped with the same information material. The Residents' Associations and their dedicated WhatsApp groups were an especially helpful means to disseminate information as well as to clarify questions about time schedules and what materials are recyclable.

One of the key principles was to keep it simple for residents to get started. Residents only need to separate the seven types of dry mixed recyclables (DMR) from the residual waste, ensure that the materials are clean and place them into the yellow box or a plastic bag. The yellow box is placed outside their homes for the recycling truck to collect on the designated day.

Drive new behaviour and understanding through CEPA



Door-to-door engagement



Leaflet distribution



Residents' Association meetings



Roadside banners



Collection truck with jingle

Figure 8 : Pictures of CEPA activities

Source : Nestlé-MBPJ door-to-door collection pilot project

Introduce formal collection service for DMR



Transparent bag for initial four (4) weeks of collection



Yellow bin/box for households that participated in the first 4 weeks



Figure 9 : Pictures of separation approach and collection truck

Source : Nestlé-MBPJ door-to-door collection pilot project

Develop detailed sorting operations to recover all recyclable materials

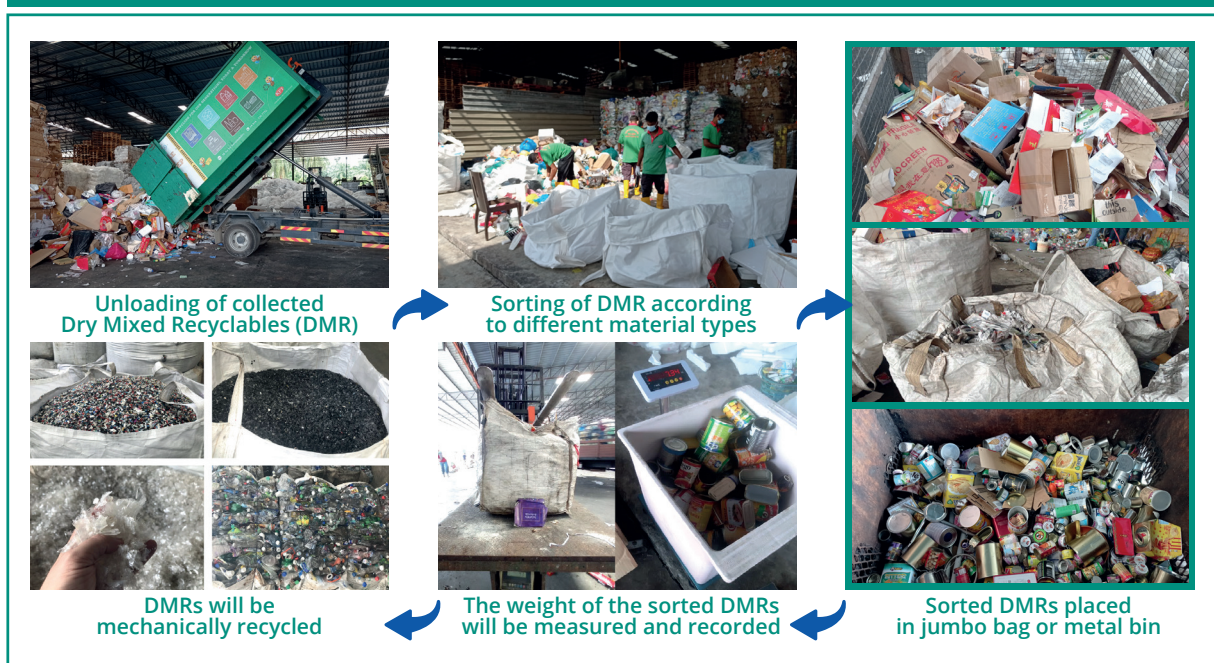


Figure 10 : Process of collection and sorting
Source : Nestlé-MBPJ door-to-door collection pilot project

Where it was possible, various face-to-face workshops and individual stakeholder engagement sessions on the use of the yellow box with accompanying educational leaflets were carried out within the limitations of the Covid-19 restrictions. Subsequently, these sessions were switched to online group discussions.

In October 2020, the collection started, and households were initially supplied with clear plastic bags to collect the recyclable materials that they would place outside the house during the specified collection day. Households that participated for two times then received a yellow box to replace the plastic bags. If the yellow box is not sufficient, households often reuse cardboard boxes to place additional materials outside their gate.

Once the material is picked up, it is transported to KPT's recycling plant, where the detailed sorting is carried out. Since KPT operates its own paper mill, the company is able to process all paper grades and beverage cartons directly. Plastic and metal are sorted by grade and sold to local specialized recycling companies who can process the respective plastic grades into recycled resin.

Lastly, the results of the collection and the composition of the recycling materials are reviewed monthly. In addition, regular online engagement sessions were organized and attended by senior management of MBPJ as well as Nestlé Malaysia in order to foster social acceptance and obtain feedback from the residents and the Residents' Associations.

Both the quantitative analysis and the qualitative engagement sessions provide a lot of insightful primary data (as shown in this report) as well as inputs for the continuous improvement of the approach. Some of the residents were concerned to leave the recyclables outside the house for long time in case of rain. Thus, based on the residents' feedback, the truck was equipped with a loudspeaker playing a catchy tune like the paper-lama trucks¹¹ for residents to know when the truck is in the neighbourhood.

As shown in the next chapter, this approach has been successful in mobilizing collection of the full range of recyclable materials ranging from 'expensive' aluminium cans, over bulky carton board to single-use recyclable plastic.

¹¹ The 'paper lama' (old newspaper) collection trucks are a very Malaysian semi-formal collection system mainly focusing on newsprint and other paper grades

Initial Results and Early Impact

5.1 Immediate Observations after the Intervention

The collection started in Ara Damansara in October 2020 with 2,235 households followed by Bandar Sri Damansara with 6,034 households in November 2020 and the collection showed a constantly increasing collection volume in both areas as well as an increasing participation rate. By February 2021, more than 50% of the households in Bandar Sri Damansara and more than 75% of the households in Ara Damansara participated actively in the recycling collection.

The peak in the February collection volume and subsequent slump in March 2021 needs to be explained since this is a regional waste management phenomenon that always happens around the Chinese New Year (CNY) due to a combination of CNY spring cleaning, acquisition of new items and family celebrations. Operationally the project had to deal with significantly more recyclable materials on the days leading to the Chinese New Year requiring the truck crew to carry out more collection cycles than ever before.

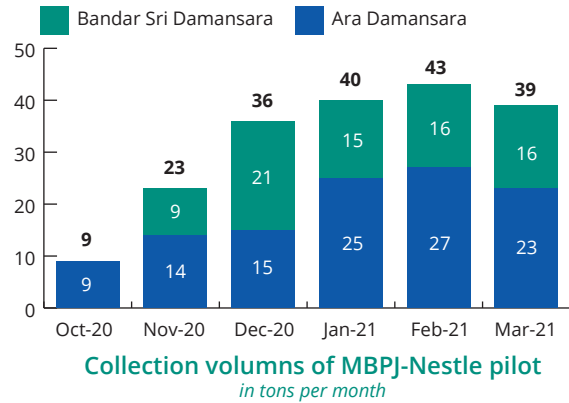


Figure 11 : Primary Data on Monthly collection volume
Source : Nestlé-MBPJ door-to-door collection pilot project

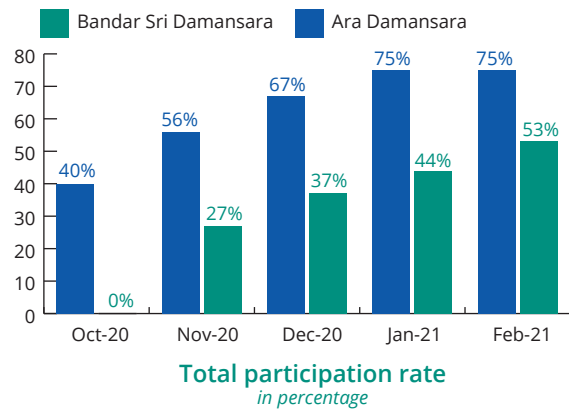


Figure 12 : Primary Data on Monthly participation rate
Source : Nestlé-MBPJ door-to-door collection pilot project

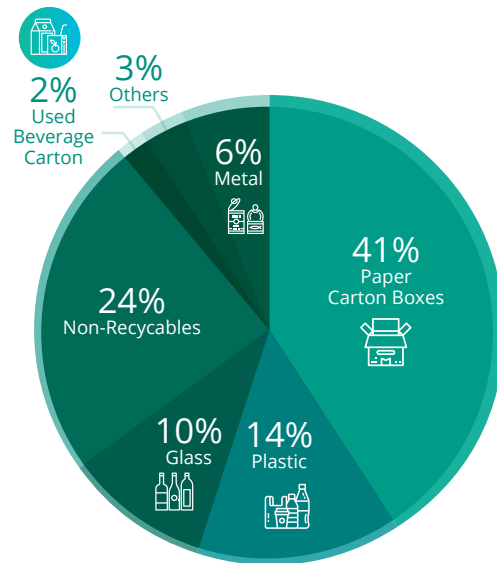
5.2 Changes Observed against the Baseline Scenario

As mentioned before, it is close to impossible to generate a quantitative baseline given the lack of reliable data from the informal sector. However, the daily analysis and monthly reporting of the collection volumes provide significant insight and learnings.

Figure 13 provides an overview of the waste composition of all the Dry Mixed Recyclables (DMR) collected over the past six months, indicating that the waste composition has been fairly stable and consistent over time and across the two different areas in PJ.

However, it should be noted that considering the short duration of the programme, the quality of the DMR separation by the households is excellent. Most of the materials are clean and dry and do not contain any food or other major contaminations. Thus, all the materials that can be mechanically recycled in Malaysia at the moment can be further sorted, aggregated and sold on to specialized recycling processors in Malaysia.

The waste characterization also shows that ~24% of the materials are not recyclable as of today. This includes two types of materials. On the one hand, some households add materials to the DMR such as broken toys or heavily used clothes that simply cannot be recycled and are unlikely to be reused. This often seems to happen with the best intentions and can be described as 'Wish-Cycling' or hoping that by adding the material to the recycling stream somebody will be able to re-use or recycle it. Continued education of the households can address this situation. On the other hand, there is a significant amount of packaging materials that is currently not mechanically recycled in Malaysia, which requires more attention as described in the following chapter.



Waste composition of DMR collected between October 2020 to March 2021

*Figure 13 : Waste composition since start of the programme
Source : Nestlé-MBPJ door-to-door collection pilot project*

In summary, within the first six months of operations, this door-to-door recycling programme was able to collect nearly 200 tonnes of DMR materials, which is the equivalent of roughly 40 compactor trucks full of mixed waste. In the baseline scenario, some of the DMR would have been recovered by the truck crew or other informal waste sector participants. However, the majority of the single use plastic and lower value items would have ended up in the local landfill. Thus, this programme has successfully diverted a significant share of recyclable waste from either ending up in the landfill or even the environment. More importantly, this programme has also shown that it is possible to implement formal recycling collection systems in Malaysia, provided that the recycling collection system is thoughtfully designed, and a comprehensive CEPA approach is used.

Improvements

As explained before, the project puts significant emphasis on continuous improvement and learning. Introducing the catchy jingle sound was one of these improvements. In addition, the project had to deal with many other operational challenges throughout the first six months, which have largely been addressed in close collaboration between MBPJ, Nestlé Malaysia and KDEB as well as KPT. E.g. it took one month to ensure that the collection routes are fully aligned without any overlaps between mixed waste and recycling collection. Few informal sector scavengers were trying to benefit from the households sorting efforts and attempted to pick up the recyclables at the same days when KPT trucks would come to pick them up, but guarded and gated communities generally do not grant access to informal sector waste pickers to do so. This is more so during the Covid-19, as SOPs had to be strictly adhered.

In the planning of expansion to non-gated/guarded communities and other locations (second phase), MBPJ and all their partners will be exploring different ways in integrating, organising and training informal workers to increase social acceptance of their critical roles in the waste management system. The experience of informal waste sector intervention in waste management has been diverse in different contexts in Selangor and Malaysia. MBPJ is currently exploring how to establish informal waste worker networks where they become regular partners of municipalities, city councils and private enterprises' pilot projects. This would require concerted efforts in various political, legal, cultural and social conditions to determine the best possible approach to informal waste sector integration in the national context. In addition, there will be a continuous effort to work on the education and awareness to ensure that only relevant materials are sorted out by the households be it through the existing or new channels.

6.1 Gaps and needs

There are still a few major systematic and structural challenges that are beyond this project and which the larger Malaysian recycling and waste management sector needs to address.

Non-recyclable materials

As mentioned before, a large share of materials are currently not recyclable in Malaysia. This includes multilayer or composite materials, which cannot be added to the current mechanical recycling process of

mono-materials. There is also a large share of mono-materials that are currently not accepted by the recycling sector because the material properties are slightly different across collected volumes. This can be a result of colouring (e.g. coloured PET bottles), the manufacturing process (e.g. thermoformed PET egg cartons and clamshells used for salads), unnecessary mixture of materials (e.g. calcium carbonate addition to HDPE bottles) or simply due to missing or unclear labelling.

6.2 Solutions

Non-recyclable materials

There are multiple ways to address materials that are currently not recyclable. The best approach would of course still be the first R to avoid these materials all together.

Alternatively, the World Bank report provides a comprehensive list of government and private sector initiatives to address this challenge including design standards for recycling that ensure that all materials can be recycled or also advanced chemical recycling solutions that can deal with composite materials. In addition, the WWF report provides additional suggestions on how to structure an EPR scheme with modulated fees i.e. with a fee structure that penalizes hard to recycle materials and thereby incentivizes brand owners, packaging companies and plastic converters to rethink and refine their current packaging solutions.

Enabling conditions & integrating the informal waste sector

As mentioned above, the second phase of the project will expand the collection into apartment buildings, which will most likely include the apartment cleaners as key stakeholders in the organisation and improvement of the apartments recycling system. As of the publication of this report, the initial stakeholder discussions only just started.

Moreover, the door-to-door collection approach should also be expanded over time to non-gated areas, where street material pickers and motorized material pickers (e.g. tricycles, small trucks) are the predominant group of informal waste sector participants, which will require a more comprehensive engagement effort coupled with training to create a win-win for all parties in the upcoming pilot projects.

Way Forward: Sustainability and Upscaling

7.1 Replicability / Transferability of the Door-to-Door Recycling Programme

Based on the experiences and the success of the current programme, MBPJ and Nestlé Malaysia have already launched a 'Phase 2' and expanded the door-to-door collection to the next set of communities in PJ. This will include very similar residential areas such as four gated or guarded locations with landed properties in PJ¹² that can generate significant environmental and social benefits since recyclable materials are avoided from ending up in landfill and the formalized local employment opportunities for the collection truck crews.

Additionally, MBPJ and Nestlé Malaysia will also pilot a recycling approach in four apartment buildings with very different socio-demographic situations¹³. This will require a very different recycling system adapted to the respective apartments and the relevant stakeholders as well as a different CEPA approach. Most importantly, this expansion will include the apartment cleaners who are in most cases already operating a successful small-scale recycling system by collecting and aggregating the high-value post-consumer recyclable materials. The exact setup varies widely between different apartment buildings due to its overall physical setups (e.g. pre-sorting by households & availability of segregation bins, type & size of waste skips, storage space in the waste chambers) as well as the economic benefit-sharing agreement between the different stakeholders i.e. cleaners, apartment management body and waste management contractor.

7.2 Sustainability Plans for the Door-to-Door Recycling Programme

The current programme and the planned expansion under Phase 2 are excellent voluntary EPR initiatives by MBPJ and Nestlé Malaysia to increase recycling rates in PJ and test how to develop a more formalized recycling collection in different environments using different CEPA approaches.

However, it must be acknowledged that MBPJ and Nestlé Malaysia cannot do this alone. Within the government, several local government authorities, especially in Selangor, have expressed interest to replicate this approach for landed properties and/or gated communities.

Within the private sector and especially in the States that have implemented Act 672, waste management companies have to acknowledge that it is possible to formalize the recycling collection, stopping the current approach of leaving this task to the informal waste sector and thereby increasing the recovery of clean and well sorted plastic material for the local recycling industry.

The pilot project naturally comes with a significant upfront investment. While the experience so far shows that the revenue from the recyclable materials cannot cover the cost of collection, transport and sorting, thus requiring the continued support through an EPR mechanism, the ongoing monthly monitoring also indicates that there are significant improvement opportunities in the long-term to increase the revenue, reduce the cost and thereby minimize the net cost of the EPR system and ultimately to the consumer.

- Consumer engagement and education drives high participation rates, improves the quality of separation at source, which reduces the cost of collection and sorting.
- Increasing collection volumes will enable large and partially automated sorting plants (Material Recovery Facilities – MRF) with lower sorting costs. While improved sorting in these MRFs will create higher quality material stream, which can be sold at a premium thereby increasing the revenue within the system.
- Improvements in the packaging design will ensure that more materials are recyclable thereby increasing the revenue of the overall post-consumer waste stream.
- And processing innovations (e.g. chemical recycling) will allow to monetize also low-value packaging materials.

While the collaboration between MBPJ and Nestlé Malaysia is an excellent starting point, the involvement of all international and local manufacturers and brand owners is needed. To that extent, 10 large international and local brand owners have recently formed the **Malaysian Recycling Alliance, MAREA**¹⁴, which was incorporated in January 2021 and launched by March 2021. Comprised of some of the largest local and international brand owners, this group can significantly increase the scope and scale of voluntary EPR systems, which ultimately should lead to a mandatory EPR scheme that includes all brand owners that put packaged materials into the local Malaysian market.

¹² Aman Suria, Taman Bukit Mayang Emas, Tropicana, Damansara Indah, Kota Damansara, Mutiara Damansara

¹³ Sri Damansara Court, Paramount View Condominium, Metropolitan Square, Gugusan Dedap Low Cost Flats

¹⁴ Surin Murugiah, 6 April 2021. 'Ten fast-moving consumer goods players team up to kick start Malaysian Recycling Alliance', <https://www.theedgemarkets.com/article/ten-fast-moving-consumer-goods-players-kick-start-malaysian-recycling-alliance>

7.3 Policies and Legislation

The Selangor government successfully implemented the "No Plastic Bag Day" every Saturday in 2010, followed by introducing a no free plastic bag policy in 2017. From 1 July 2019, the Selangor government had enforced a campaign to stop the use of single-use plastics at all departments and agencies under the state's administration. These actions have accelerated the shift from dependency on single-use plastic bags to the adoption of reusable bags on a regular basis. These practices are also in compliance with "Malaysia's Roadmap towards Zero Single-Use Plastics 2018-2030", Environmental Sustainability in Malaysia 2020-2030 under its Strategic Collaboration Pillar, "Malaysia's Circular Economy Roadmap for Plastics " and the proposed "Malaysia's National Marine Litter Policy and Action Plan 2021-2030".

MBPJ and Nestlé Malaysia will continue its collaboration in rolling out various Communication, Education, and Public Awareness (CEPA) activities among the stakeholders by sharing the benefits of the rebate scheme incentives coupled with voluntary EPR. KASA on the other hand will host continuous dialogues between the government, local communities and businesses, on strengthening collaboration and finding innovative ways to reduce the usage of plastic (single use and otherwise) to promote the use of alternative materials that are environmentally friendly as part of an eco-friendly lifestyle.

List of Abbreviations

Abbreviation	Detailed description and/or explanation
Act 672	Solid Waste and Public Cleansing Management Act 2007 (Act 672)
Act 672 States	States of Johor, Melaka, Negri Sembilan, Kedah, Perlis and Pahang as well as the two Federal Territories of Putrajaya and Kuala Lumpur
CEPA	Communication, Education and Public Awareness
DMR	Dry Mixed Recyclables
EPR	Extended Producer Responsibility
HDPE	High-density polyethylene
KDEB	KDEB Waste Management Sdn Bhd
KPKT	Kementerian Perumahan dan Kerajaan Tempatan (Ministry of Housing and Local Government)
KPT	KPT Recycle Sdn Bhd
LDPE	Low-density polyethylene
MBPJ	Majlis Bandaraya Petaling Jaya or Petaling Jaya City Council
Nestlé Malaysia	Nestlé Malaysia Berhad
NGOs	Non-governmental organisations
OCC	Old Corrugated Cardboard
PET	Polyethylene terephthalate
PJ	Petaling Jaya
PP	Polypropylene
SAS	Separation at Source
Tzu Chi	Taiwan Buddhist Tzu-Chi Foundation
UNESCO	United Nations Education, Scientific, Cultural Organisation