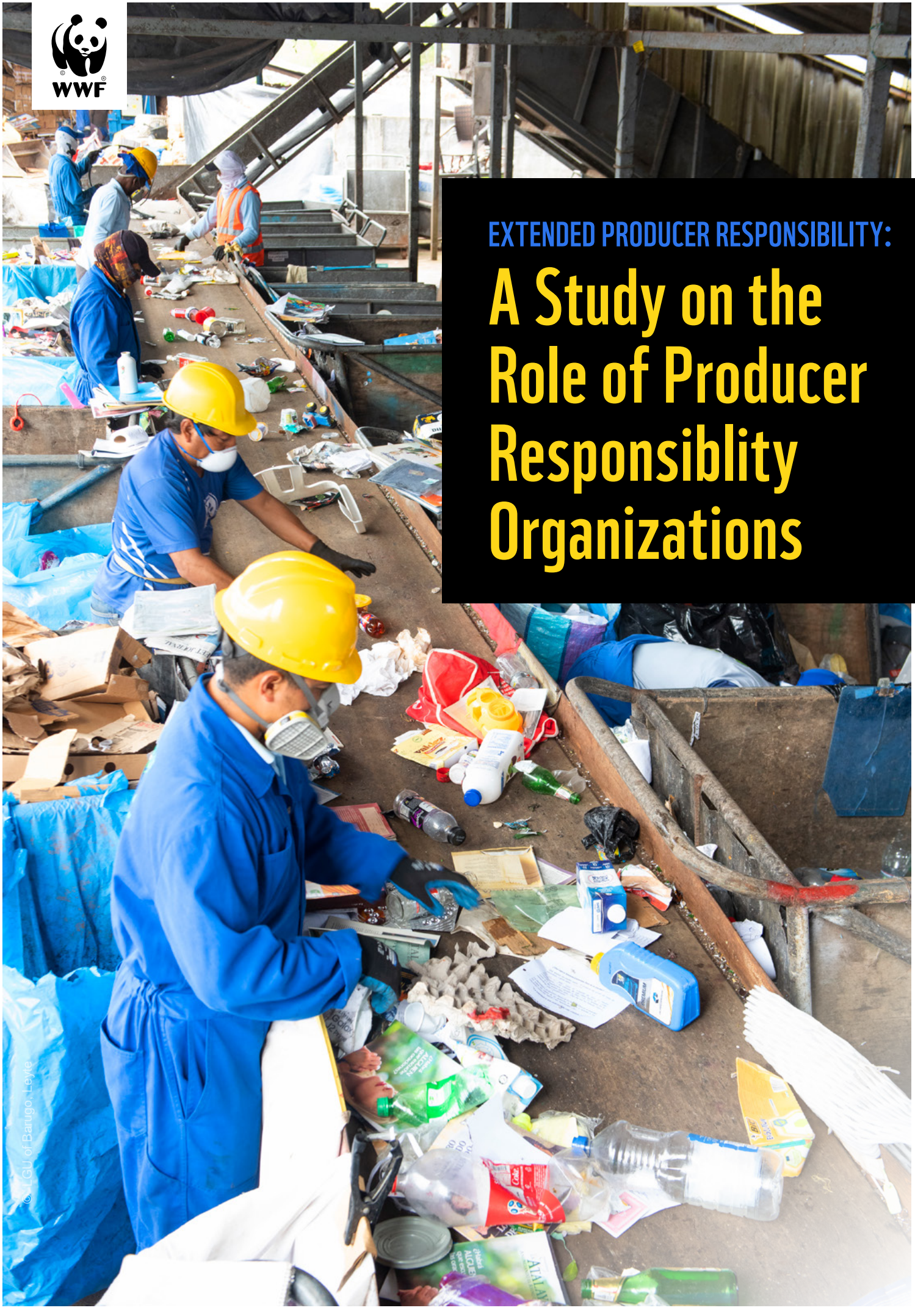

EXTENDED PRODUCER RESPONSIBILITY:

A Study on the Role of Producer Responsiblity Organizations

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The Philippine Learning Center for Environment and Social Sustainability (PHILCESS) is a constituent center of the University of the Philippines National Engineering Center; dedicated to provide capacity building programs to increase the country's ability to plan, build, and maintain infrastructure projects for the greatest benefit to communities with the least impact on the environment and society.

WWF-Philippines has been working as a national organization of the WWF network since 1997, locally registered as Kabang Kalikasan ng Pilipinas Foundation, Inc. WWF-Philippines works to improve Filipino lives by crafting solutions to climate change, providing sustainable livelihood programs, and conserving the country's richest marine and land habitats.

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Norad

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ACRONYMS

DENR	Department of Environment and Natural Resources
DfE	Design for Environment
EMB	Environmental Management Bureau
EPR	Extended Producer Responsibility
FMCG	Fast moving consumer good
FOH	Friends of Hope
IRR	Implementing Rules and Regulations
LGU	Local Government Unit
NSWMC	National Solid Waste Management Commission
MRF	Material Recovery Facility
MSMEs	Micro-, Small, and Medium-sized Enterprises
NGO	Non-government organization
OE	Obliged Enterprise
OECD	Organization for Economic Co-operation and Development
PARMS	Philippine Alliance for Recycling & Material Sustainability
PAB	Pollution Adjudication Board
PBSP	Philippine Business for Social Progress
PCX	Plastic Credit Exchange
PHILCESS	Philippine Learning Center for Environment and Social Sustainability
PRO	Producer Responsibility Organization
RA	Republic Act
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

Plastic pollution is a global problem that requires a comprehensive approach to address all stages of the plastic life cycle. It has reached alarming levels worldwide, with millions of tonnes of plastic entering the oceans each year.

The Philippines is one of the top countries contributing to plastic leakage, with low-value plastics dominating the waste stream. The country lacks the capacity to recycle high-value plastics, resulting in low recycling rates (Jambeck et al., 2015; WWF, 2020b). To combat this issue, the World Wide Fund for Nature Philippines (WWF) has identified Extended Producer Responsibility (EPR) as a critical policy tool to reduce plastic consumption and leakage to the environment. EPR holds manufacturers accountable for the end-of-life impacts of their products and encourages eco-design in the business sector. Especially for plastic packaging, EPR can be a tool that accelerates the transition from linear to circular business models. To determine if the intended outcomes of EPR are met, the key elements of successful EPR programs can be used as a basis. These include mandatory participation, scope definition, equal treatment of producers and importers, involvement of waste management operators, and government support.

While EPR has been institutionalized in the Philippines, there is a need for further guidance for producers, including micro, small, and medium enterprises (MSMEs) who may be obliged under the EPR Act. To address this, WWF has partnered with Philippine Learning Center for Environment and Social Sustainability of the University of the Philippines to conduct a case study as part of a working paper on EPR programs to inform stakeholders about the benefits, challenges, and opportunities of implementing an EPR with Producer Responsibility Organizations (PROs). As EPR programs grow from planning to execution, this working paper will be updated with learnings and insights.

The present case study highlights the EPR activities of a PRO, a buyback and collection program, and a co-processing facility. The interviewed organizations in this case study all highlighted the importance of partnering with local government units to increase support of households and waste pickers in the proper segregation and collection of plastic wastes. Intensifying information and education campaigns, both for businesses affected by EPR and the general public, are recommended to improve the effectiveness of EPR programs.

The respondents consider economic factors in their operations and pricing structures. The Philippines also faces significant challenges in solid waste management, especially with plastic waste. Implementing EPR programs, such as the one facilitated by PROs, shows that addressing these challenges can promote a more sustainable and circular economy.

Social assessment is then essential for the effective implementation of EPR programs. Public participation, education, and cultural considerations play a vital role in waste management behaviors. The EPR law expands stakeholder involvement and cooperation mechanisms, but challenges related to attitudes, public participation, and education remain. Creative ideas and region-specific measures are recommended to overcome these challenges and promote sustainable waste management practices.

- Addressing plastic pollution and promoting a circular economy requires a systematic and holistic approach. While the implementation of EPR in the Philippines through RA 11898 is still in its early stage, implementing EPR programs with PROs can hold producers accountable, increase recycling rates, and reduce environmental impacts (OECD, 2006). PROs that have a head start in implementing EPR-aligned programs can be a model for organizing the collection and processing of plastic waste. The adoption of standards such as the Plastic Pollution Reduction Standard (PPRS) can promote better coordination between different stakeholders in the reverse supply chain of plastics. To add, having a robust mechanism such as certification for the tracing and auditing of plastic waste will ensure that the intended social and environmental benefits of EPR are realized. The importance of involvement and support of communities and local government to the growth and success of EPR has also been underscored. Furthermore, implementing rules and regulations should be comprehensive enough to discourage perverse incentives and unintended outcomes such as freeriding.

The case study highlights the initial EPR initiatives in the Philippines and provides insights into the economic, environmental, and social aspects of EPR implementation. By addressing challenges, considering economic factors, involving stakeholders, and promoting public participation, the Philippines can move towards a more environmentally friendly waste management system, and ultimately, greater sustainability.

INTRODUCTION

A global transboundary problem, plastic pollution requires a systematic and holistic response for all stages of the life cycle of plastics. Plastic pollution has reached gigantic dimensions worldwide. Approximately 4.8 to 12.7 million tonnes of plastics enter the ocean yearly. This has been attributed to continuous plastic production and the lack of sound waste management, especially in low- and middle-income countries, such as the Philippines—the top 3rd country in the world for plastic leakage (Jambeck et al., 2015). **Plastic holds the third largest share in the overall generated waste in the Philippines at 2,150,000 tonnes p.a. in 2019** (WWF, 2020b); 62% of this are low value plastic (e.g. all kinds of flexibles like sachets), and high value plastics (e.g. PET, PP, HDPE) constitute about 37% of the country's plastic. **Thirty-five percent (35%) of the consumed plastics by Filipinos leak into the open environment while 33% are disposed of in sanitary and unsanitary landfills, with only 9% recycled because of the country's lack of capacity to recycle such high value plastics** (WWF, 2020b).

Approximately

4.8-12.7 MILLION TONNES

of plastic enter the ocean yearly

35% of consumed plastics by Filipinos leak into open environment

The World Wide Fund for Nature (WWF) has identified Extended Producer Responsibility (EPR) as a critical policy tool with a track record in holding manufacturers accountable for the end-of-life impacts of their plastic products and packaging, as well as encouraging holistic eco-design in the business sector. EPR schemes are increasingly recognized as an effective policy approach to tackle insufficient waste management and littering around the globe, with over one hundred (100) businesses supporting the Ellen McArthur Foundation Statement on EPR (2021).

In the Philippines, EPR has been institutionalized through RA 11898 with the implementing rules and regulations (IRR) released in January 2023 (as DAO 2023-02). However, the law and IRR themselves do not have all the guidance for producers and businesses, which has left many, especially the micro, small, and medium enterprises (MSMEs), unsure of the future outlook of having a mandatory EPR scheme in the Philippines.

Even prior to the implementation of the EPR law, the WWF has been one of the pioneers of advocating for EPR, and has pursued various efforts ranging from research and other publications to opening free and accessible online courses from collaboration with stakeholders to ensure its establishment in the Philippines (WWF, 2021).

WWF-Philippines has partnered with the Philippine Learning Center for Environmental and Social Sustainability (PHILCESS) of the University of the Philippines to conduct a case study for businesses to understand the impacts and benefits of EPR programs and to equip businesses with the necessary information and knowledge to the end of affecting support for EPR programs. Keeping in mind the EPR law is only at its outset, this case study report aims to showcase the practices that enable the feasibility and sustainability of Extended Producer Responsibility (EPR) programs implemented by Producer Responsibility Organizations (PRO) in the Philippines. The findings of this study are intended to inform stakeholders on the advantages, challenges and opportunities for implementing EPR programs with PROs.

This case study presents the EPR activities of Plastic Credit Exchange (PCX), a registered PRO. PCX partners with collection and processing facilities to track the takeback and diversion of plastic wastes. They issue plastic credits, which represent an equivalent amount of plastics diverted from waste, which can be bought by clients and obliged enterprises to meet their targets under RA 11898. One of the partners in this EPR program is the Aling Tindera program by the Friends of Hope organization which provides communities a center for plastics collection while also empowering local women. This case study also includes the Ecoloop program of Republic Cement which co-processes plastic waste into their cement kilns and acts as the final destination for non-recycled plastics. The Aling Tindera and Ecoloop programs both generate plastic credits for PCX.

CHAPTER 1

IMPLEMENTATION OF EPR IN THE PHILIPPINES

A. Current Legislation

The Ecological Solid Waste Management Act of 2000 or Republic Act No. 9003 was the national policy dedicated to govern waste control (Republic Act No. 9003, 2000) for the past two decades. It provides a comprehensive structure from national to barangay level to participate in solid waste management through segregation, collection and transport of solid wastes, recycling, composting, establishing waste management facilities, and others.

While a solid waste management policy is significant in protecting the environment and public health, it can be further strengthened through an Extended Producer Responsibility (EPR) policy which will help in solving the excessive plastic waste crisis faced globally today. To reiterate, solid waste management utilizes efforts that mostly focus on post-consumption rather than production where the scale of plastic generation takes place. Thus, with the implementation of EPR, greater responsibility is placed on the producers, therefore holding producers accountable for the full life cycle of their products (Republic Act No. 11898, 2022; WWF, 2022). EPR is aligned with the concept of circular economy which presents an alternative sustainable economic model for production. To further accelerate efforts towards environmental sustainability, RA 11898 or the Extended Producer Responsibility Act of 2022 is implemented as an amendment of RA 9003, providing more detailed provisions and institutional mechanisms (Republic Act No. 11898, 2022). Generally, EPR mandates large enterprises to eliminate products harmful to the environment and recover plastic waste they produced (Chapter III-A, Republic Act No. 11898, 2022).

Elimination strategies include reusing recycled materials in the production, redesigning, establishing product refilling systems, conducting educational campaigns, and others. Meanwhile, various recovery schemes are utilized such as buying their products back (or buy-back), collecting for reuse or recycling or redemption, cleaning up of wastes, establishing recycling, composting, undergoing thermal treatment, and other waste diversion or disposal facilities (Chapter III-A, Republic Act No. 11898, 2022). These reduction and recovery schemes must be in accordance with improving the product's reusability, recyclability, or retrievability. These are further expounded in Part V. Section 11. National Framework for EPR on Plastic Packaging Waste, where reduction activities and strategies as well as recovery programs are enumerated in the IRR (DAO-2023-02) (DENR, 2023). Overall, the implementation of EPR as a national policy has been a necessary development to urge producers to take responsibility for the products they manufacture, where protection of the environment does not solely rely on solid waste management.

EPR in other ASEAN countries

Various countries in the ASEAN region have adopted principles of EPR, and have integrated EPR schemes into policy (Johannes et al., 2021; Edita, 2022).

SINGAPORE: EPR frameworks were introduced in national legislation and master plans such as the 2019 Resource Sustainability Act (which includes the introduction of EPR for electronic waste) and the Singapore 2019 Zero Waste Master Plan—which aims to extend EPR regimes to the processing of packaging by the year 2025 (Bea and Low, 2019).

VIETNAM: New EPR schemes were introduced into policy in 2022, such as mandatory recycling frameworks for packaging waste management and products, and waste management frameworks for products that are difficult to recycle or cannot be recycled (Nguyen and Komarnisky, 2022).

THAILAND: Specific laws regarding EPR are currently at the drafting stage (Johannes et al., 2021).

INDONESIA: EPR principles are included in the Waste Management Law of 2008, which stipulates that producers hold responsibility for disposing packaging and products that are difficult to compost or cannot be composted. However, this specific legislation lacks further impact as it does not specify requirements or penalties (EPR Indonesia, n.d).

Levels of EPR implementation and integration within policy differ among countries in the ASEAN region. These differences include the inclusion and scope of programs, levels of integration within legislation and roadmaps, and timelines of implementation. Significantly, it must be noted that Kojima et al. (2009) contend that social, technological, and economic conditions, as well as other factors, must be considered in the introduction of EPR systems in developing countries. Johannes et al. write that factors related to these conditions account for the observed differences in EPR implementation across developing countries (2021, p. 690).

It is also important to note that the ASEAN region has several Producer Responsibility Organizations (PROs). PROs in the region include the Philippine Alliance for Recycling and Materials, the Thailand Institute of Packaging and Recycling Management for a Sustainable Environment, the Packaging Recycling Organization Vietnam, the Packaging and Recycling Alliance for Indonesia Sustainable Environment, and the Malaysia Recycling Alliance (Lee, 2021). In the Philippines specifically, there are currently eight PROs registered with the Department of Environmental and Natural Resources.

B. Existing programs in the private sector

Examining the private sector in the country, some organizations such as CEMEX, Nestlé, Unilever, L'Oréal, Mars, PepsiCo, the Coca-Cola Company, and H&M already have existing initiatives aligned with EPR principles. In the Philippines, Nestlé recovered 52 million kilos of plastic waste last July 2022 (Nestlé, 2022), aligning with IRR's Section 11.2 and 12.2 on recovery schemes (DENR, 2023). One of their initiatives includes the Bear Brand Tibayanihan project, providing 131 public schools in collaboration with the Department of Education over 12,000 benches and chairs made of upcycled Bear Brand packs (Nestlé, 2022). They have also invested in producing modules on solid waste management for students, and have collaborated with DENR for conducting training with LGUs. Their efforts correspond with the IRR's Section 11.1.5 and Section 12.1.5 on administering information and education campaign schemes, specifically on preparing guides on solid waste management and collaborating with academic institutions (DENR, 2023).

Alongside Nestlé, Unilever has also pledged to partake in EPR, advocating for a circular plastics economy (Unilever PLC, 2022). Their mantra and framework is "Less plastic. Better plastic. No plastic." which respectively means reducing plastic use, redesigning plastic that can be recycled or using recycled products (IRR Section 12.1.2), or adopting refilling stations and utilizing alternatives to plastic like paper, glass, or aluminum (IRR Section 12.1.3) (Unilever PLC, 2021; DENR, 2023). For instance, cutting down the weight of packaging or offering ultra concentrated products for less plastic are some of the ways to achieve this goal (Unilever PLC, 2021). This complies with IRR Section 12.1.4.3 which stipulates the reduction of the amount of material used in packaging (DENR, 2023). As of 2021, 53% of Unilever's packaging is recyclable, reusable, or compostable, and have been incorporating post-consumer recycled plastic (PCR) equivalent to 17% of their total plastic footprint (Unilever PLC, 2021). Some of Unilever's particular programs regarding EPR include investing in the Flexible Plastic Fund, which intends to search for better flexible packaging solutions to eliminate plastic that is not recyclable through partnering with other brands such as Mars, Nestlé, and other plastic manufacturers, and even

recyclers and retailers. Flexible packaging solutions are imperative especially for plastics like sachets which are accessible to low-income consumers. Sachets contain various layers, demanding immediate remodeling of their material. This follows IRR's Section 12.1.1.2.4. on enhancing the design of packaging materials. To follow their 'no plastic' route, Unilever also offers plastic-free packaging and products (Unilever PLC, 2021).

Although these are not necessarily their efforts for compliance to EPR law, Nestlé and Unilever declare that their motivations are to mitigate plastic pollution and move towards a circular economy.

Aside from the desire to reduce plastic waste, they are also incentivized by the implementation of EPR act to practice enhancing recycling facilities, redesigning plastic and packaging, finding efficient ways of collection and recovery, educating consumers, and coordinating with various stakeholders such as governments, international companies, research and development institutions, and others. Sections 11 and 12 of the IRR released by DENR may be used as a guide for these EPR schemes. Institutionalizing EPR as a national policy compels companies to take account and explore diverse strategies to significantly reduce plastic waste.

C. Mechanisms of implementation

EPR programs are implemented through various mechanisms. The Implementing Rules and Regulations (IRR) of RA 11898 enumerates three (3) types of mechanisms. These are: Obliged Enterprises, Collectives, and PROs. Table 1 differentiates these three types of mechanisms.

Table 1. Mechanisms of EPR

MECHANISMS	OBLIGED ENTERPRISES	COLLECTIVES	PRO
Definition (IRR, 2023)	Large enterprises (or MSMEs whose total value of assets of all enterprises carrying the same brand, label, or trademark exceeds that of medium enterprises) that generate plastic packaging waste and are required to implement an EPR program under the 2022 EPR Act.	Group of obliged enterprises that organize themselves, not as a PRO, to implement a common platform for their EPR programs.	Voluntarily formed organizations or organizations that are authorized by obliged enterprises who serve as the platforms to implement enterprises' EPR programs.
Reasons for Utilizing Mechanism (OECD, 2016)		Collective systems of EPR implementation are utilized for several reasons: to generate economies of scale or density and reduce costs for participants, to share risk among participants, to reduce free-riding, to simplify operations and reduce administrative burdens, and to provide a means for governments to manage waste by orphan products.	PROs are enlisted by producers as third-parties because it may otherwise not be practical, economical, or feasible for producers to manage and collect post-consumer products, or take back their own products under take-back programs.

It must be noted that the IRR states that when a collective or PRO fails to meet compliance targets, it shall cooperate with the Philippine Accreditation Bureau in identifying its non-performing member-Obliged enterprise/s that may be held liable under the EPR act. If the collective or PRO refuses or fails to disclose its non-performing members, all members thereof shall be liable for the shortfall and accorded the penalties (IRR, 2023, p. 41-42). These penalties are further discussed in Chapter 4 of the case study.

Finally, the United Nations Environment Program (UNEP, 2018) also distinguishes between individual and collective EPR systems. In individual systems, the producer is responsible for collection and disposal of their products after it has become waste; in collective systems producers do not have a direct relationship with collecting and disposing of products after they have become waste (UNEP, 2018). The following section explores the programs that exist within these systems and through these mechanisms in greater depth.

Additionally, the National Framework for Extended Producer Responsibility, mandated in RA 11898, establishes the range of actions that EPR programs can implement. The framework urges all sectors to reduce the utilization of environmentally harmful products or materials and to redesign products with the aim of enhancing their reusability, recyclability, or recoverability (Republic Act No. 11898, 2022).

The law lacks clarity in differentiating between reuse, recycling, and reduction of plastic product footprint, as it primarily focuses on "recovery" without specifying the scope of measurement. There is ambiguity regarding whether the term "plastic footprint" encompasses plastic sales volume or extends to all manufactured and imported products. Achieving a balanced recovery of the plastic product footprint requires considering both upstream and downstream measures (UNEP, 2022). In Chapter 5 Section B, a more thorough discussion about plastic footprint definition, calculation, and dimensions leading to a metric in a general sense can be read.

The reporting on the recovery of the plastic product footprint shall be presented using these three categories:

- Reduction of unrecyclable, unnecessary, and single-use plastic packaging
- Increase the recyclability of plastic packaging
- Increase the reuse of recyclable plastic packaging.

The obliged enterprises (OEs) are required to establish a baseline value for the current volume of their plastic packaging during their initial registration to the Extended Producer Responsibility (EPR) program. This baseline value serves as a starting point for reporting. Additionally, any subsequent expansion of the enterprise resulting in an increase in plastic packaging production and volume must be registered in the following reporting year.

CHAPTER 2

EPR PROGRAMS

A. Goals and objectives of EPR programs

Based on the Extended Producer Responsibility Act of 2022, the goals of EPR initiatives are to achieve circular economy and plastic neutrality through establishing significance on producer's responsibility. Circular economy is an economic model based on reduction, reusing, recycling, and recovery that allows a closed-loop production, where waste is already managed in the production phase rather than solely during post-consumption (Republic Act No. 11898, 2022). Even better, waste and potential waste are already eliminated during the production. A circular economy model thus requires the development of resources to increase their efficiency and productivity, and obliges formation of new business models (Ekins, 2019). On a national level, this compels legislation of policies from which the EPR act is established. As Ekins (2019) demonstrated, studying circular economy involves the flow of materials and the economic conditions that produce such flow.

In this regard, plastic neutrality can be a measurement of success in waste reduction and management. In fact, the EPR law holds plastic neutrality as one of its principles, where the goal is the amount of plastic recovered is the same as the amount of plastic produced (Republic Act No. 11898, 2022). Plastic neutrality and circular economy are deeply intertwined with one another. Beyond compliance with the law, various companies in the country are also motivated to mitigate harmful impacts to the environment and are inspired to move towards plastic neutrality and a circular economy.

While it is obvious that EPR has primarily environmental aspirations, there is also greater aim towards unburdening local government units and reaching out to the informal sector who are largely the actors of waste diversion in the country. This means ensuring that producers and all stakeholders, government, the informal sector, and the like, participate in creating a circular economy. From a business perspective, this also provides the opportunity for producers to explore ways to cut down project costs in their EPR strategies such as reducing plastic packaging, redesigning packaging in ways that use less resources, and establishing cost-effective collection system, and other financial incentives written in the Philippine EPR law (see Chapter 4). EPR programs of various corporations have demonstrated their commitment to plastic neutrality as a means to achieve a circular economy, and a goal in itself. While these goals are environmental, they also contribute to social sustainability. Indeed, working towards sustainability means exhausting interdisciplinary efforts to achieve it.

Goals and objectives of EPR

- Achieve circular economy and plastic neutrality
- Unburden local government units
- Reach out and integrate informal secto
- Explore cost-efficient ways to produce and recover plastic

B. Elements of EPR programs

To achieve these goals and objectives, identifying and strengthening each element of EPR programs are imperative. The WWF (WWF-Philippines, Inc., cyclos GmbH, & AMH Philippines, Inc., 2020) enumerates several key elements of EPR programs:

- Being mandatory or voluntary
- Scope
- PROs
- Producers and Importers
- Waste management operators
- Government/defining targets and responsibilities

Examining these elements further, participation in EPR systems and programs can either be done voluntarily by companies, or are required and obligatory. It should be noted, however, that WWF's briefing for implementation of EPR in businesses and governments identified that voluntary schemes are not as powerful as mandatory schemes, but are still significant (WWF, 2020a). In terms of scope being a key element, EPR programs and schemes must identify coverage—whether it covers all packaging or specific packaging and products. These products and packaging must also be clearly identifiable and assignable. Third, another key element of EPR programs are PRO setups, varying in terms of responsibilities depending on effectiveness and efficiency. Additionally, other key elements of EPR schemes are producers and importers—the WWF emphasizes that producers and importers must be treated equally to ensure a level playing field. Additionally, waste management operators are key elements of EPR programs: stakeholders who collect, sort, and recycle waste, and receive funds for the service of treating materials. The final key element of EPR schemes are government and defining targets and responsibilities—in cases of mandatory systems, EPR schemes must be defined in law. Moreover, targets and legislation regarding EPR must be clear, unambiguous, and must consider factors such as feasibility, infrastructure, geographic and demographic factors, and waste management system (WWF Philippines, Inc., cyclos GmbH, & AMH Philippines, Inc., 2020).

The WWF has previously made recommendations for these elements in 2020, in a context prior to the passage of the EPR law in the Philippines (WWF-Philippines, Inc., cyclos GmbH, & AMH Philippines, Inc., 2020). Nonetheless, some of the organization's recommendations are relevant to the practice of EPR, as well as in future iterations of laws related to EPR. These include underscoring transparency and avoiding corruption on the part of producers and importers. For the government, the WWF recommends enacting mandatory laws, regulation, and rigid enforcement mechanisms. Finally, on the part of waste management operators, the organization recommends a hybrid model involving PROs and Local Government Units.

With the recent introduction of RA 11898, it can be said that much still remains to be observed—especially with regard to the EPR models adopted by PROs, Local Government Units, and other stakeholders, as well as the very implementation of legislation regarding EPR. Further, according to the The EPR System and Policy Landscape Extended Producer Responsibility (EPR) Law Toolkit 1 for the Philippines by the UNEP and the WWF, EPR programs should include both upstream and downstream solutions. The toolkit underscores that the implementation of EPR and the fulfillment of its objectives is a balance of both upstream and downstream measures.

Upstream measures include adopting strategies and investing in technologies that can reduce and eliminate the harmful environmental impacts of products. Some programs relating to these are eco-design, redesigning products and materials, improving product design, plastic reduction, substitution, reducing the use of unrecyclable, single-use, and unnecessary plastic packaging, reusing recyclable plastic packaging materials, and providing alternative product delivery. Downstream measures meanwhile, are post-consumer—and center on developing end-of-life waste management. This includes reaching recovery rates, recycling, and disposal. (WWF Philippines, UNEP, et al., 2022, p. 6, 9, 14, 16, 19, 28).

Additionally, the Philippine IRR on RA 11898 enumerates several components of EPR programs. These include information on: the specific type of packaging materials and the product brands for which they are used, verifiable weight, target weight of plastic packaging footprint to be recovered and diverted, other EPR programs, labeling of packaging materials, status of implementation, and status of compliance. The full details regarding these are found in DENR Administrative Order 2023-02.

C. Challenges and barriers for EPR programs

Since EPR programs and legislation are fairly recent to the Philippines, most data regarding challenges and barriers are limited to international contexts. Such recent implementation of EPR in the country means it has its own challenges that may not be documented yet. A 2014 global forum, organized by OECD (2014) in Japan with other countries who have long standing EPR frameworks, illustrates the following challenges and barriers for EPR programs: governance and administrative, economic, issues specific to EPR start-up phases, and new and emerging issues. In addition to that, other challenges that emerged from the COVID-19 pandemic are shown in Figure 1 (Salman et al., 2021).

Governance and administrative challenges

- Unclear and overlapping roles and responsibilities of different sectors, including the relationship between public bodies and PROs
- A lack of transparency and difficulties in the comparability of data
- Concerns with free-riding
- A lack of enforcement mechanisms
- Concerns with collective schemes (PROs)

Issues specific to EPR start-up phases

- Informal waste management sector and social challenges
- Waste leakage
- Orphan products and free riders
- Absence of a business framework that is conducive to investment

Economic challenges

- Trade and competition concerns with:
  - Product market competition
  - Competition among PROs
  - Competition among PROs and waste collection markets
  - Competition between PROs and recycling/recovery providers
- Difficulty to implement differentiated fees and lack of incentives for Design-for-Environment (DfE)
- Different understandings of full cost recovery
- Difficulty to assess the cost effectiveness of EPR policies

New and emerging issues

- Internet sales by-passing EPRs
- Increasing export of waste and used products
- Whether and how to extend EPR schemes to cover new products as well as strategic materials, and components
- Whether and how to address waste prevention in EPR policies
- Waste as a valuable resource changes the rationale for EPR
- Diversity of stakeholders involved
- Cost and time implications for EPR policy establishment and enforcement
- Complexity in implementation of EPR regulations
- Modification inbuilt facilities and health and safety issues

Figure 1. Challenges and barriers to EPR implementation (OECD, 2014; Salman et al., 2021)

Emphasis on unclear and overlapping roles and responsibilities of various stakeholders pose risks to EPR programs since each corporation has their own pre-existing schemes in policy, waste management practices, or even objectives; thus, these urge policy makers to ensure that assignment of responsibilities to different roles are definitive, not overlapping, and without any loopholes (OECD, 2014). An example of this challenge is the vague definition of obliged enterprises or even the term “producer”. While developed countries have their own industries and can easily determine their own plastic producers, for developing countries, this is not as easy as they are mostly importers of plastic rather than producers (Edita, 2022). As concluded, this makes importers feel less responsible over waste management (Edita, 2022). While the 2001 OECD Guidance claims that a producer may include both the brand owner or importer, some countries like Indonesia utilize other terms to define a producer such as ‘stakeholder’ to ensure that other actors are involved (OECD, 2014).

Nevertheless, the Philippine EPR law distinguishes producers from importers. Specifically, product producers could either be brand owners and product manufacturers or importers, whose brand name affixed to the commodity is deemed as the producer (Republic Act No. 11898, 2022, Section 3). Importers on the other hand refer to “a natural or juridical person engaged in bringing consumer goods into the Philippines” (Republic Act No. 11898, 2022, Section 3). These are important distinctions made in the EPR policy.

Clearly defining obliged enterprises is necessary to determine whether they are importers or producers. While each has their own respective responsibilities and obligations, the unclear delineation of roles poses risk to the success of EPR programs. This may also cause and reinforce freeriding practices, thereby allowing freeriders to bypass regulations (OECD, 2014). Those who are not included in the definition of obliged enterprises permit non-compliance of those who utilize large amounts of plastic packaging such as courier services, but are not covered by the EPR law. All these may be attributed to a weak or lack of enforcement mechanisms (OECD, 2014). Overall, there are several challenges in implementation of EPR, but through constant collaboration, such barriers can be overcome.

The OECD list of challenges and barriers to EPR programs also resonate with the recent publication of The World Bank (2022b). Given that the Philippine EPR law focuses on plastic packaging, the World Bank’s study on EPR schemes for packaging, which is based on Asia-Pacific countries, is more apt in the context of the country. Table 2 shows the challenges to EPR schemes for packaging (World Bank, 2022b, p. 23-24).

Concrete examples of these challenges on EPR schemes for plastic packaging are discussed in the following chapters. Chapter 3 provides the EPR challenges by the interviewed organizations. Chapter 4, 5, and 6 discusses these barriers in terms of its economic aspects, environmental aspects, and social aspects respectively.

Table 2. Challenges to EPR schemes for Packaging (World Bank, 2022b)

CHALLENGES TO EPR SCHEMES FOR PACKAGING	
Regulations and monitoring	• The responsibilities and tasks are not clearly defined • Competing legislation of the involved ministries and agencies • Fees are not spent on EPR tasks but spent as part of the general public expenses or as part of public funds • Monitoring agencies are not experienced with document verification and control of verifications • Undeveloped certification schemes • No transparency to the public • No monitoring and controlling in place • No cooperation with the industry • Individual actors quarrel and compete with each other • Corrupt public actors and decision makers

Table 2 (CONTINUED)

CHALLENGES TO EPR SCHEMES FOR PACKAGING	
Producer responsibility organization (for waste management subject to EPR legislation)	• PRO does its work insufficiently • No experience regarding databases, balances, tenders and contracts • Is corrupt and accepts corruption payments • Does not or insufficiently builds up the EPR system • Does not control any services or tasks of the involved actors
Producers and importers	• The companies do not regard existing recycling capacities in their packaging and/or product design, thus putting goods on the market that cannot be recycled within the respective member economy • Do not work within environmental standards and/or social welfare standards • For EPR systems: The obliged companies are not registered and do not pay their fees • The companies do not know the quantities and exact material fractions of their packaging • Companies import illegally • For EPR systems: Corrupting the PRO to pay less fees for waste subject to EPR legislation
Waste management operators – collection, recycling	• The collection points are unclear and hardly accessible • Do not build up a good waste infrastructure • Do not fulfill their contracts • Corrupting the PRO • Do not inform the public • Do not work within environmental standards and/or social welfare standards • Do not conduct or conduct false mass flow balances • Informal sector is not integrated and works “against” or outside the system
Consumer – purchases through distributor and later disposal	• No environmental awareness or education • Low level of education • No access to collection systems • Not informed about the system

D. Characteristics of successful EPR programs

Nonetheless, these challenges can be directly overcome by a successful EPR program. Below is a list of characteristics that make EPR programs successful according to the Legal Framework Study of Extended Producer Responsibility of cyclos GmbH (2019). These characteristics are mostly related to EPR program policies and stakeholders. While there are various EPR programs for different kinds of products, the scope of Philippine EPR legislation involves plastic packaging. For further discussion on EPR in relation to plastic packaging and the Philippine context, the following chapter will discuss the EPR supply chain in the Philippines. It can be said that EPR policies centered on plastic packaging can be deemed successful if stakeholders have exact knowledge of plastic quantities and material fractions, if there are clear and accessible collection points and systems for plastic, and if plastic is separated according to regulations (Legal Framework Study of Extended Producer Responsibility by cyclos GmbH, 2019).

Figure 2. Characteristics of Successful EPR programs (Legal Framework Study of Extended Producer Responsibility by cyclos GmbH, 2019)

The introduction of the RA 11898 has stipulated that obliged enterprises are required to have EPR programs. The following sidebars summarizes the characteristics of an obliged enterprise under the law, as well as some benefits of adopting an EPR program.

CHECKLIST

If you check 2 or more boxes, your organization may be an obliged enterprise—further consultation is recommended.

Is My Organization An Obliged Enterprise?

(IRR, 2023; RA 11898, 2022)

- ☐ It is an enterprise that generates plastic packaging waste
- ☐ It is not a micro, small or medium enterprise defined under Republic Act No. 9501
  - ☐ The total value of assets of all enterprises carrying its brand, label or trademark exceeds that of medium enterprises stated under Republic Act No. 9501
  - ☐ Its total assets, inclusive of those arising from loans but exclusive of the land on which the particular business entity's office, plant, and equipment are situated, are exceeding that of medium enterprises stated under Republic Act No. 9051
- ☐ It is an MSME, but the total value of assets of all enterprises carrying the same brand, label, or trademark exceeds that of medium enterprises as prescribed by Republic Act No. 9501
- ☐ It is a brand that sells or supplies any commodity under a brand, label, or identity using a product it produced, or a material supplied to it by another manufacturer or supplier
- ☐ It is a Product Manufacturer or Importer that supplies its commodities for the use of the general consumer, or distributes the same as a material product of a brand owner
  - Provided, that as amended by the EPR Act of 2022, in case the commodities are manufactured, assembled, or processed by a product manufacturer for another Obliged Enterprise which affixes its own brand name, the latter shall be deemed as the manufacturer.

Nonetheless, **all enterprises are encouraged to practice EPR voluntarily, or to be part of networks, collectives, and PROs practicing EPR**. The benefits of adopting EPR programs are outlined in the sidebar below.

BENEFITS OF EPR PROGRAMS (IRR, 2023; OECD, 2016)

- Fiscal Incentives
- Tax Incentives
- Tax and Duty Exemptions
- Other various rewards and recognitions
- Reducing waste disposal
- Increasing recycling
- Increasing technological and organizational innovation
- Diversifying sources of material supply
- Resource security
- Better organization of supply chains

CHAPTER 3

AN EPR SUPPLY CHAIN

Having discussed an overview of Extended Producer Responsibility, an analysis of the EPR supply chain (i.e., a system of people, organization, activities, information, and resources involved) will offer a view of how EPR is operationalized. With the EPR Act, each component of a supply chain, including the regulatory agencies, is compelled to work towards the goals of EPR. Hence, manufacturers and businesses are becoming more proactive on the management of the entire lifecycle of their products. Their efforts toward the circular economy through recycling and recovery programs motivated producers of all sizes to be stewards of a better environment. EPR as a supply chain requires interdisciplinary efforts, and may only be successfully achieved through constant collaboration of all stakeholders.

Extended Producer Responsibility is an essential concept and policy approach aimed at addressing the challenges associated with plastic waste. This chapter begins with an examination of the steps involved to register and participate in EPR. Next, to give a glimpse of how EPR can work in a supply chain, this study conducted interviews with Plastic Credit Exchange, Friends of Hope with emphasis on their Aling Tindera project, and Republic Cement about their recovery arm, Ecoloop. Below is a brief discussion of these organizations, challenges and barriers they encountered, how they overcome these challenges, and attain accomplishments in relation to EPR.

PHILIPPINE ENVIRONMENTAL MANAGEMENT BUREAU

The Philippine Environmental Management Bureau (EMB) was formed to support the Department of Environment and Natural Resources (DENR) in mitigating pollution. The EMB is mandated to set standards for water and air quality. They also monitor the sources of pollution and manage hazardous and toxic wastes.

One of the programs of EMB is Solid Waste Management. They implement the rules and regulations (IRR) of the Environmental Planning Act of 2013 and the republic Act 11898 or the Extended Producer Responsibility (EPR) Act of 2022. The IRR provides a step-by-step process for the registration of the EPR for the obliged enterprises, collectives, and Producer Responsibility Organization (PRO). The EMB is tasked to oversee the registration, compliance, and audit of OEs according to the EPR Act.

REGISTRATION AND COMPLIANCE

Under the provisions of Republic Act No. 11898, companies have the option to implement EPR programs individually or through partnerships with other stakeholders to enhance their efforts. They may also choose to join a Producer Responsibility Organization. Obliged Enterprises, including brand owners who sell or supply commodities under their brand, are responsible for complying with the regulations outlined in Sections 44-E to 44-H of the law.

Obliged enterprises are required to participate in the EPR program, while smaller enterprises are not obligated but strongly encouraged to do so. These enterprises must establish EPR programs specifically for their plastic packaging within six months of the law's implementation and register these programs with the National Solid Waste Management Commission. Furthermore, they are obliged to measure their annual plastic packaging footprint and achieve diversion targets set by the law. By the end of 2023, they need to demonstrate recovery and diversion of 20 percent of their 2022 plastic packaging footprint; 40 percent by 2024, with a 10 percent annual increase up to 80 percent by 2028 and onwards.

To ensure transparency and accuracy, companies must submit annual compliance reports audited and assured by an independent third-party auditor. These reports should encompass various aspects, such as the company's plastic packaging footprint, the quantity of plastic recovered, the recovery rate, and adherence to the EPR program standards established by the Department of Environment and Natural Resources.

Compliance with the EPR law can be achieved through multiple methods, including recovery schemes, recycling initiatives, responsible transport of plastic waste to appropriate processing or disposal sites, cleanup efforts for plastic waste leaked into coastal areas, public roads, and other locations, establishment of large-scale recycling or waste diversion facilities, as well as partnerships with LGUs, communities, and the informal waste sector to recover plastic waste. Incentives and penalties will be discussed further in the next Chapter (Chapter 4)

Initially, February 2023 was set as the deadline of the registration of EPR. OEs must submit their EPR programs. According to the DENR (DENR, personal communication, May 16, 2023) there are eight registered PROs. These are:

- The Philippine Alliance for Recycling and Materials Sustainability (PARMS),
- Plastic Credit Exchange (PCX),
- Polystyrene Packaging Council of the Philippines,
- Tritek Reverse Logistics Corporation,
- Philippine Business for Social Progress (PBSP),
- Greencycle Innovations Incorporated,
- Cleanway Environmental Management Solutions Incorporated, and
- Vic Metal Fabrication and Environmental Services Incorporated.

There are also 8 collectives registered with the DENR. Latest reports indicate that out of 4000 expected OEs, only 600 have registered and complied with the EPR Act (Bosano, 2023). As of writing, the EMB is still accepting the registration applications (DENR, personal communication, May 31, 2023).

PLASTIC CREDIT EXCHANGE (PCX)

About the organization. Drawing from the success of the Hope in a Bottle program, Plastic Credit Exchange was launched to take on the challenge of managing global plastic waste (PCX Group, 2022b). Founded in the Philippines, PCX works with businesses, local communities, and the government by maintaining a platform where they can purchase and offset plastic credits. To do this, PCX built a network of partners who recycle, co-process, and recover plastic waste with the same goal of establishing a circular economy. PCX is one of the eight PROs that initially registered with EMB. Aside from their offices in the Philippines, Singapore and USA, their operations have extended to ten countries with significant plastic pollution.

How it works. PCX collects its waste from local communities all over the Philippines through their Aling Tindera partners (collectors) from which plastic credits are purchased. Once the collection points are filled, the partners of PCX then transport all the plastic wastes to their partner processing facilities. Wastes are then divided into three categories: wastes to be recycled, wastes to be upcycled, and wastes to be co-processed. The recyclable plastics are sent to facilities and are converted to reusable plastic materials. On the other hand, the plastics that cannot be recycled are sent to facilities and transformed into more useful or valuable materials. End-of-life plastics are sent to partners who use plastics as alternative fuel to coal in waste-to-energy operations. Process flow is shown in Figure 3.

The Plastic Credit Exchange represents a comprehensive EPR strategy for plastic waste management. By setting goals, executing viable reduction strategies, auditing plastic footprint, activating their ecosystem, verifying and tracking impact, and providing certifications, PCX demonstrates how EPR can be implemented in supply chain management (PCX Group, 2022a). PCX highlights that their varied approach ensures their accomplishments in plastic waste reduction.

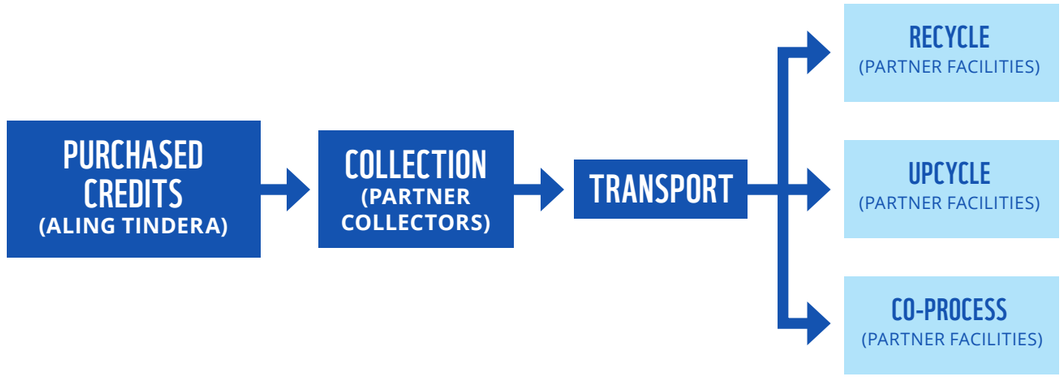


Figure 3. Process Flow Diagram of PCX Pollution Reduction (Plastic Credit Exchange, 2022a)

Challenges and barriers. From the personal correspondence with PCX representatives (Plastic Credit Exchange, personal communication, March 28, 2023), some challenges in implementing EPR include the following:

- inability to determine whether a producer or brand is an obliged enterprise,
- lack of monitoring,
- consumers' economic limitations,
- unequal advancement on sustainability practices across various companies ranging from highly advanced (strong documentation and auditing, eco-labelling, etc.) to no sustainability effort at all.

Moreover, even if EPR law is already in place, there are still no clear standards governing different stakeholders.

Additionally, the lack of documentation poses risk to the traceability of their plastic footprints, rendering enterprises vulnerable to committing harmful environmental practices such as not following standards and perpetuating the danger of double counting impacts. Some OEs also lack the knowledge of what relevant data to collect for documentation. Documentation implies compliance, thus it is imperative in ensuring EPR success. This also calls for establishing a national registry to ensure control and cease abuses and corruption. Moreover, it was shared that there are some concerns from companies that are wary of additional audits from government agencies.

These challenges are consistent with some of the governance and administrative barriers as well as issues specific to EPR start-up phases listed by OECD (2014) such as unclear and overlapping roles, difficulties in comparability of data, absence of a business framework, concerns with free-riding, and lack of enforcement mechanisms.

Given that the data from OECD (2014) are from international contexts, there are some challenges noted by PCX Group that are not included. One of which would be the lack of infrastructure in the Philippines. The lack of recycling facilities, education, roads, access to aggregators, properly managed and engineered landfills, expensive costs, and many other factors contribute to inefficient implementation of EPR (Plastic Credit Exchange, personal communication, March 28, 2023).

In addition to that, PCX also notes that the informal sector is an integral part of sustainability, but is not recognized nor valued. Some cultural beliefs and practices also inhibit sustainability practices. These will be further discussed in Chapter 6.

PCX mentions that they overcome these barriers by providing access to obliged enterprises and other stakeholders to other partners and connecting them with one another. PCX personalizes their service depending on the needs of their client. These are in line with the collaboration and cooperation needed within EPR systems for successful implementation and accomplishment.

EPR Accomplishments. PCX reports that their commitment to extended producer responsibility for plastic waste has yielded notable accomplishments, showcasing the impact of their initiatives. Particularly, the organization has aligned its accomplishments in relation to the United Nations Development Goals such as clean water and sanitation (SDG 6), sustainable cities and communities (SDG 11), life below water (SDG 14), no poverty (SDG 1), decent work and economic growth (SDG 8), sustainable cities and communities (SDG 11), and responsible consumption and production (SDG 12) (PCX Group, 2022a).

The organization's published global accomplishments include diverting a total of over 38,000 tons of plastic waste, investing a total of more than 3.3 million USD into the plastic waste circular economy (allocated for education, infrastructure and negative tonnage initiatives), and achieving an estimated carbon reduction of 64,000 tonnes through their coal replacement efforts.

Finally, through the organization's Aling Tindera partnership program, PCX partners with women micro-entrepreneurs, providing women with the necessary infrastructure, knowledge, and support to collect and purchase plastic waste from their communities. This program will be further discussed in the following section of the paper.

FRIENDS OF HOPE – ALING TINDERA PROJECT

About the organization. PCX's waste-to-cash program, Aling Tindera, is a community collection program that diverts waste plastics while generating income for communities (PCX Group, 2022a; Generation Hope, 2020). It was launched in 2020 by the Friends of Hope organization and has several sites in NCR, Regions IV-A, VII, and XI. To date, the Aling Tindera program has 129 sites around the country, encouraging engagement of women micro-entrepreneurs. Aling Tindera aims to foster behavior change through educating the public about plastic waste management responsibility and prompting communities to be actively involved in the clean-up of waste plastics.

How it works. Friends of Hope (FOH) establishes infrastructure for collecting and buying plastic waste from the community for Aling Tindera partners (Generation Hope, 2020). Through the partnership of local government units and communities, the Friends of Hope allows open nomination of Aling Tindera partners in various locations (Generation Hope, 2020).

Challenges and barriers. According to Friends of Hope (Friends of Hope, personal communication, April 18, 2023), navigating through differing levels of progress between one location to another is their constant challenge. They noticed that the kind of leadership of the governing unit dictates such progress in terms of their sustainability efforts. Leadership is key to spreading the message of waste management. This is similar to the challenges noted by PCX, and resonates with the government and administrative challenges in OECD (2014).

In terms of participation, Friends of Hope notes that Materials Recovery Facilities (MRFs) are more interested in partnering with FOH for financial aspects rather than environmental impacts. Notably, communities from metropolitan areas comply more compared to those in provinces. This has been identified as an opportunity for institutional mechanisms of EPR act to provide greater incentives and encourage participation.

The lack of processors is another constraint to the supply chain linkages (from businesses to processors). The inter-island transfers of waste is difficult because Aling Tindera projects or collection points happen in rural areas, while the processors are located in urban areas. It was pointed out that shipping waste internationally is cheaper compared to shipping locally. These may be considered as issues related to start-up phases particular to the material conditions of the Philippines.

Finding potential partners who have resources to participate in this program is another challenge. Some were not interested in being an Aling Tindera because they find it tedious to clean the waste they collect. Additionally, there are certain types of plastic that are not accepted, therefore, not paid for.

Lack of information and education was also noted by the organization, and will be discussed in Chapter 6. Investment related challenges will be tackled on Chapter 4.

Notably however, according to the Friends of Hope, (Friends of Hope, personal communication, April 18, 2023) these challenges have been partly overcome through proper leadership and forging partnerships with other organizations that share the same passions and advocacies, and are equipped with technical knowledge and space that can address these challenges. According to the organization, having support from local organizations and partners also allows the organization to better spread their program's message. These can all be related to the characteristics of successful EPR programs discussed in the previous chapter including characteristics of collaboration, cooperation, experience, having proper infrastructure, and being well-equipped (cyclos GmbH, 2019).

The organization, meanwhile, notes that their biggest success indicator is the number of Aling Tindera sites, as well as the amount of plastic that has been diverted through the program and the amount given back to their community partners.

EPR Accomplishments. To date, Aling Tindera has 129 total sites with a total community revenue of 3.5 million PhP (Generation Hope, 2023). The program has claimed a carbon reduction of 1.8 tons through coal replacement. A total of 1,477 tons of plastics has also been diverted by the program through co-processing, recycling and upcycling (PCX Group, 2023). Finally, the program has also given opportunities to their partners, who are all women micro-entrepreneurs, through their partnerships with local communities. They report that their partner micro-entrepreneurs see an average income increase of 35%.

ECOLOOP

About the organization. Ecoloop is the resource recovery arm of Republic Cement, and places itself in the supply chain as a waste diverter (Republic Cement, 2015). The organization manufactures cement through co-processing and using plastic wastes as alternative fuel instead of coal. By partnering with fast moving consumer goods (FMCG), local governments, and manufacturers, they collect pre-and post- consumer waste, thus effectively addressing the crisis in plastic pollution. Currently, Ecoloop has 30 public and private partners in the Philippines but is not itself a PRO.

How it works. Ecoloop's co-processing promotes the reduction of coal use in cement production by partially substituting plastic waste as a fuel (Republic Cement, 2015). The recovered heat content from the waste collected partially replaces the traditional heat from fossil fuels. Some recovered minerals also replace some raw material used in the production of cement. Ecoloop receives plastic waste from collectors or directly from partner businesses at several cement plants around the country. Each delivery is tested to determine the appropriate conditions for feeding into the cement kilns. Upon confirmation of the processing of plastic waste, the partner businesses can claim plastic credit.

Challenges and barriers. Ecoloop identifies the following challenges:

- vague definition of 'obliged enterprise' in the law,
- participation of LGUs and OEs,
- segregation at source,
- type and quality of materials collected,
- density of waste, and
- lack of workforce for each part of the process (from collection, transportation, quality assurance, to processor).

The challenge of vague definition of obliged enterprises was emphasized in Chapter 2, and it really is a deciding factor for enterprises to fully participate in EPR. This way, they are informed of their responsibilities and avoid overlapping roles with other actors. Furthermore, Ecoloop shares the same sentiments with Friends of Hope regarding the need for participation of LGUs and OEs as key actors of implementing sustainability practices (Republic Cement, personal communication, April 24, 2023).

On the technical side, segregation at source, density of waste, and the type and quality of materials also hamper EPR efforts because the existing infrastructure cannot take on high amounts and certain types of waste. Lastly, every step of the process requires trained manpower which the Philippines currently lack. Capacity building programs will be necessary if the country is to take EPR implementation further (Republic Cement, personal communication, April 24, 2023).

Ecoloop overcomes some of these challenges and barriers by targeting partners that have segregation practices and are willing to invest in such. The organization has also expressed that it hopes more local government units become willing to segregate and divert waste from landfills, and to make the investment to segregate and sort at materials recovery facilities. These are all directly in line with the need for accessible and established infrastructure, systems, and collection points, and well-equipped facilities and organizations for successful EPR implementation (cyclos GmbH, 2019). Moreover, Ecoloop has expressed that coverage in some regions, such as Pampanga, have been successful due to leadership, investment, and support from the local government, and improvement of local infrastructure such as materials recovery facilities, bailers, and sorting lines. Currently, Ecoloop works with around 30 partner local government units.

EPR Accomplishments. The organization currently has over 30 partnerships across the Philippines. They declare that the co-processing program conserved non-renewable resources as they use plastic wastes as replacement for a less fossil fuel consumption. Through this, less carbon dioxide and greenhouse gasses were emitted. They position Ecoloop as the pioneer of co-processing in the Philippines and have 5 integrated power plants nationwide (Republic Cement, 2015).

OTHER PROS REGISTERED UNDER RA 11898

Aside from PCX, other PROs are also establishing their EPR programs and gathering member OEs. Two of the larger organizations are the Philippine Alliance for Recycling and Materials Sustainability (PARMS) and the Philippine Business for Social Progress (PBSP).

The mission statement of PARMS (PARMS, 2015), a non-stock non-profit organization, states that they aim to develop and implement a holistic and comprehensive program to increase resource recovery and reduce landfill dependence toward zero waste. PARMS promotes their 'Zero Waste to Nature Ambisyon 2030' (ZWTN) roadmap as a basis for their EPR program. Their approach is summarized in 4R: reduce, reuse, recover, and recycle. They have also developed the Plastic Footprint and Waste Diversion Accounting standards as a key tool for EPR. Similar to PCX, PARMS invites OEs, volunteers, waste diverters and third-party auditors to join their EPR program through an online portal. Several capacity-building workshops have been organized by PARMS to encourage participation in their EPR program (PARMS News, 2023).

PBSP (PBSP, n.d.) started in 1970 with a mission to reduce poverty by promoting business sector leadership in, and commitment to programs that lead to self-reliance. As a business-led non-government organization, PBSP has 260 members and currently oversees 175 projects in various areas including environment, livelihood, education, and health. PBSP reports that they have started partnering with select recyclers and diverters to establish their EPR program. For example, PBSP financially managed a recycling facility established by a snacks company in Paranaque which will be turned over to the city employees' cooperative after training (Malaya Business Insight, 2023).

CHAPTER 4

ECONOMIC ASPECTS OF THE EPR PROGRAM

The successful implementation and effectiveness of the extended producer responsibility programs are directly affected by their economic viability. Considering the costs within its framework helps create sustainable financing mechanisms, promote program efficiency, drive eco-design practices, and foster innovation in waste management and recycling. This ensures that the environmental impact of products is adequately addressed while maintaining viability. Some of the economic aspects and considerations of EPR programs are discussed in the following sections.

A. COLLECTION COSTS IN EPR PROGRAMS

A common feature of EPR policies is that producers are involved in the collection mechanism for specific categories of waste, which have different collection costs. Collection costs under Extended Producer Responsibility are the costs of collecting, transporting, and storing end-of-life products and materials. As mentioned, producers are responsible for managing the disposal of their products at the end of their useful life. This means they must establish systems for collecting and transporting the products and storing and managing the materials. In India, for example, the producer responsibility organization (PRO) operates the collection of waste through house-to-house "kerbside" collection, bring system, and retailer collection (Gupt & Sahay, 2015). Manufacturers must collaborate with local governments, waste management companies, and other stakeholders to establish a cost-effective collection system. This can involve the development of efficient collection and transportation methods, as well as the establishment of convenient drop-off points and recycling centers for consumers.

The collection costs can vary depending on the type of materials, production design, geographic location, volume, and efficiency of the collecting system (Amasuomo & Baird, 2016; Bank, n.d.; Gupt & Sahay, 2015). The type of materials affects the collection costs of a system in a way that bulky, large, or heavy products may require specialized collection and transportation methods, which can be more expensive than the standard system (Damamy, 2014).

In the EPR Law's IRR, as Section 44-C of RA 11898 mandates, all the plastic packaging utilized to carry, protect, or pack goods for transportation, distribution, and sale shall be collected. Based on the IRR, plastic packaging includes:

- sachets, labels, laminates, and other flexible packaging products, whether single-layer or multilayered with plastics or other materials,
- rigid plastic packaging, whether layered with any other materials (including containers for food, beverages, home, and personal care products, cosmetics, and their coverings, necessities, and labels),
- plastic bags/sheets (including single-use plastic bags), and
- polystyrene (such as flexible PS materials boxes, cutlery, and coffee cups).

These types of waste have different collection costs and EPR fees, as shown in Table 3. For PCX as a PRO, Table 4 shows the available projects for credit buyers, type of processing, plastic type, the annual capacity of partner companies and the cost. The minimum cost is $115/MT while the maximum cost is $345/MT for the collection and processing fees. These data are available in PCX markets.

Table 3. Sample EPR Fees for different Packaging

MATERIAL	PET & HDPE FROM BOTTLES	OTHER RECYCLABLES	OTHER NON-RECYCLABLES	GLASS	BEVERAGE CARTON	PET BOTTLE
PRICE PER KILOGRAM	~17 PHP	~17 PHP	~27 PHP	0.74 PHP	~14 PHP	~16 PHP
DESCRIPTION	0.5 L PET bottle	0.5 L LDPE stand-up pouches	0.5 L multilayer PET/PE stand-up pouches	0.5 L glass bottle	0.5 L beverage carton	0.5 L PET bottle
PACKAGING WEIGHT	26.33 g	11.59 g	11.5 g	380.5 g	16.06 g	17.00 g
EPR PAID FEE (PRICE PER PACKAGING)	~0.45 Php	~ 0.20 Php	~ 0.31 Php	~ 0.28 Php	~ 0.23 Php	~0.27 PHP

Source: (UN Environment Program, COBSEA, SEA circular, Sweden Sverigate, 2022)

Table 4. PCX Market Price

PLASTIC TYPE	PROJECT	$ / MT	TYPE OF PROCESSING	TYPE OF CLEANUP
PETE	Community collection and HDPE/PET Recycling in Manila	345	Recycling	Landfill diversion
	PET recycling in Bulacan	115	Recycling	Landfill diversion
USED TIRES	Community Collection of Tires	345	Co-processing	Landfill diversion
OTHER/MIXED	Community collection and Co-processing 2022	345	Co-processing	Landfill diversion

Table 4 (CONTINUED)

PLASTIC TYPE	PROJECT	$ / MT	TYPE OF PROCESSING	TYPE OF CLEANUP
OTHER/MIXED	Community collection and Co-processing 2021	340	Co-processing	Landfill diversion
	Co-processing in Rizal	115	Co-processing	Landfill diversion
	Co-processing in Batangas	115	Co-processing	Landfill diversion
	Co-processing in Lugait	115	Co-processing	Landfill diversion
	Co-processing in Bulacan 1	115	Co-processing	Landfill diversion
	Co-processing in Antipolo Rizal	115	Co-processing	Landfill diversion
	Co-processing in Naga, Cebu	115	Co-processing	Landfill diversion
	Co-processing in Bulacan 2	115	Co-processing	Landfill diversion
	SDG Gold Credit	345	Co-processing	Landfill diversion
AVERAGE		197.7272		
MINIMUM		115		
MAXIMUM		345		

In product design, products that are difficult to disassemble or contain hazardous materials can be more costly to collect and manage (Relich et al., 2022). Moreover, for geographic location, waste in remote or hard-to-reach areas may also require specialized equipment or additional transportation costs, increasing the overall collection costs. Correspondingly, the volume of waste being collected can also impact collection costs. If the volume is too low, the cost per unit of waste will be higher due to the fixed costs associated with the collection, while if the volume is too high, it can create inefficiencies in the collection process, such as increased transportation costs (Amasuomo & Baird, 2016; Bank, n.d.; Damamy, 2014; Jara et al., 1999). Lastly, the collection frequency directly affects the collection costs (Dijkgraaf & Gradus, 2015). Generally, the more frequent the collection, the higher the cost, as more resources are utilized. The less frequent collection will accumulate a larger volume of waste leading to increased storage and handling costs, while too frequent collection can lead to inefficiencies (Afonso et al., 2014; Storto, 2021).

In Asia, municipal governments collect and dispose of solid waste (Jara et al., 1999). Waste collection and transport usually generate up to 50-80% of the community's or municipality's total solid waste system budget (Curtis et al., 2000; Ezugwu et al., 2019; Nathiya & Thandapani, 2019; Otoma & Castillo, 2013; Risse et al., 2012; Usepa, 1999), as shown in Figure 4. To cite some examples of the solid waste system budget in the Philippines, the local government of Quezon City allocated Php 1.7 billion to environmental and sanitation last 2019, and the budget increased by around 29% for the year 2022. Another example is based on the 10-year solid waste management plan of the Municipality of Ipil, Zamboanga Sibugay, which allocated Php 1.6 million for the labor and collection of waste for 2023 and will increase around 75% by 2029.

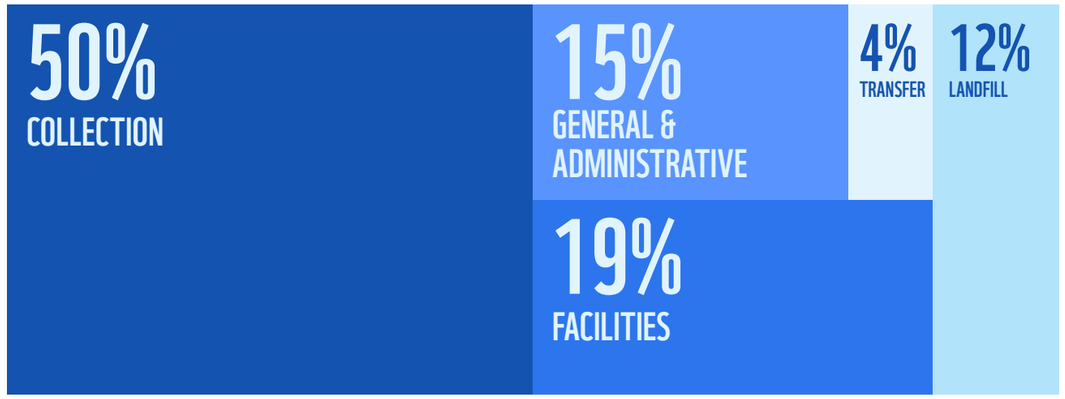


Figure 4. Municipal Solid Waste Management System Costs (U.S. EPA., 1999)

Furthermore, according to the Republic Act No. 9003, the local government should implement and enforce proper waste management. The barangay is responsible for the 100% collection efficiency of waste from residential, commercial, industrial, and agricultural sources within the coverage area. Correspondingly, according to Otoma & Castillo (Otoma & Castillo, 2013), around 40-85% of waste generated in the Philippines is collected nationwide, and 15-60% is improperly managed. Metro Manila recorded a maximum collection rate of 85%, while the uncollected wastes are, unfortunately, burned or dumped in open areas. Regarding recyclable wastes collected as shown in Figure 5, plastic packaging materials comprise around 38% of the residual waste fraction, 31% of paper and cardboard, and 31% of metal, glass, textile, leather, and rubber (EMB, 2019).

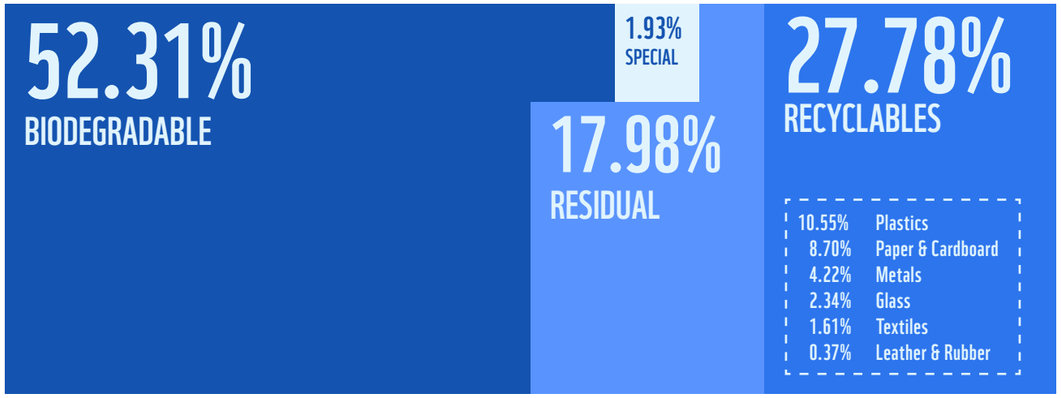


Figure 5. Solid waste composition in the Philippines. (EMB, 2019)

The most common collection practice in the Philippines is the house-to-house collection and curbside pickups, where wastes are collected in every house within a target area and a block or communal collection which utilizes MRFs in barangays within or near the targeted collection area (Domingo et al., 2021). Many local government units have detailed local plans covering waste collection services and detailed route maps for collection vehicles. In Metro Manila, the collection of waste goes through four levels of recovery of recyclables. The first level occurs at the source of the households and establishments. The second level is performed by a mobile picker at waste drop-off points outside residences, establishments, at MRF, and barangay eco-aides under the material recovery system (MRS). The third level takes place at the collection vehicles of the LGU-managed collection system and is performed by the truck crews. Lastly, the last level is performed by informal waste pickers at the disposal sites (Asia et al., 2022). Figure 6 provides an overview of the flow of waste from the Metro Manila LGUs from generation through diversion, collection, and disposal.

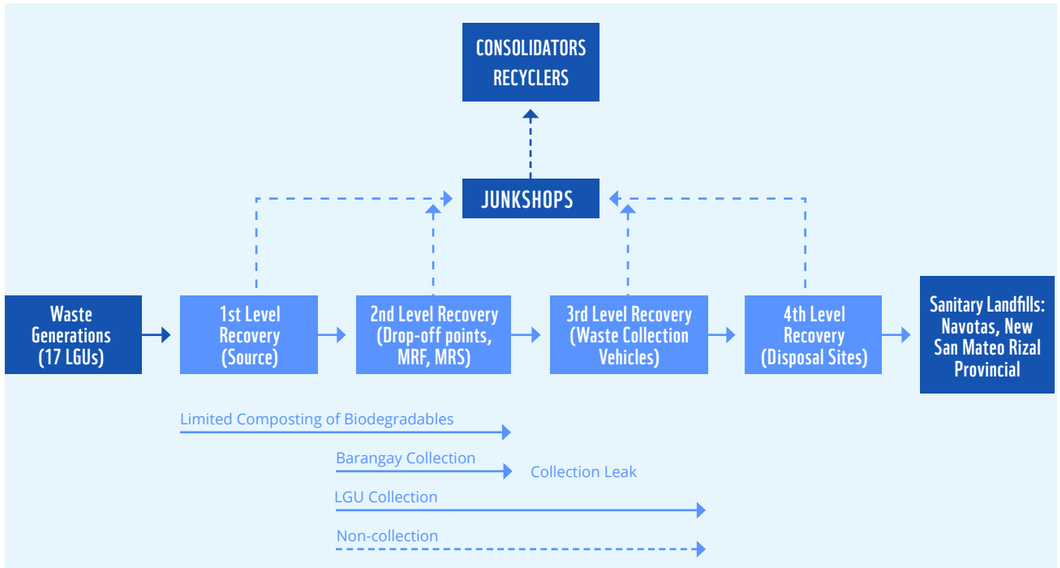


Figure 6. Waste Flow within the SWM Systems of the Metro Manila LGUS (Asia et al., 2022)

Correspondingly, the bulk of the waste collection in Metro Manila is performed by the LGUs with their contracted private haulers, as shown in Table 4. This is done along defined routes, available MRFs, and designated locations. The frequency varies from two to three times per week, with separate days for segregated biodegradables and recyclables. Daily waste collection is performed on main highways, markets, and busy areas of the cities. The contractors are responsible for waste collection, transfer, and disposal. One example is Pasay City, divided into five sectors, for which the city and the contractors have agreed upon the number of truck trips. Four contractors run 102 truck trips to dump "wherever they can," including Rodriguez and Montalban. Transfer and disposal are considered expensive, taking up to 4 hours per load and costing up to Php 1,500 per truck for tipping fees at private dump sites (ADB, 2004).

Based on Table 5, most of the Metro Manila LGUs have allocated a large amount of environmental and sanitation budget to appoint private haulers to collect their waste. To develop a more efficient and comprehensive collection system under EPR, awareness of the existing waste collection system of Metro Manila LGUs is essential since some of its programs may involve setting up new collection points, expanding existing recycling facilities, or implementing specialized collection systems for specific products like packaging plastics.

In the case of PCX as a PRO, they have partner aggregators who collect the wastes from their partner local government units and communities through waste-to-cash programs and then deliver it to a processor for upcycling and recycling. One example is their Aling Tindera project, which already has more than 100 locations managed by a non-government organization (NGO) called Friends of Hope. The Friends of Hope organization collects the waste by incentivizing communities to bring it to a women's sari-sari store (Aling Tindera). They will handle the logistics to send it to the PCX-partnered processors.

Overall, considering collection costs is essential in implementing EPR in promoting a circular economy and reducing the environmental impact of products throughout their lifecycle. By carefully considering and managing waste collection costs, EPR programs can incentivize sustainable product design, ensure financial responsibility, optimize waste management systems, and foster active consumer engagement.

Table 5. Waste Collection Implemented by Metro Manila LGUs

LOCAL GOVERNMENT UNIT	DAILY COLLECTION (m3)	COVERAGE	WASTE COLLECTOR
QUEZON CITY	5676	Residential and commercial areas of the LGU, except Barangay Holy Spirit which operates its own collection system	Six private haulers: LEG Hauling Services Corp., ACY Transport Corp., OMNI Hauling Services Corp., IPM Construction and Development Corp, 316 Metro Transport, Inc., Harley Construction, Inc. Collection from inaccessible areas through barangay-managed pushcarts
MANILA	5507	Residential and commercial areas	Leonel Waste Management Corp

Table 5 (CONTINUED)

LOCAL GOVERNMENT UNIT	DAILY COLLECTION (m3)	COVERAGE	WASTE COLLECTOR
CALOOCAN	4511	Residential areas and institutions; commercial establishments have their own haulers	Private hauler: International Solid Waste Integrated Management Specialist, Inc.
PARANAQUE	2638	Residential and commercial areas	Leonel Waste Management Corp
MAKATI	2531	Residential and commercial areas	Private hauler: International Solid Waste Integrated Management Specialist, Inc.; Six affluent barangays have their own private collectors
MARIKINA	2260	Residential and commercial areas	LGU Marikina
TAGUIG	1708	Residential and commercial areas	Two private haulers: Leonel Waste Management Corporation, and IPM Environmental Services, Inc.
VALENZUELA	1522	Residential and commercial areas	LGU Valenzuela
PASIG	1433	Residential and commercial areas	Private Hauler: IPM Environmental Services, Inc. with support from e-collectors of the city; IPM was replaced by Eco-waste in February 2021
MUNTINLUPA	1234	Residential and commercial areas	Private Hauler: IPM Environmental Services, Inc.
PASAY CITY	938	Residential and commercial areas	Two Private Hauler: IPM Environmental Services, Inc. and International Solid Waste Integrated Management Specialist, Inc.

Table 5 (CONTINUED)

LOCAL GOVERNMENT UNIT	DAILY COLLECTION (m3)	COVERAGE	WASTE COLLECTOR
MALABON	826	Residential and commercial areas	Private Hauler: Leonel in combination with barangays managed collection of recyclables using pushcarts
NAVOTAS	641	Residential and commercial areas	LGU Navotas
LAS PIÑAS	637	Residential and commercial areas	LGU Las Pinas and private hauler: L.E.G. Hauling Services Corporation
MANDALUYONG	98	Residential areas and institutions; commercial establishments have their own haulers	Private hauler: IPM Environmental Services, Inc.
PATEROS	75	Residential and commercial areas	Leonel Waste Management Corp.

B. COSTS TO HOUSEHOLDS

The assessment of household costs differs across the Organization for Economic Co-operation and Development (OECD) countries. Some EPR programs imposed obligations on households that might involve costs in terms of time and money. According to Working Group on Waste Prevention and Recycling of the OECD (ENV/EPOC/WGWPR, 2005), household costs should not be included in the assessment of the overall costs and benefits of EPR if they voluntarily engage and should be included if households are compelled by the law to separate their waste, required to transport their waste to collection facilities that needs time and money (Ezugwu et al., 2019). One example is in Quezon City, households pay around Php 100-600, depending on the size of the lot, for garbage fee in the form of real property taxes (SunStar 2014). Moreover, the changes in product costs, waste collection, disposal methods, and increases in packaging costs under EPR could influence households to take on other expenses. When product costs increase, households spend more money to purchase the same products they previously bought. It is challenging for households with lower incomes or those who rely on certain products affected by the increased cost (Qin et al., 2019). Also, some EPR programs require changes in waste collection and disposal methods. Households must separate their waste into different categories, such as recyclables and non-recyclables, or take their waste to specific drop-off points, which can be time-consuming and need additional costs to purchase new bins or containers and transportation (Ezugwu et al., 2019).

Under the EPR Law, households can participate in waste recovery by returning plastic packaging to collection points established by OEs through PROs or via participating in buy-back programs. Under RA 9003, households can contribute to solid waste management by segregating waste, reducing waste generation, and participating in local recycling programs. Given the mandate of the National Solid Waste Management Commission (NSWMC) to develop programs to assist local government units and encourage community participation, it is the case that local government units are to have specific incentives or programs to encourage household compliance to solid waste management and their impact to the implementation of the EPR Law.

C. LEGAL AND ADMINISTRATIVE COSTS, PENALTIES & INCENTIVES

The economic and financial aspects of the EPR Law are multifaceted. One key aspect is the imposition of a cost on companies in relation to the plastic waste they generate, thereby internalizing a previously external cost. This is expected to prompt businesses to find cost-effective ways to reduce, reuse, and recycle plastic waste, potentially leading to innovation and economic opportunities in the waste management and recycling sectors. The costs of implementing EPR programs are considered necessary business expenses and are deductible from annual gross income, providing some financial relief to companies.

Companies need to measure their annual plastic packaging footprint and meet diversion targets mentioned in Chapter 3, and this will involve costs related to the setup and operation of recovery schemes, recycling processes, transportation of waste to appropriate sites, cleanup of leaked plastic waste, and establishment of waste diversion or disposal facilities.

Incentives. As stated in Section 45 of Republic Act No. 11898, the costs incurred by the companies for EPR program are considered necessary business expenses and are deductible from their annual gross income. Additionally, donations, legacies, and gifts supporting solid waste management programs are exempt from internal revenue taxes and customs duties, and can be fully deducted from the donor's gross income for income tax purposes. These are intended to encourage enterprises to participate in these programs actively and significantly contribute to waste management and reduction.

Fines & Penalties. The EPR law enforces regulations and penalties to address various violations related to waste management. Such violations, fines and/or penalties are enumerated in the IRR of RA 11898 - specifically, infractions pertinent to Section 49 of the EPR Law. These violations encompass littering, illegal dumping, improper waste handling, establishment of unauthorized facilities, non-compliance with environmental permits, and more. Offenders can face fines ranging from Php 300 to Php 1,000,000 depending on the severity of the violation, and imprisonment for varying durations. These penalties aim to promote responsible waste management practices, deter harmful actions that degrade the environment, and encourage compliance with the law.

The IRR also establishes a fine-tiered system, starting at five million pesos (Php 5,000,000) and escalating to twenty million pesos (Php 20,000,000) for third offenses, with automatic business permit suspension until compliance. This emphasizes the government's dedication to EPR principles and addressing the plastic waste crisis. Failure to meet targets incurs fines equal to non-compliance fines or double the cost of recovery and diversion of the footprint or shortfall.

Penalties apply regardless of the type of cause to ensure transparency and accountability. The Pollution Adjudication Board (PAB) handles violations and imposes fines, reinforcing the EPR Act and encouraging sustainable waste management for plastic neutrality in the Philippines. On the other hand, if a collective or PROs with a registered EPR Program fails to meet the compliance targets set for the compliance year under Section 44 of the Act, as amended by the EPR Law (2022), it shall cooperate with the PAB in the identification of its non-performing member-Obliged Enterprise/s that may be held liable under the provisions of Section 49(g). If the Collective or PRO fails to disclose the nonperforming member-Obliged Enterprise/s, all the members thereof shall be liable for the shortfall and accorded the appropriate fines.

Additionally:

- Paragraphs 4-7 cover various prohibited actions related to waste management, such as collecting non-segregated or unsorted waste, squatting in open dumps or landfills, open dumping or burying waste in flood-prone areas, and unauthorized removal of recyclable material intended for authorized collection. Violators can be fined Php 1,000-3,000, and imprisonment ranging from fifteen (15) days to six (6) months, or both.
- Paragraphs 8 and 9 address the mixing of recyclable material with other waste during collection or disposal and the establishment or closure violation of open dumps, respectively. Violators can face fines of Php 10,000-200,000, or imprisonment for thirty (30) days up to three (3) years, or both.
- Paragraphs 10 and 11 pertain to the manufacture, distribution, use, and importation of non-environmentally acceptable packaging materials. First-time offenders can be fined Php 500,000.00 and an additional 5-10% of their net annual income from the previous year. Subsequent violations can result in imprisonment for one (1) year up to three (3) years, as determined by the court.
- Paragraphs 12-16 cover offenses like importing toxic wastes misrepresented as recyclable, improper transport and dumping of collected wastes, and construction or operation of waste disposal facilities in prohibited areas. The fines range from Php 100,000-1,000,000, and imprisonment can be imposed for not less than one (1) year up to six (6) years, or both.

D. ECONOMIC IMPACTS OF EPR

The successful implementation of the EPR law will undoubtedly encounter challenges; however, these challenges also present opportunities. The implementation of EPR programs can drive businesses to innovate, developing more sustainable packaging alternatives and enhancing waste management processes. It can foster partnerships between businesses, government, and communities, strengthening collective efforts towards a more sustainable future.

IMPACT ON OPERATIONAL COSTS

Primarily, EPR could lead to increased operational costs for businesses due to the need to establish waste recovery initiatives and meet mandated recovery targets. Non-compliance carries hefty fines according to RA 11898, potentially escalating the cost of doing business for companies that fail to meet their obligations (Ranada, 2022). However, these costs could have a relatively limited direct impact on consumers. A study on the impact of EPR regulations in the US found that even if compliance costs led to a doubling of packaging costs, the expected increase in grocery bills would be negligible at around 0.69% (Bose, 2022). This is because suppliers, faced with some elasticity in consumer demand, are unlikely to pass on 100% of cost increases to customers. Indeed, the outlook of EPR implementation on businesses, consumers, government, and the environment itself seems more positive than bleak.

Taking a further look into the economic aspects of EPR, Table 6 summarizes economic-related processes and challenges practiced and observed by PCX, Aling Tindera, and Ecoloop representatives from a conducted interview.

Although PCX, as a PRO, is a non-profit organization, the revenue from utilizing a cost-plus model ensures that cost collection is directed to waste management operations. This also includes investment in establishing infrastructure which FOH also advocates for, particularly in setting up processors around the country. On another hand, the long-term co-processing practice of Ecoloop determined the path of their investments towards shredders. There are still several investments to be made from collection to processing.

Pricing is also essential in sustaining waste management programs. For Ecoloop, pricing should cover all the fees (collection, pre-processing transport, co-processing). To encourage collection, they pay the delivery fee from various sources.

Table 6. Economic aspects of EPR in PCX, Aling Tindera, and Ecoloop

Plastic Credit Exchange (PCX, personal communication, March 28, 2023)	Aling Tindera (Friends of Hope, personal communication, April 18, 2023)	Ecoloop (Republic Cement, personal communication, April 24, 2023)
As a PRO, PCX operates on a cost-plus model, where partners and processors provide PCX with baseline pricing depending on various factors (location, logistics, type of processing, manner of collection, etc.) PCX is non-profit, thus most of the revenue is directed to operations such a salaries, registry, maintaining the blockchain, training, education, and the like Investment goes to establishing infrastructure for waste management	FOH provides Aling Tindera partners working capital to establishing their own collection systems where they are paid based on the amount of waste collected Aling Tindera programs should be considered as a means to make extra income rather than primary livelihood There is a need for investment in processors that can accommodate high amount of waste	Republic Cement invests in big capacity shredders to allow waste to be sized in specific dimensions for optimal combustion at co-processing plants Pricing includes collection, pre-processing transport, and co-processing fees Republic Cement pays the delivery fee of waste materials from collectors (condominiums, NGOs, etc.)

Particularly with Aling Tindera, through the waste-cash program, plastic is bought for Php 2-15 depending on the type of waste as shown in Table 7. The Aling Tindera program offers opportunities to its partner communities by empowering women through female micro-entrepreneurs. The program also creates behavior change through financial incentives for buying plastic waste in the communities at higher prices, providing additional income to the households.

In terms of the economic benefits of EPR programs, EPR reduces the financial burden of the local government units and municipalities associated with the collection, transportation, and disposal of waste as the program shifts directly the financial responsibility to the producer (ENV/EPOC/WGWPR, 2005). EPR could also increase recycling rates and resource recovery by imposing and incentivizing manufacturers to design sustainable products (ENV/EPOC/WGWPR, 2006).

EPR could also stimulate job creation and economic growth in the recycling and waste management sectors, like the Aling Tindera program, in which collection systems, transportation, and recycling facilities need human resources. Lastly, EPR could reduce the need for landfilling and incineration by promoting recycling and resource recovery (ENV/EPOC/WGWPR, 2005, 2006). Altogether, the economic impacts of EPR have a positive outlook in that it can benefit the economy in various ways. Yet, there is still a need for several investments and support from the government. Investments in waste recovery infrastructure and technology could foster innovation, and the need for compliance auditing could also stimulate growth in the consulting and professional services sector.

Table 7. Aling Tindera Market

TYPE OF WASTE	BOTE	PANGKAIN	SACHET	PANLIGO	SANDO BAG	GULONG ATBP.
COST	15	4	2	2	2	2

Source: Source: USAID Urban from (Clean Cities, Blue Ocean in the News: PCX's Aling Lorme Interview - YouTube)

REDUCTION COSTS

Under the EPR system, material efficiency is a major area where cost reduction can occur (Maitre-Eken, 2021). By minimizing the amount of raw materials used in products or packaging, businesses can realize significant savings. This could involve innovative product or packaging redesigns to use fewer materials or replacing existing materials with more cost-effective, eco-friendly alternatives. Another crucial aspect of the EPR system is waste reduction. By optimizing production processes to generate less waste, businesses can save on waste disposal costs (Bassi et al., 2020). This could also involve the reuse of waste within the production cycle, effectively turning waste into a resource. Furthermore, EPR systems promote recycling and recovery of waste materials. This not only reduces reliance on virgin raw materials, potentially leading to cost savings, but can also create an additional revenue stream through the sale of recovered materials. An additional economic benefit of EPR is the potential reduction in compliance costs. By diminishing waste and enhancing recycling, businesses can decrease their obligations under EPR regulations, avoiding fines and penalties associated with non-compliance.

EPR systems offer the potential to sidestep costs associated with environmental damage. By minimizing the environmental footprint of their products, businesses can prevent future expenses related to environmental cleanup and liability. However, the implementation of an EPR system is not without its costs. Businesses may need to incur expenses related to modifying manufacturing processes, procuring new equipment, training employees, and ensuring regulatory compliance. The net cost or savings for a business will hinge on several factors, including specific EPR regulations, the nature of the business's products, and existing waste management practices (Diggle and Walker, 2020).

CHAPTER 5

ENVIRONMENTAL ASPECTS OF EPR PROGRAMS

A. ENVIRONMENTAL BASELINE

Solid waste management (SWM) is one of the major issues in the Philippines as it is continuously inhibited by challenges and stagnation. The National Solid Waste Management Commission (NSWMC) reported that waste generation in the Philippines is steadily increasing exponentially from 9.07 million metric tons in 2000 to 16.63 million metric tons in 2020 (COA, 2023).

In Metro Manila alone, 3.47 million metric tons were generated in 2020 and this number is projected to rise even more. Unless the identified causes of SWM problems are promptly addressed, the projected annual waste generation will continually increase to around 22.7 million metric tons in the year 2040 as shown in Figure 7.

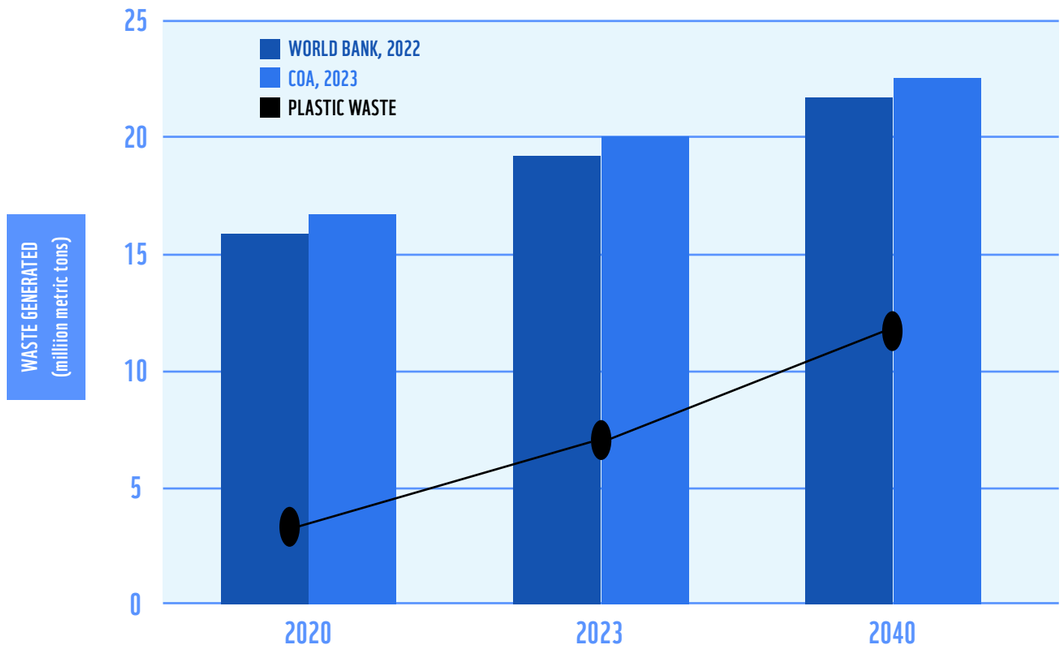


Figure 7. Projected Waste Generation in the Philippines from 2020 to 2040 (World Bank, 2022a; COA, 2023)

Plastic waste has become a significant economic and environmental challenge globally. The total production of plastics has reached 353 million metric tons and plastic packaging takes up to 40% worldwide (OECD, 2019). Since the plastic production era began in the 1950s, the amount recycled has only been 7%, and a large portion of plastics has been discarded or leaked into the environment (Geyer et al., 2017; Boucher et al., 2019). The Philippines ranked third as the world's largest plastic waste generator and contributor to marine litter with 2,565,766 tons of plastic pollution in 2021, and a recycling rate of only about 9% (Jambeck et al., 2015; ASEANO, 2022; World Bank, 2022, WWF, 2020b). The recycling rates of different countries with their respective plastic waste generation per capita per year are shown in Figure 8 (Khoo, 2019).

Republic Act 9003, or the Ecological Solid Waste Management Act of 2000 has been enacted for more than two decades, yet, waste generation increased exponentially along with urbanization, industrialization, and population growth (Premakura et al., 2013; Chiu, A., 2010). It is a strong law with weak implementation. SWM capacity is way beyond the garbage produced in the Philippines.

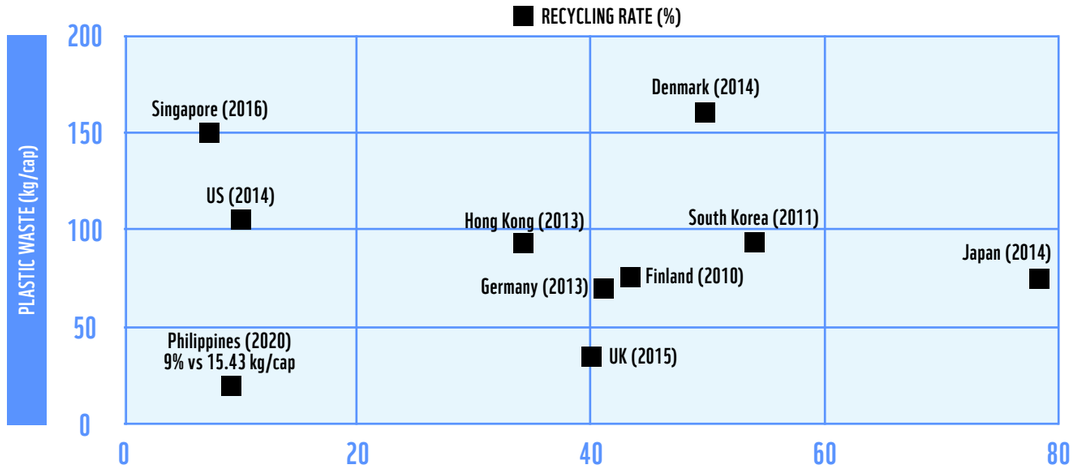


Figure 8. Recycling rate vs. Plastic waste in various countries (Khoo, 2019)

Waste diversion targets, 10-year solid SWM plan, materials recovery facilities, and disposal facilities remain poorly complied, particularly by local government units (LGUs) according to the report made by the NSWMC. As of 2020, there are only 189 sanitary landfills (SLFs) in the country servicing 399 LGUs. The number of existing landfills is still small given that it has been 20 years since the implementation of the law. At present, poor areas in cities and municipalities are underserved and wastes are not regularly collected, which is one of the probable causes for improper waste disposal, burning of wastes and open dumping (World Bank, 2022a; Mayuga, 2021; Domingo and Manejar, 2021; Coracero et al, 2021; Sarmiento, 2018).

In spite of the issues enumerated, indications of policy compliance are still visible. For example, there is an increase in the recycling rate from 6% in 1997 to 31% in 2009 in Metro Manila. There are also notable waste management projects carried out by different LGUs such as in Pasig City, Quezon City, and Sta. Rosa, Laguna (Chiu, 2010; Conexor, 2008; Mendoza, 2010). In addition, 410 Solid Waste Management Plans (SWMPs) were approved and 618 rehabilitation plans were implemented, accomplishing 103 percent and 128 percent of the annual target, respectively (DENR, 2019). Top 5 regions with the highest number of SLFs as of 2020 includes Region 4A (Calabarzon), Region 2 (Cagayan Valley), Region 1 (Ilocos Region), Region 10 (Northern Mindanao), and Region 7 (Central Visayas). Together, they have contributed to 72.5% of the total SLFs in the country and almost all these areas do not contribute to solid wastes in the country (Coracero et al, 2021).

In the hopes of aiding RA 9003, the Extended Producer Responsibility (EPR) scheme is pushed through as a critical policy tool for plastic packaging waste management in the Philippines (WWF, 2022). EPR requires large enterprises to recover a certain portion of their plastic packaging waste, which is quantified using plastic footprint. The first target is on December 31, 2023 with a twenty percent (20%) plastic footprint recovery of the year prior then gradually increasing the percent capacity of recovery for the coming years (RA 11898, 2022).

B. PLASTIC FOOTPRINT

Footprint, in general, is a metric that captures the direct and indirect effects of an activity that are transferred along a supply chain (Marques et al., 2017). Typically, a Life Cycle Assessment (LCA) is utilized to measure footprints of products and production processes and assess their relative environmental impacts. There are different indicators that can serve as a basis for the LCA such as carbon footprint, ecological footprint, energy consumption and the like. As a basis, the concept of footprint may include three dimensions shown in Figure 8 which may lead to different types of metric.

Plastic Credit Exchange (PCX) is one of the PROs that aspires to address Global Plastic Debt which continues to accumulate over decades through plastic credits and working with partner OEs on their Plastic Reduction and Responsibility Plan. PCX contributes to the goal of the EPR law by providing a market for plastic credits (pcxmarkets.com). These credits can then be purchased by other companies that are not meeting their plastic waste reduction targets. With this, they are able to provide a practical and scalable solution for companies to comply with the law while creating economic incentives for companies to reduce their plastic footprint.

The platform of PCX Markets also provides access to a plastic footprint calculator which helps organize an organization's footprint and establish plastic reduction targets. Their plastic footprint calculator accounts for the plastic inputs to production of goods and rendering services for service companies, plastic used in logistics and shipping, plastic used for advertising, promotions, and merchandising, and plastics reused, recycled, or composted which are aligned with the metric aforementioned.

PCX promotes a standard on plastic waste management, publishing this in March 2020. The Plastic Pollution Reduction Standard (PPRS) is a module-based governance document in the implementation of credible and verifiable plastic credit and certification systems (PCX Group, 2022c). It is a set of criteria and guidelines to measure and verify the reduction of plastic pollution. The PPRS provides a framework for companies to quantify and report their plastic waste reduction efforts, as well as for independent third-party verifiers to evaluate and certify such efforts.

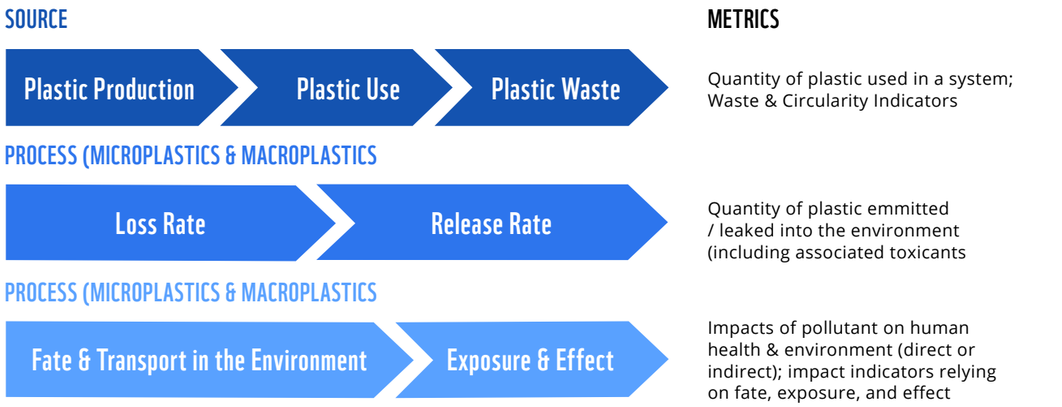


Figure 9. What is included in a plastic footprint? 3 main modeling stages lead to 3 types of metrics (Boucher et al., 2019)

The potential flaw of quantifying the ability of OEs to attain the goal of the EPR law solely basing on the IRR set by the country is the lack of specificity and adaptability. The ambiguity in regulations, the one-size-fits-all approach, the limited flexibility for innovation and the inadequate monitoring and enforcement may be causing the dilemma.

The existing legislation and plastic footprint assessment exhibits a lack of clarity in distinguishing between reuse, recycling, and reduction of plastic product footprint. The law predominantly emphasizes "recovery" without providing explicit guidelines on the measurement scope. Ambiguity further arises as to whether the term "plastic footprint" solely pertains to plastic sales volume or encompasses all manufactured and imported products. To ensure a well-rounded recovery of the plastic product footprint, it is crucial to consider both upstream and downstream measures.

To address these flaws, it is essential to have clear, specific, and adaptable regulations that consider the diversity of industries and provide flexibility for innovation. Additionally, robust monitoring and enforcement mechanisms should be in place to ensure compliance and accurate quantification of an enterprise's progress towards EPR goals. As the EPR law is at its early stage, consistent evaluation and updates of regulations can help address any shortcomings and align with evolving waste management practices.

Section 12 of the EPR IRR focuses on plastic footprint waste reduction measures, implementation, and recognition, but several areas require further clarification. The section addresses the reduction of non-environmentally friendly packaging, specifying parameters such as volume, weight, and material type. While emphasizing the importance of material or mass balance studies for GHG analysis, the section lacks clear implementation timelines and targets. The inclusion of recycled content in packaging materials is mentioned, but the establishment of efficiency targets for the recycling process is necessary. The proposal for adopting product refilling systems for retailers, limited to specific products sold in bulk, raises the need for detailed modalities of implementation, certification schemes, a list of goods, and a thorough mass balance study. The section also highlights the importance of a viable reduction rates plan, particularly for plastic containers and bags. It acknowledges that weight reduction through thinner layers alone is inadequate for achieving plastic neutrality, but an acceptable approach would be increasing container volume (which may not be ideal in the Philippine settings) to reduce overall plastic packaging mass released or placed on the market. Furthermore, the establishment of a system for crediting plastic waste footprint reduction accomplishments is recommended, highlighting the importance of fairness, avoidance of double counting, and alignment with the country's Nationally Determined Contribution (NDC). However, no detailed process for the system has been provided yet.

As discussed in the aforementioned plastic footprint reduction scheme of PCX and notably in PARMS in spearheading the development of an extensive draft set of standards for waste management, just to mention a few. These standards encompass crucial guidelines for calculating waste footprint, and incorporate measures aimed at promoting effective recovery and diversion strategies.

With these ongoing compliance, the experiences and adaptation of OEs, collectives, and PROs could aid in the lack of clarity and guidance hence narrowing the gap of ideas in quantifying and imposing the present EPR IRR.

C. PLASTIC PACKAGING REDUCTION

A direct way to address plastic footprint is the reduction of plastic packaging use through redesign of products. Plastic packaging reduction revolves around implementing strategies to minimize the amount of plastic packaging used throughout the product life cycle (US EPA, 2023).

The goal of plastic packaging reduction is to decrease the environmental impact associated with plastic waste generation, such as reducing resource consumption, minimizing pollution, and mitigating the challenges of plastic waste management (Helm et al., 2022; White and Lockyer, 2020). By focusing on reducing the overall amount of plastic packaging, the emphasis is placed on waste prevention and the adoption of more sustainable packaging solutions.

Approaches and recommendations to reduce plastic packaging waste are as follows (UNEP, 2023; Iberdrola, 2023)

Reusable packaging – reduces the need for single-use plastic packaging (SUPPs) and encourages the use of packaging that can be reused multiple times.

Design for recyclability – design products with circularity and end-of-life (EOL) consideration to facilitate easier recycling and promote circular economy.

Alternative materials – exploring and adopting materials that are more environmentally friendly, such as biodegradable or compostable alternatives (cloth bag instead of plastic, glass or steel containers instead of plastic Tupperware, etc.)

Lightweighting or source reduction – reducing the weight of packaging materials while maintaining functionality and performance.

Geographical and social context matters – policymakers must consider these contexts when identifying appropriate alternatives. Factors such as local waste management infrastructure, education, likelihood of littering, production requirement, and expected use impacts how relevant and effective proposed alternatives are.

Through these approaches, the focus is on reducing the environmental impact of plastic packaging by minimizing its production, consumption, and subsequent waste generation. This contributes to more sustainable waste management practices and helps address the global plastic pollution challenge. Furthermore, active involvement and education of communities can enhance waste prevention initiatives.

D. ENVIRONMENTAL IMPACTS OF RECYCLING, CO-PROCESSING, AND REDESIGN

The focus of waste management is progressively transitioning from direct waste elimination to the integrated management of potentially valuable resources and residues. This shift is evident in the current widespread efforts to increase the recovery of materials and energy in order to promote a circular economy. Recycling, co-processing, and redesign are some waste management strategies that can have positive environmental impacts, but the specific effects depend on either waste-specific or process-specific properties, or both (European Union, 2017; Soderman, 2002).

In the table shown below, all three waste management approaches have their own benefits and limitations. However, redesign comes out to be the most sustainable in terms of significantly reducing the demand for natural resources, minimizing waste generation throughout the product life cycle, promoting sustainable consumption and addressing the root causes of waste generation. Although it is a positive approach to waste management, its implementation can still face various challenges and barriers such as cost, short-term thinking, market demand and lack of awareness.

Table 8. Advantages and Disadvantages of Waste Management Approaches (USEPA, 2020; IEA, 2011; Ellen MacArthur Foundation, 2016

Waste Management Approach	Pros	Cons
Recycling Waste materials are converted into new products or raw materials to be used again (USEPA, 2020)	★★ Conserving natural resources ★★ Reducing greenhouse gas (GHG) emissions ★★ Diverting waste from landfills	Environmental benefits vary depending on the: • Material being recycled • Recycling process used • Energy and resources required to transport & process the material • Some forms of plastic recycling may be energy-intensive & result in lower-quality products
Co-processing Waste is used as a fuel or raw material in industrial processes (e.g. cement production) (IEA, 2011)	★ Conserve natural resources ★ Reducing greenhouse gas (GHG) emissions ★ Reducing the amount of waste that goes to landfills	Environmental benefits vary depending on the: • Type of waste being used • Specific industrial process • Co-processing hazardous waste can pose risks to human health & the environment if not managed properly.
Redesign Product packaging materials are reduced and reusability is increased (Ellen MacArthur Foundation, 2016)	★★★ Reduce the use of natural resources ★★★ Decreasing greenhouse gas (GHG) emissions ★★★ Reducing waste generation	Redesign have unintended consequences such as: • Increased use of other materials • Increased energy consumption during production • Environmental impacts depend on the: • Specific product or packaging • Design choices made

Note: Since all the pros are similar for each waste management approach indicated, the number of ★ quantifies the impact of each pro, with the least number indicating the least impact relative to those in comparison, and vice versa.

As many countries lean towards EPR implementation, numerous improvements and challenges in terms of SWM are observed and recorded. In Portugal, EPR policies contributed to an increase in the quantity and quality of waste recovered and recycled. Recycling rates of the national PRO's were placed above EU targets and complied at 55% in 2011 (Niza et al., 2013). In Japan, EPR implementation also contributed to achieving higher collection and recycling rates. There is a 27% increase in recycling between 1997 and 2000 from 1.25 to 1.59 million tons. In France, EPR implementation has managed to reduce public spending spent on waste management by almost 15% in 2015 (OECD, 2014). Korea implemented EPR in 2003 and was able to increase waste recycling rates by 74%. However, conflicting results exist regarding the success of EPR policies in reducing plastic debris along the shorelines of countries, indicating that the effectiveness of legislative efforts in waste reduction is highly dependent on the socio-economic status of each nation (Kwon et al., 2023).

A summary of the case study's interviews and assessment of their environmental impacts and the process used to measure and validate those impacts is provided below:

Plastic Credit Exchange (PCX, personal communication, March 28, 2023)

- Impact areas aside from the Philippines are Indonesia, Vietnam, Thailand, Argentina and Mexico.
- Diverted more than 40 million kilograms of post consumer plastic waste working with different project partners from aggregators to processors.
- Aid in around $4 million dollars of total investment to education, infrastructure, and negative tonnage gearing into plastic waste circular economy and 79,154 tonnes estimated carbon reduction from coal replacement.

How do they measure and validate the impact?

PCX has a network of project partners and waste diverters who are accredited according to their Plastic Pollution Reduction Standard (PPRS). For example, a company wants to take responsibility for a hundred metric tons of their plastic footprint or their plastic packaging footprint, PCX now asks for their network of partners to divert and to collect a certain tonnage of plastic waste from the environment. This can be through aggregation, and also through different types of processing, like recycling, upcycling, co-processing. Once they have finished, they would need to submit the supporting documents, like certificate of treatment or processing, delivery receipts and other chain of custody documents to PCX. Following this, PCX verifies the whole value chain before encoding it into the blockchain registry to track these plastic credits so once that they are able to validate this, they issue plastic credits or plastic offsets to the company, and that will in turn offset part or whole of their plastic footprint.

Friends of Hope – Aling Tindera project (FOH, personal communication, April 18, 2023)

- FOH manages 120 sites nationwide with 120 women managing through their sari-sari stores. With this project, they are able to empower women and build a network of micro-entrepreneur store owners - increasing their income and opportunities.
- The biggest indicator of their success is the amount of plastic diverted from the landfills, which amounts to around 30-50 thousand kilograms a week on average.
- The Aling Tindera program was also able to give back to local communities around an estimated 2 million pesos from their waste-to-cash scheme which directly incentivizes residents while promoting plastic diversion from the environment.

How do they measure and validate the impact?

FOH does an assessment, takes a baseline, and then measures incremental income (calculates the percentage increase of their livelihood from their baseline) the Aling Tindera women are receiving. Each of them has a ledger and inputs the quantity. FOH coordinators check on these and digitize into a masterbase file for the Senior Program Manager of Aling Tindera program and their team to see. Since Aling Tindera is a non-profit organization, data is transparent and they can provide information to anyone. When hauling the plastics, they require the weighing scales to be verified and calibrated by a third party. These values are inputted in their system as well.

Republic Cement (Republic Cement, personal communication, April 24, 2023)

- They have been doing co-processing for more than 20 years and began voluntary compliance on plastic neutrality with Nestle in 2018.
- They have replaced up to 25% of traditional fuels in the mix.
- Energy consumption is reduced.
- Old models are replaced by more energy efficient machines and equipment.
- Products are developed and redesigned to be a green cement to reduce clinker amounts in every bag produced. The biggest CO2 footprint comes from the production of clinker, so the less amount the better and greener

How do they measure and validate the impact?

Republic Cement submits environmental impact and CO2 footprint reports every year. An auditing firm audits their plastic credits because it was mostly voluntary early on their part. They put self-regulation in the system since they started issuing credits and intend to do so for transparency and accountability.

Overall, as mentioned in Chapter 2, the experience, control, order, and network of project partners and waste diverters manifest characteristics of a successful EPR program through the PRO and waste management operators. PCX and FOH also provide ways to involve consumers by providing environmental information and raising awareness through their projects and community involvement. Republic Cement is one of the waste diverters. Economic challenges are a factor since using alternative fuel adds complexity to the system. Feasibility study must be conducted since quantity and quality are crucial for management decisions. System modification and material flow requirements should make financial sense while successfully implementing the EPR law.

E. ENVIRONMENTAL AUDITING

For NSWMC to regulate and monitor compliance of OEs to the EPR law, registration of their EPR Programs and annual submission of their compliance reports are to be fulfilled. The EPR Compliance Audit Report (ECAR) is a type of environmental audit that focuses specifically on assessing an organization's compliance with EPR regulations. OEs or their PROs are required to establish and implement an auditing system to monitor and evaluate their compliance performance with the law and their EPR programs. To ensure the accuracy of reported information on plastic product footprint generation, recovery, and EPR program compliance, independent third-party auditors must be engaged by OEs or their PROs. The auditors will certify the veracity of the reported data using standardized criteria to be established by DENR. The audited report, confirming compliance and accuracy of the reported information, must be submitted by the OEs or their PROs to DENR-EMB. The certified reports on plastic product footprint generated and recovered by obliged enterprises will be publicly available on the Department's website. However, certain confidential information that may disclose trade secrets, production or sales figures, or unique methods and processes that could negatively impact the enterprise's competitive position will not be made public (Republic Act No. 11898, 2022).

Initial ECAR submission is still in July 2024 for the EPR programs implemented in 2023. The report coverage should include (Villacorte and Gomez, 2023):

- Footprint declaration pertaining to the quantity of plastic packaging produced and brought to the market by OEs within the stated period,
- Recovery or plastic packaging waste diversion based on third-party audited diversion or credits,
- Determination of the equivalent plastic packaging waste footprint reduction resulting from other EPR programs, and
- Confirmation of confidential information declared by the OEs.

PPRS outlines the standards and guidelines used for auditing plastic waste reduction projects that generate plastic offset credits (PCX Group, 2022c). Some key standards used in auditing includes:

Table 9. Auditing Standards (PCX Group, 2022c)

Auditing Standards	Description
Integrity and Consistency	PCX requires transparency and assurance from third-party verification to ensure they meet the standards and assure consistency and accuracy of information and accreditations.
Materiality	PCX requires plastic offset credit projects to demonstrate a significant reduction in plastic waste and pollution either through diversion, reduction, or replacement of virgin plastic with recycled plastic.
Additionality	PCX targets operations in communities where there is high mismanagement of plastic waste in order to introduce innovative solutions ensuring that any plastic collected finds its way back into the circular economy.
Transparency and Traceability	PCX shall disclose relevant and sufficient information of stakeholder interests to the public, making every effort to ensure easy, prompt, and practical access to the appropriate information. The registry is protected by a blockchain ledger – a robust and tamper-proof way to manage every Plastic Credit processed.
Social and environmental safeguards	PCX requires plastic offset credit projects to adhere to social and environmental safeguards, including the protection of human rights, labor rights, and biodiversity.
Local stakeholder engagement	PCX requires plastic offset credit projects to engage with local stakeholders, including waste pickers, waste management companies, and communities, to ensure that their activities are aligned with local needs and priorities.

These auditing standards, particularly with regard to stakeholder engagement and social aspects, are especially salient in the Philippine context. The next chapter of the case study focuses on a social assessment of EPR programs in the Philippines.

CHAPTER 6

SOCIAL ASPECTS OF EPR PROGRAMS

A. THE OTHER SOLID WASTE MANAGEMENT STAKEHOLDER UNDER RA 9003 AND RA 11898

The earlier chapters have extensively discussed the Obliged Enterprises (OEs) and Producer Responsibility Organizations (PROs), which are under the "Producer" umbrella after which the EPR law is titled. This Chapter discusses other stakeholders who have been identified under RA 9003 and RA 11898 to be part of the solid waste management process in the Philippines. As the EPR Law is still in its infancy stage, it is timely to review these roles as defined by law, to maintain a grounded basis as implementation moves forward.

a. Sources: In the Philippines, the law requires solid waste segregation to be done at the source.[1] This includes individuals/households, as waste generators, who are mandated to start the process by segregating at source. Violations are punishable by a fine and/or imprisonment.[2]

b. Collectors: Solid waste management is generally assigned to the LGU, pursuant to RA 7160, otherwise known as the Local Government Code, and reiterated under Section 10 of RA 9003. The following two (2) LGU levels have active roles:

   - Barangay Level: Segregation and collection of reusable waste is assigned at the Barangay Level which should ensure 100% collection efficiency from residential, commercial, industrial and agricultural sources within its area of jurisdiction[3]. It is also required that a Materials Recovery Facility or MRF be established in every Barangay, or cluster of Barangays, where mixed wastes may be sorted and segregated[4].

   - Municipal/City Level: The City or Municipality develops and implements the City or Municipal Solid Waste Management Plan that shall ensure the long-term management of solid waste[5]. This should include, but not limited to source reduction methods, e.g. recycling, composting. LGUs are encouraged to cooperate with multi-purpose cooperatives and associations in this endeavor[6] and are allowed to "determine and grant a price preference to encourage the purchase of recycled products"[7].

   - Finally, the LGUs are assigned to collect non-recyclable materials and special wastes to the municipality or city [8]. Specific to Metro-Manila, which is composed of seventeen (17) LGUs, the task of waste collection is reiterated in RA 7924, otherwise known as the MMDA Charter, which further assigns the MMDA to operate and manage disposal sites. At the point of transfer from the LGU to the MMDA, the contributing LGU does not benefit anymore from whatever plastics are "harvested" and diverted to junk shops, other collectors and/or processors.

c. Processors: The processing phase was mostly left to the Business and Industrial sectors which are encouraged, through incentives, to invest in ecological waste management projects as well as initiate support community activities[9].

It is important to note that until 2022, several stakeholders in solid waste management efforts have not been recognized—as the law has stayed silent about them despite their long-time presence in daily Philippine community life. The passage of RA 11898 expanded both Collector and Processor stakeholders who may assume these roles by opening these not just to OEs and PROs, but to Manufacturers, Importers, Junk Shop Operators, Retailers, Brand Owners, Waste Management Entities, Distributors, Grocery and Store Owners and even Individuals or Entities in the informal sector involved in waste management as well.

d. National Governance: The National Solid Waste Management Commission (NSWMC)

   The direction to put more weight on the responsibility of the private sector is also reflected in RA 11898. From a membership of seventeen (17), composed of fourteen (14) government and three (3) private representatives under RA 9003, the NSWMC composition has been revised under RA 11898 to thirteen (13) members, with eight (8) members from the government sector and five (5) members from the private sector respectively. From a private sector representation of only 17.6% under RA 9003, their participation in the NSWMC was more than doubled to 38.5% under RA 11898. Also, from recycling and air/water quality protection backgrounds, RA 11898 now requires NGO membership to be more specifically targeted to those with track record on solid waste management. It maintains its oversight functions over the National Ecology Center.

e. Local Governance: LGUs and Barangays

   LGUs and Barangays are the government's arm in implementing national regulations at the grassroots level. Though not mandatory, some LGUs take the initiative to adopt national regulations and additionally introduce new provisions for their respective localities, e.g. The Comprehensive Solid Waste Management Ordinance of the Municipality of Cardona, Rizal under Municipal Ordinance # 31, s2006 which was specifically pursuant to RA 9003. Alternatively, LGUs may integrate related national regulations into one local ordinance, e.g. The Quezon City Environmental Code under Ordinance # SP 2350, s2014 which referred to RA 6969 (Toxic Substances Act of 1990), RA 8945 (Mechanical Engineering Act of 1998, RA 8749 (Clean Air Act of 1999), RA 9003 (Solid Waste Management Act of 2000), RA 9147 (Wildlife Resources Conservation and Protection Act of 2001) and RA 9275 (Clean Water Act of 2004) in one document. Similarly, some Barangays further adopt and translate local regulations into their own Ordinance. Again, reiteration of a national law through the issuance of ordinance is not mandatory at the LGU and Barangay levels.

For more than two decades, RA 9003 was cascaded down to the LGUs and Barangays with leeway on how it will be actually implemented on the ground. Approaches, strategies and priorities may differ across LGUs and Barangays. Given that the roles of the LGUs have not been significantly changed under RA 11898, it may now be worth considering unifying efforts at the LGU and Barangay levels nationwide. One existing channel which may be considered to do this is through the National Solid Waste Management Commission (NSWMC) which has retained the Department of Interior and Local Government (DILG) as one of its members. The DILG may champion the program among the 145 Cities, 1,489 Municipalities and 42,029 Barangays in the Philippines. Methods may be through

1 RA 9003 Section 21
2 RA 9003 Section 48(4): Prohibited Acts and Section 49: Fines and Penalties, penalty for violation is *"Any person who violates Sec. 48, pars. (4) shall, upon conviction, be punished with a fine of not less than One thousand pesos (P1,000.00) but not more than Three thousand pesos (P3,000.00) or imprisonment of not less than fifteen (15) days but not more than six (6) months, or both"*.
3 RA 9003 Section 17
4 RA 9003 Section 32
5 RA 9003 Section 12
6 RA 9003 Section 13
7 RA 9003 Section 17
8 RA 9003 Section 10
9 RA 9003 Section 57

localized ordinances, regional task forces, Memorandum of Agreements with private stakeholders, awards & rewards programs, centralized or standardized systems and facilities, synchronized schedules, information drives and others. There may be greater synergy and impact in having LGUs and Barangays simultaneously moving towards the same objective.

B. FILIPINO VALUES, TRAITS, AND OTHER CHARACTERISTICS WHICH MAY AFFECT SOLID WASTE MANAGEMENT PROGRAMS

The following are views expressed about Filipino characteristics which may impact solid waste management programs.

On the Collectors, some negative attitudes which have prevailed at the start of RA 9003, may continue to hinder optimization of RA 11898.

- **"Mababa ang tingin" sa basurero (Discrimination/looking down on waste pickers/informal waste collectors).** In the Philippines, sorting through garbage is literally a dirty job, as the work is usually done manually and without protective equipment. Despite the essential service performed for the society, being a "basurero" carries a negative social perception and is thus often regarded as an undignified job. It is not uncommon for people to shun away at the sight of grime or mounds of trash or even cover their noses against possible offensive smells (Yan, 2022). A study by Nicanor et al. (2021), which involved waste collectors as participants, found that waste collectors experienced low-self worth and felt inferior to other people. The participants also experienced negative social perceptions and stigmas, such as being belittled by other people.
- **"Maliit ang kita sa basura" (Income from trash is small).** For most informal waste collectors, income from "kalakal", or waste items which may still have value, usually come from a mix of wastes, e.g. plastic, metal, paper etc. Value may depend on the component material, quality and weight collected. Generally however, income is not steady and only enough to meet survival to supplemental needs. This may also not serve as enough incentive to participate in EPR efforts. Scavengers in a study by Bernardo expressed that looking for recyclable items in garbage was their only source of income, which was "generally not enough for their meals" (Bernardo, 2008, p. 423).
- **"Nahihiya magpalit" ng basura (Embarrassed to exchange trash).** The hesitancy to exchange trash is not just caused by the stigma of discrimination but also influenced by the often wrong expectation of the public that informal waste collectors should collect all trash, and not just what they can trade (WWF, 2023)
- **"Sigurista" (Playing safe/Not risk taker)** by not participating in new programs until it is generally proven to be successful by a majority. As the EPR Law is new, innovative arrangements, specifically for collectors, may take time to be picked-up until successful schemes are documented and made known ("List Of General Filipino Values You Need To Know," 2017).

Derogatory views of the poor, as above, may have contributed to the earlier difficulties in solid waste management under RA 9003. Efforts to reorient or re-direct these views (Huss, 2007) on the Consumers or Sources of Waste, increase in discipline in the following areas may positively improve RA 11898 outcomes:

- **"Pasaway" (Stubborn/disobedient)** e.g. will not follow waste segregation rules, steal trash bins for re-sale, continue to throw trash in overflowing bins, pile trash along streets/sidewalks/center islands despite regular LGU collection). Despite awareness of basic solid management rules, many Filipinos still do not comply. Knowledge is not translated into practice. The weak enforcement of penalty provisions under RA 9003 may have caused wide tolerance for this behavior (Tatlonghari & Jamias, 2010; Bernardo, 2008).
- **"Ningas Cogon" (Fleeting enthusiasm)** cooperative and hardworking at the start but loses interest soon after. Waste segregation, use of ecobags, participation in trash-to-cash programs, patronage of product refill systems and other environmentally-friendly consumer programs have been introduced before. Although some have gained some followers, these have not been enough to lead to sustainability and replicability of the programs.
- **Sachet economy or Throw away mentality** with sachets and other small quantity purchases. Convenience, availability and affordability make sachets an indispensable part of daily life among Filipino families - from toiletries, condiments, snacks, supplies etc. Many items may be purchased, in single use quantities, within one's budget, at the nearest sari-sari store (local convenience store) or supermarket, and in both urban and rural areas. With more than 26 million households in the Philippines, sachets comprise about 52% of residual plastic wastes (De Jesus, 2020).

As above are embedded in Filipino culture, it will be difficult to aim to change behaviors right away. Strategies must be purposive and convincing to effectively address the issues on consumption, waste, discrimination, compliance, circular framework and others. A recently developed approach is the use of behavioral insights to encourage people to make better choices for themselves and society (GOV.UK, n.d.). The basic framework promoted by the Behavioral Insights Team is the use of EAST Model in behavioral change programs, wherein EAST stands for: Easy, Attractive, Social and Timely (Habit Weekly, n.d.). The behavioral insights approach is also seen to be applicable on the regulatory side, as a measure to better understand institutional biases and barriers as basis for future policy decisions (Drummond et al., 2021).

There are other methods which may be considered, depending on the social, psychological, structural priorities identified and its appropriateness for the Filipino culture. Regardless of the strategy of choice, it remains important to pursue efforts to effect social and behavior change as these ultimately lead to the protection of people's rights (UNICEF, n.d.).

C. CURRENT INVOLVEMENT OF FILIPINOS IN EPR IMPLEMENTATION

It has been observed that Filipinos' understanding of solid waste management is still mostly confined to the definition of "Nabubulok" (Biodegradable) and "Di-Nabubulok" (Non-Biodegradable). However, aside from having solid wastes segregated and collected, as well as exerting effort to maintain clean environs, public concern for the solid waste management process wanes at this point. There appears shallow public interest in, and appreciation for how harmful solid wastes are diverted away from the environment. There is no general awareness, nor interest, on where the wastes are brought, who/how wastes are transferred, and what is done with the wastes.

The Declaration of Policies under RA 9003 cites 1) "institutionalization of public participation", amended under RA 11898 to "integrate public participation"; and 2) strengthening solid waste management topics in the "academic curricula of both formal and non-formal education". Assignments on information and education are given to the LGUs, the National Government and the Department of Education, Culture and Sports (DepEd). The impact of all efforts however, if truly accomplished, still needs to be observed and felt.

This may explain the current limited awareness, interest, concern and cooperation for solid waste management among the general population. Nevertheless, the need for public participation and education remains important and continues to deserve to be among the principles of the Philippine solid management law. Study respondents (PCX, FOH, and Ecoloop) agree with this direction.

D. POTENTIAL IMPACT OF CHANGES UNDER THE EPR LAW

a. Businesses Engaged in Waste Management Operations: The recognition under RA 11898 given to long-time industry stakeholders (waste management entities, distributors, retailers, grocery and store owners, junkshop operators, and individuals or entities in the informal sector involved in waste management) is a positive move to improving the solid waste management program. The reach of harvesting of plastic wastes, in terms of geographical locations and demographics, may be widened through them. Targets for volume of wastes may be set higher and documentation may be more precise.

   Although incentives for participation were limited to LGUs, enterprises, private entities, and NGOs under RA 9003[10], a wider scope of cooperation mechanisms are being planned and incentives have been included under RA 11898 for all stakeholders. Specifically, these include other stakeholders, waste management entities, distributors, retailers, grocery and store owners, junkshop operators, and individuals or entities in the informal sector involved in waste management[11].

   More stakeholders, e.g. individuals, private organizations and entities, OEs, and PROs, including Non-Government Organizations, are also now entitled to receive rewards, recognition and incentives for innovative projects, technologies, processes and techniques or activities in reuse, recycling, and reduction. Further, OEs, PROs, and registered business enterprises may also now qualify for fiscal incentives (e.g. income tax holiday, special corporate income tax rate, tax exemptions, tax deductibles) as provided for under the National Internal Revenue Code of 1997[12].

b. Individuals and Households: The reiteration of segregation at source is important as these mostly involve the general Philippine population which continue to generate waste, plastics included, on a daily basis. While there is not much incentive to their participation based on the law, the volume of wastes they generate may collectively be of interest to other stakeholders, such as collectors and processors. The latter may work on systems efficiency to facilitate proper disposal practices at the household level and maximize harvestable plastic wastes from them. Another approach is to continue to encourage reduction in plastic wastes, in general.

c. Informal Waste Recovery Sector: Similar to legitimate businesses discussed above, "individuals or entities in the informal sector involved in waste management" are also now recognized as valid stakeholders. While there is no call or requirement yet to legitimize their operations, the proposed drafting of implementation parameters for their activities may result in efficiency in the system and translate to an increase in profit margins, or income, which they may generate from the performance of their role. Currently, the amount and frequency of income from this sector may be described as "supplemental" only and cannot be considered as a sustainable means of livelihood. The prospect of this income source to become sufficient and reliable may lead to more permanence in their presence. Hopefully, more respect for the role that this sector performs on a daily basis will also eventually follow. Local informal waste sector groups may also learn from their counterparts in other countries, e.g. India, Latin America, Africa, wherein waste pickers have been organized to pursue collective interests (WEIGO, 2019).

   It may be important to note that there are conditions in the Informal Waste Recovery Sector which the EPR Law may not change, or even improve, on its own. These include: 1) welfare of the informal waste recovery sector as well as, 2) location and conditions of informal settlements, both of which may have indirect impact on the sustainability of the EPR Law and other solid waste management programs.

10 RA 9003 Section 45
11 RA 11898 Section 44
12 RA 11898 Section 45

- Welfare: Although long overdue, RA 11898 has made the first important step to recognize the role of the informal sector in waste management. A 2021 study (Ordinario, 2021) further proposes the institutionalization of the informal economy, not just as a means to protect the welfare of the informal waste sector, but to contribute to the operational viability of solid waste management programs. There is concern however, that while cities and municipalities move to formalize their solid waste management programs, the informal waste sector might be displaced. Hopefully, efforts toward this goal may be looked into once the basic implementation of the EPR Law has been put in place.

- Informal Settlements: Unfortunately, most of the informal waste recovery sector live in settlements which are without basic utilities, e.g. water, power, sewage, and which may also be located in critical areas being protected by solid waste management programs (Castelo, 2019). In Metro-Manila alone, more than 200,000 informal settler families live along waterways. Having no facilities like toilets, the rivers become their dumping grounds for all types of wastes. Being informal settlements, and therefore illegal, there is also no assurance that government waste collection will service them. Resettlement programs have been started by the government in various areas. Special assistance for Individuals and families from the informal waste recovery sector may be worked out so that they may qualify and benefit from these programs.

d. Local Government Units: The roles of the LGUs have not been significantly changed under RA 11898. LGUs however, may need to factor in the identification of new stakeholders involved in the implementation of the EPR Law as it may have an impact on the respective Solid Waste Management Plans of Cities and Municipalities. LGU Solid Waste Management Plans need to be reviewed every two (2) years or as needed[13]. With the passage of RA 11898 in 2022, it may be timely now for Cities and Municipalities to prepare for this review and consider the following opportunities, as it may impact the cost-effectiveness of their plans vis-a-vis annual budgets:

   i. Adopt revenue-generating measures and/or recommend proposals on institutional arrangements to manage solid waste (RA 9003, Section 12)

   ii. Avail of more options for partnerships (RA 9003, Section 13)

   iii. Negotiate for better prices of recyclables (RA 9003, Section 17)

   The Barangay Ecological Solid Waste Management Committee is one of the Barangay-Based Institutions (BBIs) that each Barangay must create. Unlike other BBIs, e.g. Disaster, Gender and Development, Protection of Children, Senior Citizens and PWD, there is no mandated annual budget for the management of solid wastes at the Barangay Level. Thus, expectations for the Barangays to expand their role may be difficult to meet. It may be encouraging to know however, that some Barangays exert effort to show off their best practices in solid waste management competitions out of motivation to earn awards, recognitions and incentives.

13 RA 9003 Section 12

Table 10. Impacts of EPR Law Change in Various Sectors

Sector	EPR Law Change	Impact
Businesses Engaged in Solid Waste Management Operations	Recognition of long-time industry stakeholders	Wider reach of collection Higher target for collection More precise documentation
	Encourage wider scope of cooperation mechanisms	Formalized participation schemes Increased opportunities for stakeholders to avail of incentives
	Provision of incentives, rewards, recognition	Encourage cooperation, participation and innovation
Individuals and Households	Reiteration of segregation at source	Possible innovations by collectors to increase efficiency in segregation and harvesting
Informal Waste Recovery Sector	Recognition of more stakeholders and drafting of implementation parameters	Increased collection efficiency and profit margins
LGUs	Increase in partnership opportunities	Improvement in cost-benefit of Solid Waste Management Plans, especially in budget allocation for collection

It should be noted that while stakeholders are defined under RA 9003 and RA 11898, there is no exclusivity on most roles. While LGUs may accredit partners, there is no regulation mandating patronage of these. Collectors, PROs, OEs may choose which sources to tap. Sources may choose which Collector to work with, or go direct to PROs and OEs. Relationships are very fluid. At the moment, some relationships are direct between the source and OE, while other transactions are layered with several collectors and PROs in between. Thus, some stakeholders are able to maximize income from solid waste management transactions while for other arrangements, income is shared among, and benefits several intermediary collectors. An illustration of varied set-ups is presented in Figure 10.

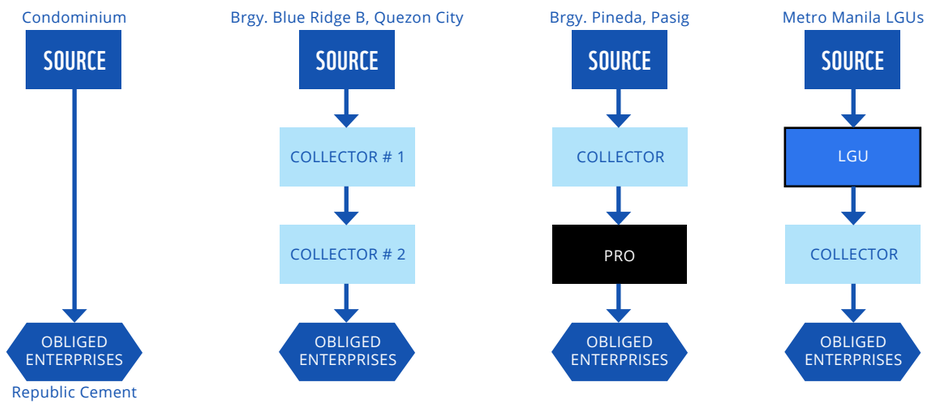


Figure 10. Examples of Current EPR Set-Ups

Two (2) cases on Barangays in Metro-Manila presented in this Chapter will also illustrate that convenience and income may be factors in the collection system. Other motivations may be uncovered as other arrangements are studied.

Mismatch, failed partnerships, and frustration in searching for partners may continue to happen at this early stage. Hopefully, efforts by all stakeholders will eventually be aligned and streamlined as best practices are shared and lessons learned from mistakes as the EPR Law implementation moves forward.

Materials Recovery Facility of Barangay Pineda in Pasig City.

Brgy. Pineda, Pasig City

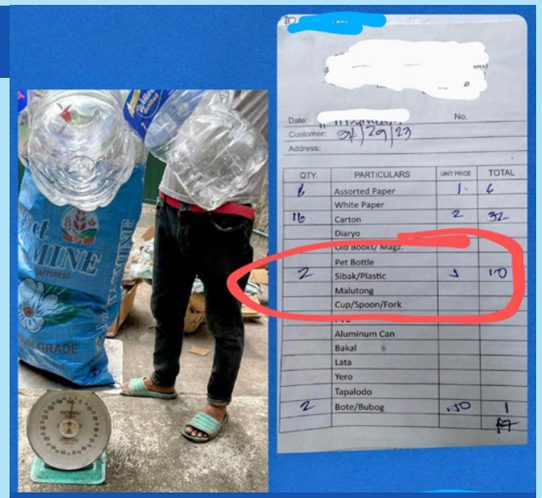
Barangay Pineda is located along the Pasig River. Its solid waste management practices has won awards and recognitions from the Climathon Pasig and United Nations Development Programme (UNDP). It has also partnered with big corporations such as Coca-Cola Philippines, Inc., Unilever Corporation, Alaska Milk Corporation, PCX's Aling Tindera, SWM Pasig, Plastic Flamingo, Green Antz and others in creative ways to collect/ recycle plastic wastes. Over the past few years, residents receive incentives (e.g. rice, milk, points) whenever possible, under the different programs. Eventually, the practice of surrendering recyclable wastes has remained and continued among households, regardless of the availability of incentive or not.

Aling Tindera's Collection Bin for Plastic Waste in Barangay Pineda, Pasig City.

Wire-mesh receptacles are strategically located around the Barangay where residents may deposit with used PET bottles anytime. Barangay Pineda has e-Collectors who regularly go around in a trike to collect these PET bottles for sorting at their Materials Recovery Facility (MRF). PET bottles are disassembled or taken apart into three (3) components: cap, label and bottle. For the bottles, these are consolidated in a big bin provided by Aling Tindera and sold at Php 20/kilo. A Memorandum of Agreement (MOA) covers the collection arrangement. A one-month collection may reach 500 kilos or a cash equivalent of Php 10,000.00. Income is shared among the e-Collectors as an additional source of income.

Barangay Blue Ridge B, Quezon City

Barangay Blue Ridge B is one of the smallest Barangays of Quezon City and sits on the West Valley Fault. It has won awards for its solid waste management practices from the Quezon City Government as well as the Metro-Manila Development Authority. It has deputized Environmental Officers who actively issues citation tickets (Environmental Violation Receipt), to households caught to be mixing biodegradable and non-biodegradable wastes on scheduled collection days, for which a fine of at least Php1,000 should be paid at the QC Hall.



Actual plastic waste sold through house-to-house collection and cash equivalent computation on April 29, 2023 in Barangay Blue Ridge B, Quezon City.

Residents have the option of disposing the PET bottles during the weekly "Non-Biodegradable" waste collection day, or sell their PET bottles to an accredited Recyclable Collector which visits at least once per month to buy paper, plastic, metal, aluminum cans and other qualified recyclable items - on a house-to-house basis. PET bottles are bought "as is" at Php 5/kilo.

A Memorandum of Agreement (MOA) covers the collection arrangement. A few households exert effort to bring the PET bottles to an ambulant junk shop peddler who can pay a higher Php12/kilo for PET bottles. Schedule of said ambulant peddler however is unpredictable. The collection is also undocumented. Either way, income on a household basis is almost negligible for plastic wastes. Some jokingly say that it is just enough to buy a bottle of cold drink.

E. TREATING GAPS AND OVERLAPS IN THE LAW

Although RA 11898 is designed to be an amendment to RA 9003, it opened up the country's solid waste management to an entirely new field of players and responsibilities, i.e. OEs, PROs and Extended Producer Responsibility. Since the changes introduced are extensive which old and new players will need to understand and be familiar with, much time and additional measures may be needed to start achieving its objectives.

Aside from the RA 11898 Implementing Rules and Regulations (IRR) released early 2023, additional legal measures may be needed to further address clarification of roles, standardization of operations, interoperability of activities at the national/regional/local levels and other players, as well as refinement of implementation mechanics. These may initially be based on results of the National Ecology Center's (NEC) review due within one (1) year from the effectiveness of the EPR Law as well as analytics generated from the comprehensive solid waste management information database (RA 11898 IRR, Rule V, Section 1).

As an example, a basic, yet important, topic which may benefit from additional clarification is the function on Information and Education Campaign.

Information and education are necessary ingredients in creating social and behavioral changes, especially needed to implement this new law. While the NEC is tasked to collaborate with government academic and training institutions like the Department of Education (DepEd) and Commission on Higher Education (CHEd) and the Technical Education and Skills Development Authority (TESDA), it is only the TESDA which is represented in the NSWMC, through the DOST. There is no representation, nor directive, for the DepEd and the CHEd to take an active role. Government IEC efforts may also need to be reconciled with the directive for OEs to undertake their own IEC (RA 11898, Rule XV, Section 2.1). As currently written, efforts from the government and private sector appear to be independent of each other with no stated intention of being unified, even in terms of audience, message and means.

Gaps and overlaps in the implementation of RA 11898 need to be identified early for monitoring and/or remedy. These may still be corrected through legal measures, e.g. Memorandum Circulars, Administrative Orders, Executive Orders and even Joint Memorandum Circulars, as necessary.

CONCLUSION AND RECOMMENDATIONS

The complexity of plastic pollution necessitates a transdisciplinary understanding. In this regard, the implementation of Extended Producer Responsibility (EPR) legislation in the Philippines is crucial to ensure transparent and genuine management practices led by producers, preventing plastic leakage into the environment. The involvement of communities is a determining factor in the effectiveness of such implementation.

The introduction of EPR in the Philippines, as an amendment to the Ecological Solid Waste Management Act of 2000, represents a significant step in addressing the country's waste management challenges, particularly with respect to plastic waste. EPR holds producers accountable for the entire life cycle of their products and promotes strategies like reuse, recycling, composting, and other recovery schemes. This approach aligns with global trends, as neighboring countries such as Singapore, Vietnam, Thailand, and Indonesia have also incorporated EPR into their policies to varying degrees.

The participation of private organizations like Nestlé, Unilever, and Coca-Cola, with initiatives aligned with EPR principles, demonstrates the commitment of both the public and private sectors towards achieving a sustainable and circular economy. This case study focuses on one modality through which obliged enterprises can develop EPR programs, specifically through partnerships with Producer Responsibility Organizations (PRO) and through collection and co-processing. Organizations like Plastic Credit Exchange (PCX), Friends of Hope (FOH), and Ecoloop have made notable progress in implementing EPR for plastic waste management in the Philippines, serving as models for other obliged enterprises seeking compliance with the EPR law. However, the success of these programs is subject to the complexities of human actions, which are crucial for effective implementation. Additionally, as EPR matures in the Philippines, different modes and programs may be developed, potentially finding success in areas where the aforementioned examples have faced challenges and barriers.

Various challenges hinder the effective implementation of EPR programs. These include low uptake of EPR registration, potential for freeriding, accumulated targets and fines charged to PROs, low consumer awareness, lack of infrastructure, lack of attention on recycling and reduction, and lack of shared monitoring and evaluation mechanisms. Addressing these challenges is essential for successful EPR implementation.

- **Low uptake of EPR registration**

  A likely reason for the slow progress on registration is the unfamiliarity of obliged enterprises, with some companies unaware that they are mandated to participate in EPR.

- **Potential for freeriding**

  Large producers or sources of plastics (e.g. courier, express, and parcel services) can bypass the responsibility via MSMEs who are not required to participate in EPR through the mechanism of branding introduced in the IRR. This can result to the large plastic producers categorizing themselves as non-obliged enterprises despite the significant plastic footprint they generate in the supply chain.

- **Accumulated targets and associated fines charged to PROs**

  PROs bear the declared plastic footprint of their members and fines will be meted to the PRO if targets are not met. Arrangements between the PRO and its members on these concerns are yet to be standardized.

- **Lack of attention on recycling and reduction**

  The present IRR only sets targets for downstream processes, indicating more focus on post-consumer collection and waste diversion. However, upstream programs (such as reduction) are vital cogs in the circular framework for without them efforts in collection, sorting, and treatment fail to be genuinely sustainable.

- **Lack of shared monitoring and evaluation mechanisms**

  There are no clearly defined roles of NSWMC, OEs, PROs and partner institutions for the coordination of EPR programs, the creation of a common data collection mechanism, and the establishment of a shared monitoring and evaluation approach.

To overcome these challenges, several recommendations can be made.

Expand the scope

Expanding the scope of EPR programs to include all recyclable plastics and other single-use items is crucial. This expansion should be implemented gradually to avoid economic shocks and should be accompanied by support for affected producers in innovating their product designs.

Engage enterprises

The government should clarify penalties for non-compliance, explain the process of selecting effective PROs, monitor PRO performance, and provide financial assistance to PROs for running effective EPR programs.

Promote information and education campaigns

Comprehensive campaigns should be launched to raise awareness about the benefits of EPR, proper waste segregation and disposal, and individual actions in achieving sustainable waste management.

Ensure compliance

The rapid growth of the plastic packaging industry poses a challenge, and coordination among stakeholders is lacking. Strengthening law enforcement mechanisms, supporting research for recycling technologies, and collaborating with other countries can help address these challenges.

Establish a competitive market for PROs

Clear and transparent criteria for recognizing PROs should be set, and their performance should be comprehensively monitored. Reporting mechanisms for anti-competitive practices should be established, and one PRO should not be assigned for a specific product category to encourage competition.

Balance upstream and downstream programs

While downstream programs focus on post-consumer collection and recycling, upstream programs aim to prevent plastic pollution by influencing the design and production of products. Providing mechanisms and incentives for upstream programs in the implementing rules and regulations of EPR would provide a more comprehensive approach to addressing plastic pollution. This could include product redesign, lessening the weight of containers, phasing in of the use of recycled PETs, etc.

Develop a hybrid management model with PROs and LGUs

Collaboration between these entities would leverage their respective strengths and resources, leading to more efficient waste management systems. An example is a scenario wherein effective small-scale segregation and collection programs by LGUs can be aggregated and connected to large-scale processing and recycling facilities by a PRO.

Develop cost-effective systems and infrastructure

Collaboration between stakeholders like local governments, waste management operators, and businesses can optimize collection routes, explore innovative collection methods, and invest in appropriate waste storage, sorting, and processing infrastructure.

Address cultural attitudes and social perceptions

Recognizing and valuing the role of waste collectors and informal waste sector workers, and incorporating cultural values related to waste reduction and recycling into educational campaigns, would foster a positive environment for sustainable waste management practices.

EPR policies have proven effective in reducing waste generation and landfill disposal, incentivizing producers to design more recyclable products. They can also benefit the informal waste sector, increase recycling rates, reduce environmental impacts, improve product design, raise consumer awareness, and create jobs.

EPR is pivotal for sustainable waste management, particularly in developing countries, but their effectiveness depends on specific design and implementation contexts. By implementing these recommendations, the Philippines can make significant progress in achieving a circular economy, plastic neutrality, and social sustainability. The expansion of mandatory EPR programs to MSMEs, the expansion of the scope, the establishment of collaborative networks for data sharing, and the adoption of a hybrid model involving PROs and LGUs would provide a strong foundation for effective EPR implementation. Additionally, focusing on cost-effective and integrated systems, public education, and addressing cultural attitudes would contribute to a comprehensive and sustainable waste management approach.

This case study has also thus far observed the advantages for OEs to work with a PRO. Specifically, most PROs that have registered demonstrated years of experience on working with LGUs and local communities and have built a network of collectors, aggregators, and processors of plastic waste. However, with the expected demand for EPR programs, it will also be conducive to establish common standards across PROs and other stakeholders, especially on terms regarding plastic footprint and auditing of diverted wastes.

Future work on this paper can report on experiences in the auditing and monitoring phases which are yet to be implemented during the first year of RA 11898. Perspectives of OEs and MSMEs voluntarily participating in EPR can be collected and analyzed to identify supporting factors as well as pain points for compliance. Similarly, it is expected that new technologies will come in to satisfy the demand for EPR services. Sustainability and feasibility studies of these systems can accelerate investment in EPR.

It is hoped that through these efforts of building knowledge and capacity for EPR, the Philippines can protect the environment, reduce waste, and create a more sustainable future for its citizens.

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GLOSSARY

Barangay	The lowest administrative division in the Philippines. Barangays are responsible for the segregation and collection of reusable waste within their areas, as well as the establishment of Materials Recovery Facilities (MRFs) for waste sorting and segregation.
Barangay Ecological Solid Waste Management Committee	A committee established at the barangay level responsible for the implementation of ecological solid waste management programs and initiatives.
Blockchain	a secure digital database that tracks the movement of plastic credits.
Circular economy	Economic model based on reduction, reusing, recycling, and recovery that allows a closed-loop production under EPR Act of 2022
Collection costs	Under Extended Producer Responsibility, these are the costs of collecting, transporting, and storing end-of-life products and materials.
Collectives	Group of obliged enterprises that organize themselves, not as a Producer Responsibility Organization (PRO), to implement a common platform for their EPR programs. Collective systems of EPR implementation are utilized for several reasons: to generate economies of scale or density and reduce costs for participants, to share risk among participants, to reduce free-riding, to simplify operations and reduce administrative burdens, and to provide a means for governments to manage waste by orphan products.
Collectors	Individuals or entities responsible for the collection and transport of solid waste from households, commercial establishments, and industrial sources to designated disposal or processing sites.
Design-for-Environment (DfE)	Design method for reduction of impact of a product across its life cycle
Di-Nabubulok	A Filipino term that means non-biodegradable waste, referring to waste materials that do not easily decompose or break down naturally.
End-of-Life (EOL)	the final stages of a product's existence, including post-consumer collection and waste management
EPR Compliance Audit Report (ECAR)	a type of environmental audit that focuses specifically on assessing an organization's compliance with EPR regulations

Extended Producer Responsibility	An environmental policy approach aimed at addressing the challenges associated with plastic waste. It holds producers responsible for managing the waste generated by their products throughout their lifecycle including the post-consumer stage of a product's life cycle (i.e., when packaging becomes waste in an EPR scheme for packaging) (World Bank Group, 2022b, March 28)
EPR Law	Refers to the Extended Producer Responsibility law, which places the responsibility for managing the entire lifecycle of a product's waste on the producers.
EPR Supply Chain	A system of people, organizations, activities, information, and resources involved in the implementation of Extended Producer Responsibility
Global Plastic Debt	Total amount of plastic produced and remains in the environment or circulation which needs to be cleaned up or recovered.
Greenhouse Gas (GHG)	gasses that trap heat in the atmosphere
Informal Waste Sector	Individuals or entities involved in waste management activities without formal recognition or regulation. This sector includes waste pickers, junkshop operators, and other informal waste collectors.
Life Cycle Assessment (LCA)	a tool to assess potential environmental impacts throughout a product's life cycle
Local Government Units (LGUs)	Government bodies at the local level, such as barangays (villages), municipalities, and cities, responsible for the implementation of solid waste management plans within their jurisdictions.
Materials Recovery Facility (MRF)	A materials reclamation facility or materials recycling facility where mixed waste is sorted and segregated into reusable or recyclable materials.
Nabubulok	A Filipino term that means biodegradable waste, referring to waste materials that can easily decompose or be broken down by natural processes.

National Solid Waste Management Commission (NSWMC)	A government body responsible for overseeing and implementing solid waste management policies and programs in the Philippines. The composition of NSWMC includes representatives from both the government and private sectors.
Obliged Enterprises	Businesses and industries that are mandated by law to take responsibility for the management of the solid waste generated by their products. These are large enterprises (or MSMEs whose total value of assets of all enterprises carrying the same brand, label, or trademark exceeds that of medium enterprises) that generate plastic packaging waste and are required to implement an EPR program under the 2022 EPR Act.
Plastic Credit	Transactable environmental asset representing a specified weight of plastic waste from documented and verified plastic offsets and registered in the blockchain ledger.
Plastic Footprint	An indicator used to measure the negative impacts of plastic pollution. It calculates the amount of plastics used and produced by an individual or a company over a defined period of time.
Plastic Neutrality	Amount of plastic recovered is the same as the amount of plastic placed in the market
Plastic Pollution Reduction Standard (PPRS)	a module-based governance document in the implementation of credible and verifiable plastic credit and certification systems
Partnerships	Collaborative arrangements between different stakeholders involved in solid waste management to improve efficiency and effectiveness.
Pollution Adjudication Board	Its a quasi-judicial body created to handle violations and impose fines, reinforcing the EPR Act and encouraging sustainable waste management in the Philippines.
Processors	Business and industrial sectors involved in the processing phase of waste management. They are encouraged to invest in ecological waste management projects and support community activities.
Producer Responsibility Organizations	Organizations established by Obliged Enterprises to fulfill their obligations under the Extended Producer Responsibility (EPR) law, which includes managing the collection and recycling of their products' waste.
Public Awareness and Education	Efforts to inform and educate the public about the importance of solid waste management, including its environmental impact and proper waste disposal practices.

Public Participation	Involvement and engagement of the public in decision-making processes and activities related to solid waste management.
Recyclables	Waste materials that can be processed or transformed into new products through recycling.
Revenue-generating Measures	Actions or strategies implemented by local government units to generate income from solid waste management operations.
Sachet Economy	The prevalent use of small single-use packaging, such as sachets, in the Philippines, contributing to plastic waste generation.
Segregation at Source	The practice of separating different types of waste materials at the point of generation to facilitate proper handling and recycling.
Single-Use Plastic Packaging (SUPPs)	used once, or for a short period of time, before being thrown away.
Solid waste	Refers to any discarded material, including garbage, refuse, sludge, and other waste products.
Solid waste management (SWM)	the collecting, treating, and disposing of solid material that is discarded because it has served its purpose or is no longer useful.
Solid Waste Management Plan	A comprehensive plan developed by LGUs to outline strategies and actions for the effective management of solid waste within their jurisdictions.
Type I packaging waste	Composed of sachets, labels, laminates, and other flexible packaging products, whether single-layer or multilayered with plastics or other materials
Type II packaging waste	Collected as rigid plastic packaging (including containers for food, beverages, home, and personal care products, cosmetics, and their coverings, necessities, and labels).
Type III packaging waste	Composed of plastic bags/sheets (including SUP bags)
Type IV packaging waste	Composed of polystyrene (such as flexible PS materials boxes, cutlery, and coffee cups)

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