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Extended Producer Responsibility in ASEAN: Policy Design, Stakeholder Dynamics, and Consumer Perspectives

Economic Research Institute for ASEAN and East Asia

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Economic Research Institute for ASEAN and East Asia (ERIA)

Sentral Senayan II 5th, 6th,15th Floors

Jalan Asia Afrika No. 8, Gelora Bung Karno

Senayan, Jakarta Pusat 10270

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List of Project Members

Editors

Fusanori Iwasaki, Azusa Uji, and Reo Kawamura

Chapter Contributors

Chapter 1

- Fusanori Iwasaki, Research Fellow, Economics Unit and Environment Unit, ERIA
- Azusa Uji, Associate Professor, Graduate School of Law, Kyoto University
- Reo Kawamura, Former Director for Environment Policy, Environment Unit, ERIA

Chapter 2

- Aulia Ulfatunnisa, Research Associate, Environment Unit, ERIA
- Aulia Salsabella Suwarno, Research Associate, Environment Unit, ERIA

Chapter 3

- Dato' Agamuthu Pariatamby, Professor, Sunway University, Malaysia
- Ong Joo Hock, Chairman & Founder, Malaysian Association of Public Advocacy for Nature (MAPAN)
- Ts Lee Ching Hao, Lecturer, Taylor's University, Malaysia

Chapter 4

- Dr Maria Antonia N. Tanchuling, Professor, Institute of Civil Engineering, University of the Philippines Diliman, Philippines
- Leocer John B. Bularan, Associate Engineer, AMH Philippines, Inc.
- Benedict A. Requejo, Associate Engineer, AMH Philippines, Inc.
- Aika Romae T. Anteza, Design Engineer, AMH Philippines, Inc.

Chapter 5

- Professor Dr Suchana Chavanich, Chulalongkorn University, Bangkok, Thailand
- Professor Dr Voranop Viyakarn, Aquatic Resources Research Institute, Chulalongkorn University, Bangkok, Thailand

- Dr Sujitra Vassanadumrongdee, Sustainable Environment Research Institute, Chulalongkorn University, Bangkok, Thailand
- Dr Udomsak Darumas, Aquatic Resources Research Institute, Chulalongkorn University, Bangkok, Thailand
- Konchawan Chantima, Coral Biology research group, Chulalongkorn University, Bangkok, Thailand
-

Chapter 6

- Dr Lai Van Manh, Institute of Strategy and Policy on Agriculture and Environment, Viet Nam
- Pham Anh Huyen, Senior Researcher, Institute of Strategy and Policy on Agriculture and Environment, Viet Nam
- Do Thi Thanh Nga, Researcher, Institute of Strategy and Policy on Agriculture and Environment, Viet Nam

Chapter 7

- Azusa Uji, Associate Professor, Graduate School of Law, Kyoto University
- Jaehyun Song, Associate Professor in Faculty of Informatics, Kansai University
- Fusanori Iwasaki, Research Fellow, Economics Unit and Environment Unit, ERIA

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Chapter 1

Extended Producer Responsibilities in ASEAN: Policy Design, Stakeholder Dynamics, and Consumer Perspectives – Introduction

Fusanori Iwasaki, Azusa Uji, and Reo Kawamura

1. Global Trends in Extended Producer Responsibility and ASEAN's Response

1.1. The Rise of Extended Producer Responsibility as a Global Policy Instrument

The management of plastic waste has recently emerged as one of the most pressing environmental governance challenges. Global plastic production has grown exponentially since the 1950s, reaching an estimated 400 million tonnes per year by the mid-2020s (OECD, 2022; PlasticsEurope, 2024), with packaging accounting for the largest share of plastic use and, consequently, the largest share of plastic waste. The Southeast and East Asian regions – comprising the ASEAN Plus Three countries – ASEAN member states (AMSs), China, Japan, and the Republic of Korea – account for approximately one-third of this global total, with regional plastics use having surged nearly ninefold since 1990 to reach 152 million tonnes in 2022. In that year alone, the region leaked an estimated 8.4 million tonnes of plastics into the environment, representing over one-third of global leakage (OECD, 2025). The environmental consequences of this trajectory, marine debris accumulation, terrestrial contamination, microplastic dispersal throughout food chains, and greenhouse gas emissions from landfilling and incineration, have catalysed an unprecedented wave of policy innovation at the national, regional, and international levels.

Extended producer responsibility (EPR) has risen to the forefront of this policy response. First systematised as a concept by Thomas Lindhqvist in a 1990 report to the Swedish Ministry of the Environment (Lindhqvist and Lidgren, 1990; Lindhqvist, 2000), EPR fundamentally reconfigures the institutional logic of waste management by extending the responsibility of producers beyond the point of sale to encompass the full post-consumer life cycle of their products. Under EPR frameworks, the producers of goods – whether manufacturers, importers, or brand owners – are held financially and/or operationally accountable for the collection, sorting, recycling, or safe disposal of the products and packaging they place on the market. This extension of liability fulfils several policy objectives concurrently: it internalises negative externalities that would otherwise be shouldered by municipalities and taxpayers; it incentivises eco-design and material substitution upstream in the value chain; and it generates dedicated funding streams for the development of waste management infrastructure.

Over the past 3 decades, EPR has evolved from a predominantly European policy framework to a globally disseminated model. The European Union's Packaging and Packaging Waste Directive, initially established in 1994 and comprehensively revised in 2018 and 2024 (European Parliament and the Council of the European Union, 1994, 2018, 2024), instituted producer-funded producer responsibility organisations (PROs) as the prevailing compliance mechanism. This model has since been adopted by the Organisation for Economic Co-operation and Development (OECD) and other international bodies. Japan's Container and Packaging Recycling Law (Government of Japan, 1995) institutionalised product-specific EPR obligations, thereby establishing a system in which materials circulate from production through consumption and back into manufacturing. Japan subsequently legislated the EPR policies governing home appliances, automotives, and small electronic devices. The South Korean Act on the Promotion of Saving and Recycling of Resources (1992) established an eco-modulated deposit-refund system and mandatory recycled content requirements, thereby demonstrating the efficacy of the end-of-life management strategy in not only addressing end-of-life management issues but also in facilitating the redesign of upstream material flows (Republic of Korea, 1992).

In light of the mounting concern regarding global plastic pollution, the negotiation of a legally binding global treaty on plastic pollution under United Nations Environment Assembly Resolution 5/14 (UNEA, 2022) has been initiated through the Intergovernmental Negotiating Committee process in 2022. This development has further elevated EPR onto the international agenda. Despite the ongoing debate surrounding the precise scope and binding force of the instrument, draft treaty texts have consistently included EPR as one of the core policy measures.[1] This inclusion reflects a broad recognition amongstst member states that producer responsibility frameworks are indispensable for achieving the objectives of the treaty, which are to prevent and significantly reduce plastic pollution. This international normative momentum has reinforced domestic policy efforts across developing economies, including in Southeast Asia, where the pressures of rapid urbanisation, expanding consumer markets, and acute proximity to marine pollution sinks have combined to make plastic waste governance a matter of urgent national concern.

1.2. The Southeast Asian Context: Pressures, Vulnerabilities, and Institutional Responses

Southeast Asia occupies a paradoxical position in global plastic issues. The region is simultaneously a major centre of plastic production and consumption, a significant contributor to transboundary plastic pollution, and one of the regions most severely affected by the accumulation of marine debris along its extensive coastlines and river

[1] Most recent draft treaty text (Chair's Revised Text Proposal –15 August 2025 as at 00.48. on occasion of INC 5.2) mentions the EPR issue as follows: 'Each Party shall take measures to establish or promote, within its national jurisdiction, the development of extended producer responsibility approaches, product circularity, or, as appropriate, other economic instruments serving the same purpose, taking into account the different roles of relevant stakeholders' (Article 7: Plastic Waste Management, Chapter 4.)

systems. AMSs have been repeatedly identified in academic literature and international policy reports as amongst the world's largest sources of ocean-bound plastic waste (Jambeck et al., 2015; Lebreton and Andrady, 2019; Meijer et al., 2021). The designation reflects not the absence of environmental awareness but the structural mismatch between the scale of plastic consumption and the developmental adequacy of waste management infrastructure. Research conducted in the region has identified a cluster of structural challenges that complicate the effective application of EPR to plastic packaging waste in this context, including the prevalence of market-based informal collection systems, high transportation costs, limited waste collection services in rural areas, insufficient recycling facility capacity for difficult-to-recycle materials, inadequate pollution control in the recycling sector, and systemic free-riding and orphan product problems (Johannes et al., 2021). OECD (2025) further confirmed that the region has experienced escalating plastic waste generation and insufficient improvements in waste management, identifying the need for additional, ambitious policies including EPR.

The China National Sword policy of January 2018, which abruptly restricted imports of solid waste and mandated much higher material purity standards, served as a catalyst for policy recalibration across the region (Brooks, Wang, and Jambeck, 2018; Lin, Paengsri, and Yang, 2023). Prior to 2018, many AMSs had relied on plastic waste exports to China as a de facto waste management strategy. The sudden disruption of this outlet exposed the inadequacy of domestic recycling infrastructure and created immediate political pressure to develop more robust domestic policy frameworks, including EPR. At the same time, China's policy diverted plastic waste exports from high-income economies to Southeast Asian countries seeking alternative destinations, generating acute environmental and public health concerns and prompting Thailand, Malaysia, and Viet Nam, amongst others, to introduce or tighten plastic waste import restrictions.

At the regional level, AMSs have progressively strengthened the normative framework governing marine debris and plastic waste. The Bangkok Declaration on Combating Marine Debris in the ASEAN Region (ASEAN, 2019) and the ASEAN Regional Action Plan for Combating Marine Debris in the ASEAN Member States (ASEAN, 2021a) articulated shared commitments to waste reduction, source control, and the promotion of circular economy principles. While these instruments are largely aspirational and non-binding, they have provided a legitimising framework within which national governments have accelerated domestic EPR policy development. The Framework for Circular Economy for the ASEAN Economic Community (ASEAN, 2021b), adopted in 2021, similarly identified EPR as a priority instrument for transitioning from linear to circular material flows across the region.

However, the institutional landscape of EPR across ASEAN remains characterised by pronounced heterogeneity. The present publication concentrates on five selected AMSs – namely, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam – wherein EPR policy development has been undertaken at various stages, ranging from mandatory, legally binding frameworks to voluntary, industry-led initiatives, at various points of transition.

For instance, the Republic of the Philippines passed the Extended Producer Responsibility Act of 2022 (Republic Act No. 11898, Government of the Philippines, 2022), thereby instituting one of the most comprehensive mandatory EPR regimes in the region, with legally enforceable recovery targets. Viet Nam also operationalised EPR obligations under the Law on Environmental Protection 2020 (Government of Vietnam, 2020), creating a hybrid system combining mandatory recycling rates with financial contribution options. Indonesia has operated a voluntary EPR scheme under Ministerial Regulation No. 75/2019 (Government of Indonesia, 2019) since 2019 and announced in 2025 its intention to transition to a mandatory presidential regulation. Thailand's mandatory EPR system, anchored in the Draft Act on Sustainable Packaging Management, was in an advanced stage of legislative preparation as of 2026, with mandatory implementation anticipated from 2028. Malaysia, building on the voluntary foundation established by the Malaysian Recycling Alliance (MAREA), was advancing towards a mandatory EPR scheme for plastic packaging with full implementation targeted by 2030.

This heterogeneity reflects not merely different stages along a unilinear path towards regulatory convergence, but also distinct political economies, institutional capacities, waste management infrastructure, and societal values across the five countries. Understanding EPR implementation in ASEAN therefore requires moving beyond benchmarking policy designs against a normative template derived from European experience towards an analytical examination of the specific historical, institutional, and socio-economic conditions that shape policy adoption, compliance, and effectiveness in each national context (Manomaivibool, 2009; Johannes et al., 2021). This is the central methodological commitment of the research presented in this volume.

2. Typologies of Extended Producer Responsibility: Policy Instruments and Design Dimensions

2.1. Core Concepts and Policy Logic

EPR encompasses a family of policy instruments rather than a single, fixed regulatory form. OECD defined EPR as 'an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle', encompassing both physical and economic responsibility (OECD, 2001, p. 9; 2016, p. 21). Within this broad definition, considerable design variation exists along several critical dimensions that substantially affect the distributional, environmental, and economic outcomes of EPR systems.

The 'polluter pays principle' is operationalised by EPR through the allocation of the costs associated with end-of-life product management to the parties that profit from the placement of products on the market, as opposed to allocating these costs to taxpayers or local governments (OECD, 2016, p. 21). This cost internalisation fulfils two functions that are theoretically distinct. First, it provides a revenue stream for funding waste collection, sorting, recycling, and disposal infrastructure, thereby addressing market

failures in the provision of these public goods. Second, it establishes financial incentives for upstream eco-design improvements. When producers assume the full costs of managing their products' end-of-life, they possess a direct economic interest in reducing the complexity, weight, and non-recyclability of their packaging (Joltreau, 2022). The equilibrium between these two functions – financing post-consumer waste management versus incentivising upstream redesign – varies considerably across EPR system designs and has significant ramifications for the trajectory of material circularity.

2.2. Design Dimensions and Typological Variation

The literature identifies several key design dimensions along which EPR systems vary, each with distinct implications for policy effectiveness and equity (OECD, 2016; Lindhqvist, 2000).

2.2.1 Mandatory versus voluntary character

The most fundamental distinction is between mandatory EPR schemes, in which producer obligations are legally enforceable and subject to penalties for noncompliance, and voluntary schemes, in which producers participate on a discretionary basis, often with government encouragement or industry-negotiated targets (Johannes et al., 2021). Mandatory schemes have been demonstrated to provide stronger incentives for compliance across the producer population, including the deterrence of free riders. However, the implementation of such schemes necessitates robust regulatory capacity and enforcement infrastructure. Voluntary schemes have been shown to offer greater flexibility and lower implementation costs. However, these schemes often result in participation being concentrated amongst large, internationally visible firms, leaving a significant number of smaller producers who do not comply (Johannes et al., 2021; World Bank, 2025). As demonstrated by the case studies in this volume, the transition from voluntary to mandatory EPR is a salient challenge across the ASEAN region (Khetriwal, Kraeuchi, and Widmer, 2008).

2.2.2 Individual versus collective compliance

Within the confines of mandatory frameworks, producers have the option to fulfil their EPR obligations in two distinct ways: either by undertaking these responsibilities individually through the establishment of their own take-back, collection, and recycling systems, or by collectively delegating their obligations to a PRO. While PROs achieve economies of scale in waste management operations by pooling financial contributions from multiple producers, they also introduce collective action challenges, including moral hazard, cost allocation disputes, and the risk of underperformance by the PRO itself. Therefore, the governance structure, financing transparency, and performance monitoring of PROs are therefore critical determinants of the effectiveness of the

collective EPR system (Atasu and Subramanian, 2012; Toyasaki, Boyaci, and Verter, 2011; OECD, 2016).

2.2.3 Financial contribution models

EPR systems generate funding through several distinct mechanisms. Fund-based models, exemplified by the Viet Nam Environmental Protection Fund (VEPF), for example, require producers to make monetary contributions calculated according to the weight of products placed on the market and mandatory recycling rates, with fund disbursement supporting recycling activities and waste management infrastructure (Chapter 6). Deposit-refund systems, applicable primarily to beverage containers, collect deposits from consumers at the point of purchase and refund them upon container return, creating consumer-side incentives for waste recovery without necessarily requiring producer financial contributions to a centralised fund. Direct take-back schemes require producers to establish and manage collection infrastructure independently, maintaining a direct operational link between producer action and recovery performance (Laubinger et al., 2022; OECD, 2016).

2.2.4 Eco-modulated fees

Advanced EPR systems categorise financial contributions based on the environmental attributes of packaging materials (Laubinger et al., 2021). These systems incentivise recyclability, recycled content, and material reduction with lower fees, while penalising difficult-to-recycle or hazardous materials with higher levies. The concept of eco-modulation introduces direct financial incentives that encourage the development of eco-design, thereby guiding market demand towards more sustainable packaging formats (Lifset et al., 2023). However, even in jurisdictions where eco-modulation have been implemented, empirical evidence suggests that its effect on packaging redesign and material substitution has been modest (Joltreau, 2022). Its absence, as observed in several of the ASEAN systems examined in this study, results in producers facing uniform cost pressures regardless of their packaging choices. This phenomenon weakens the upstream design incentive at the core of EPR theory (OECD, 2016).

2.2.5 Scope of covered products and materials

The scope of EPR obligations can be delineated in various ways. Under a narrow interpretation, the obligations may be confined to plastic packaging, whereas under a broader interpretation, they extend to multiple product categories, including electronic and electrical equipment, tyres, batteries, vehicles, and textiles. Viet Nam's EPR framework is noteworthy for its multiproduct scope, encompassing six distinct product categories in addition to packaging, while the Philippine EPR Act focuses specifically on plastic packaging. Decisions regarding the scope of EPR systems reflect political and economic trade-offs between the feasibility of implementation and the

comprehensiveness of coverage. These decisions shape the extent to which EPR systems can address the full spectrum of problematic waste streams (Brown, Laubinger, and Börkey, 2023; OECD, 2016).

2.3. EPR Systems in the Five ASEAN Member States: A Comparative Overview

Across the five ASEAN Member States covered in this publication, EPR systems exhibit the full range of design variation.

The voluntary framework implemented in Indonesia has yielded modest yet increasing compliance amongst prominent multinational corporations. This development highlights the constraints imposed by non-mandatory designs in fostering widespread participation from producers. Malaysia's EPR trajectory exhibits a broadly similar arc, with the MAREA-led voluntary system serving as the proving ground for operational models that will inform the mandatory framework expected by 2030. The Philippines boasts the most advanced mandatory framework in the region, with legally prescribed recovery targets that escalate from 20% in 2023 to 80% from 2028 onwards. The nation has also implemented third-party auditing requirements and formal incentives for eco-design and refillable systems. However, fiscal incentives for EPR investment have yet to be fully operationalised. Thailand's voluntary EPR landscape, which is predominantly characterised by industry-led platforms and voluntary PRO initiatives, is undergoing a transition towards a mandatory framework. This transition is precipitated by the legislative process for the Draft Sustainable Packaging Management Act, which is progressing through the Cabinet and Parliament. Viet Nam's hybrid architecture enables producers to select an option that aligns with their preferences and objectives. These options include self-recycling, contracting certified recyclers, delegating to PRO Viet Nam, or making financial contributions to the VEPF. It is noteworthy that the mandatory recycling rates undergo a review on a 3-year cycle, and the modulation of contribution levels is calibrated to material recyclability.

These institutional arrangements do not exist in isolation; rather, they are embedded in distinct waste management ecosystems. These ecosystems are characterised by different levels of formal collection infrastructure, informal sector engagement, local government capacity, and consumer awareness. A comprehensive understanding of EPR performance in various countries necessitates a multifaceted approach that incorporates these contextual factors alongside the formal policy design. This challenge is addressed in depth by the country-level case studies presented in this volume.

3. Project Methods

The publication employs a mixed-methods approach, integrating quantitative consumer surveys and qualitative case studies. This dual strategy is designed to ensure a comprehensive understanding of both public attitudes and institutional dynamics surrounding EPR.

3.1. Consumer Survey Using a Conjoint Experiment

The objective of the consumer survey is to ascertain the public's preferences and the extent of their willingness to pay for various attributes of EPR policy across five ASEAN countries. In contrast to earlier studies that examined single measures, such as plastic bag levies, this survey employs a comprehensive approach to understand how consumers evaluate a combination of policy elements. This is of critical importance because EPR costs are often passed on to consumers, and their acceptance has the capacity to influence policy feasibility.

The survey employs a conjoint experiment, presenting respondents with paired policy scenarios that vary in attributes such as additional price, implementing authority (companies, local or national government), and revenue allocation (e.g., improving waste management, supporting recycling technology, or redesigning products for recyclability). This methodological approach facilitates the estimation of trade-offs and the identification of policy designs that optimise consumer support.

To explore the role of information, the survey includes framing treatments. It is worth noting that a proportion of respondents received information on regional co-operation or international obligations before completing the conjoint tasks. This assists in determining whether awareness of global or regional initiatives impacts preferences. Furthermore, the incorporation of perception questions will facilitate the collection of data regarding beliefs concerning environmental protection, the severity of plastic pollution, and trust in institutions. This enables a comprehensive analysis of how attitudes influence willingness to pay.

The collection of demographic data, including age, gender, income, and urban/rural status, are utilised to identify heterogeneity in preferences. The survey is implemented by professional firms in each country, ensuring cultural and linguistic appropriateness. Ensuring ethical approval and pre-registration is paramount for maintaining transparency and rigour in research. The findings of this study provide actionable insights into designing EPR schemes that are both socially acceptable and effective.

3.2. Case Studies of Five ASEAN Member States

The case studies serve to complement the consumer survey by providing contextual depth on EPR implementation in each country. The studies encompass the present status of EPR schemes, incorporating the relevant legal frameworks, institutional arrangements, and operational mechanisms. This analysis highlights differences in policy maturity in five AMSs.

Each case study examines the roles of key stakeholders, including government agencies, PROs, and the informal sector. It is imperative to comprehend these dynamics to identify governance challenges and opportunities for integration. The studies will also assess

market conditions for recycled plastics, which persist as a significant impediment to the effective implementation of EPR.

The data is collected through a combination of methods, including the review of official documents and media information, as well as stakeholder interviews. In addition, each country chapter gathers insights into public and business attitudes towards EPR, which will inform the survey design and interpretation of results. The integration of institutional analysis with stakeholder perspectives, as evidenced by the case studies, is poised to yield a nuanced understanding of systemic challenges and best practices.

The ensuing case studies will serve as a foundational basis for the formulation of policy recommendations at both the national and regional levels. The identified lessons will be examined, along with the innovative approaches and opportunities for harmonisation that can fortify ASEAN's collective response to plastic pollution.

4. Key Debates and the Case for Consumer-Centred Analysis

4.1. The Producer–Government Paradigm and Its Limitations

The dominant tradition of EPR research has been structured around the perspectives of producers and governments. Policy design studies have examined the relative merits of mandatory versus voluntary schemes, the governance structures of PROs, the effectiveness of eco-modulated fees in incentivising redesign, and the enforcement mechanisms that determine compliance rates (Atasu and Subramanian, 2012; Joltreau, 2022; OECD, 2016). Empirical assessments of EPR system performance have focused on producer participation rates, recovery volumes, recycling rates, and the extent to which EPR funding flows translate into verifiable improvements in waste management infrastructure (Colelli et al., 2022; Compagnoni, 2022; Larrain, Billen, and Van Passel, 2022). This body of work has produced valuable insights and has informed the design of EPR systems across the world.

Nevertheless, this producer–government framing lacks an important analytical viewpoint. EPR is implicitly premised on the fiscal neutrality of the state: rather than funding waste management through general tax revenues, it places the financial burden on producers. Yet this premise obscures a fundamental economic reality. Producers operating in competitive markets typically pass increases in input costs – including EPR compliance costs – through to consumers in the form of higher retail prices. In effect, EPR frequently functions as an indirect tax on the consumption of plastic-intensive products, with the incidence falling on households rather than producers.

This observation has profound implications for the political economy of EPR. If citizens ultimately bear the financial costs of EPR policies – as higher prices for consumer goods – then the political viability, social legitimacy, and long-run sustainability of EPR systems cannot be adequately assessed through the lens of producer compliance alone. Equally relevant is the extent to which citizens, as both consumers and voters, are willing to

tolerate EPR-induced price increases in exchange for environmental improvements, and how this willingness varies across different policy designs, enforcement mechanisms, fund allocation priorities, and institutional arrangements for fund management.

4.2. Why Consumer Surveys Are Essential: Three Arguments

The systematic study of consumer preferences over EPR policy designs is justified on at least three distinct grounds, spanning the empirical, normative, and practical dimensions of policy analysis.

First, the transparency of the cost distribution argument. When EPR compliance costs are passed through to retail prices, consumers effectively pay an environmental levy on plastic-intensive purchases. Unlike explicit carbon taxes or environmental charges, which are typically visible as line items on receipts or utility bills, EPR-induced price increases are embedded in the general price level of consumer goods, rendering them largely invisible as a policy instrument. This invisibility has important consequences: consumers may simultaneously support EPR in the abstract while opposing its practical consequences if they associate price increases with corporate profiteering rather than environmental investment. Consumer surveys that elicit willingness to pay for different EPR policy designs – making the cost dimension explicit and transparent – provide policymakers with empirically grounded estimates of socially acceptable cost levels and can inform communication strategies that build public understanding of the connection between EPR compliance costs and environmental outcomes.

Second, the legitimacy argument. EPR legislation typically requires a basic legislative mandate. However, the detailed design choices that determine how EPR systems actually operate – including the selection of primary policy instruments (fees, deposit-refund, mandatory content), the level of enforcement stringency, the allocation of fund revenues across different environmental interventions, and the institutional architecture of fund governance – are frequently delegated to regulatory agencies, ministries, and industry bodies. These delegated decisions are consequential: they determine who pays how much, who benefits, and through what mechanisms environmental improvement is pursued. The proposition that these decisions should, at least in part, reflect the preferences of the citizens who ultimately bear their costs is normatively compelling.

Third, the political feasibility and policy durability argument. Policies that impose visible costs on households are politically vulnerable to reversal or dilution, particularly in democratic systems where electoral pressures constrain regulatory ambition. EPR systems that impose household costs in excess of what a substantial majority of citizens consider acceptable risk generating political backlash that erodes the regulatory framework over time. Conversely, policies designed with awareness of citizen cost tolerance and aligned with public preferences regarding fund allocation and governance are more likely to achieve durable political support. In the ASEAN context, where several countries are in the early stages of EPR institutionalisation and mandatory frameworks

are still being legislatively consolidated, the design choices made now will shape the trajectory of EPR implementation for decades. Evidence on consumer preferences provides an empirical foundation for designing EPR systems that are not merely technically sound but also politically sustainable.

4.3. Cross-Cutting Policy Debates Illuminated by the Studies in this Publication

Beyond the consumer survey rationale, the studies collected in this publication collectively illuminate a set of cross-cutting policy debates that define the frontier of EPR research and practice in Southeast Asia.

Compliance asymmetry between large and small producers. Across all five country studies, EPR participation and compliance are concentrated amongst large, typically multinational corporations, while small and medium-sized enterprises (SMEs) exhibit lower rates of engagement (e.g., Chapter 2). This asymmetry reflects differential capacities to absorb compliance costs, navigate administrative procedures, and access information about regulatory requirements. It also creates an uneven competitive playing field in which compliant producers bear costs that their non-compliant competitors avoid, potentially undermining market incentives for EPR adoption. Policy designs that address inclusion of SMEs – through phased implementation, threshold exemptions, simplified compliance pathways, and targeted technical assistance – are therefore critical to the equitable and effective operation of EPR systems (e.g., Chapters 4 and 6).

Integration of the informal waste sector. In all five countries, informal waste collectors – including itinerant scrap buyers, waste pickers, and small-scale junk shop operators – perform a substantial share of the material recovery and recycling work. In Viet Nam, for example, the informal sector is estimated to collect over 30% of recyclable plastic waste. In the Philippines, junk shops are responsible for the diversion of a significant proportion of urban waste streams (e.g., Chapters 4 and 6). Yet EPR financial flows are typically directed to legally registered firms, systematically excluding informal workers from access to EPR funding while depending on their labour forces for system performance. The formalisation of the informal sector, or alternatively the development of EPR financing mechanisms that recognise and compensate informal worker contributions without requiring full formalisation, is amongst the equity and effectiveness challenges facing ASEAN EPR systems.

The downstream bias in compliance strategies. EPR theory emphasises upstream eco-design incentives as a defining feature of producer responsibility frameworks. In practice, however, compliance strategies in several countries' studies exhibit a marked downstream bias, with producers preferring waste collection partnerships, plastic crediting, and co-processing over the more demanding and capital-intensive investments in packaging redesign, material substitution, and reusable systems (e.g., Chapters 2 and 4). This pattern reflects the relative ease and lower cost of verifying downstream compliance compared with implementing upstream design changes. However, it is at

odds with the circular economy principles that underpin EPR. Addressing this bias requires regulatory attention to measurement systems, incentive structures, and enforcement priorities that make upstream contributions to circularity visible and rewarded within EPR accounting frameworks.

The governance of EPR funds. The institutional arrangements for collecting, managing, and disbursing EPR revenues are critical determinants of system legitimacy and effectiveness. Where PROs manage funds on behalf of producers, questions of transparency, accountability, and potential conflicts of interest between fund managers and contributing producers are of central importance. Where state agencies manage funds, concerns about administrative efficiency, political allocation of resources, and the responsiveness of disbursement mechanisms to dynamic recycling market conditions arise.

The tension between upstream prevention and downstream management in public preferences. Perhaps the important finding of the consumer survey in Chapter 7 is that public preferences regarding EPR fund allocation are oriented towards upstream and midstream recycling-oriented interventions – investment in sorting and recycling facilities, research and development (R&D) for substitute technologies, and promotion of recycled materials – rather than downstream waste collection improvement or environmental cleanup. This preference structure is notable because it contrasts with the conventional policy narrative, which has tended to emphasise the inadequacy of waste management infrastructure as the primary constraint on plastic pollution reduction in the ASEAN region. The survey results suggest that the public perceives the root cause of the crisis as upstream – in the excessive production of virgin and non-recyclable plastics – and expects EPR to address this root cause rather than simply financing an extension of existing waste management services.

5. Overview of the Studies in This Publication

The six studies collected in this publication provide a comprehensive examination of EPR policy design, implementation dynamics, stakeholder landscapes, and consumer preferences across five AMSs. They constitute the first systematic, multi-country comparative analysis of EPR in Southeast Asia to integrate country-level institutional analysis with cross-national survey experimental evidence on public preferences. The following summaries indicate the scope and key contributions of each study.

5.1. Indonesia: 6 Years of Voluntary EPR and the Path to Mandatory Implementation

The Republic of Indonesia, a nation of more than 17,508 islands across the Indian and Pacific Oceans, generates approximately 7.8 million tonnes of plastic waste annually, making it one of the world's largest producers of plastic waste. Of this total, an estimated 4.5 million tonnes remain uncollected and are disposed of in open environments or water bodies. The nation's EPR framework, instituted under the auspices of Ministry of

Environment and Forestry Regulation No. 75/2019 (P75/2019), functions as a voluntary programme. Producers in the manufacturing, food service, and retail sectors are required to develop 10-year waste reduction road maps aimed at achieving a 30% reduction in packaging waste by 2029. Ulfatunnisa and Suwarno (Chapter 2) evaluate the 6-year implementation process of this regulation through a systematic literature review, drawing on official compliance data, civil society assessments, and academic analyses. The findings reveal a pattern of modest but gradually increasing producer participation. A total of 204 producers had completed account registration as of 2024. Of these, only 38 had submitted waste reduction road maps, and only 24 had reported implementation progress. Collectively, these producers documented 295,588 tonnes of waste reduction. Although this figure continues to rise, it represents only a negligible percentage of Indonesia's overall plastic waste burden. Evidence indicates that compliance is predominantly concentrated amongst large multinationals, particularly within the food and beverage sector. Moreover, compliance efforts remain predominantly oriented towards recycling interventions rather than the reduction and reuse strategies prioritised in the waste hierarchy. The study highlights structural weaknesses within the P75/2019 framework. These weaknesses include the absence of eco-modulated fees, inadequate PRO mandates, enforcement limited to public disclosure of poor performance, and insufficient inter-ministerial co-ordination. Cognisant of these limitations, Indonesia's Ministry of Environment declared in 2025 its intent to enhance the regulatory framework to a presidential regulation, thereby establishing an EPR Working Group, a Producer Responsibility Supervisory Board, and an EPR Management Information System. The study's findings culminate in the formulation of policy recommendations focused on strengthening cross-sectoral consultation, reinforcing sanctions, improving monitoring and data transparency, and sustaining engagement with the Ministry of Industry, with the aim of broadening the institutional basis for EPR governance.

5.2. Malaysia: From Voluntary Industry Leadership to Mandatory Compliance

Malaysia offers a noteworthy instance of EPR institutional evolution in the region, undergoing a transition from a well-developed voluntary framework supported by MAREA. Malaysia is progressing from this voluntary system to a mandatory one, with full implementation anticipated by 2030 and significant milestones expected in 2026. In the context of institutional transition, Pariatamby, Ong, and Lee (Chapter 3 in this report) examined the socio-economic barriers, stakeholder dynamics, and public perceptions that will shape EPR effectiveness under the emerging mandatory framework. Malaysia generates approximately 1.07 million tonnes of plastic waste per year, with single-use plastics accounting for nearly half of this total. Despite the country's relatively advanced waste management infrastructure by regional standards, plastic packaging recycling rates remain below 15%. The study identifies several persistent obstacles to EPR effectiveness: regulatory fragmentation across jurisdictions with different solid waste management governance arrangements, industry resistance rooted in concerns about

compliance costs, the limited integration of informal waste pickers – who perform essential collection functions – into formal EPR financing flows, and the disruption of recycling markets caused by China's National Sword policy. Survey evidence from the study indicates that public support for EPR is moderate and strongly conditional on trust in government enforcement and perceived transparency of reporting mechanisms, with willingness to pay emerging as a critical lever linking public trust, enforcement credibility, and the politically acceptable distribution of EPR costs. The study recommends a phased national EPR rollout beginning with high-volume resins in infrastructure-ready regions, eco-modulated fee structures differentiating contributions by recyclability and recycled content, the licensing of PROs with enforceable performance benchmarks and audit requirements, deposit-refund schemes for high-leakage beverage containers, and harmonisation of recyclability standards with ASEAN and European Union frameworks to prevent regulatory arbitrage in cross-border trade.

5.3. The Philippines: Mandatory EPR in Practice – Early Progress and Remaining Challenges

The Philippines enacted the Extended Producer Responsibility Act of 2022 (Republic Act No. 11898), which constitutes a substantial amendment to the foundational Ecological Solid Waste Management Act (RA 9003). This legislative act established one of the most legally comprehensive mandatory EPR frameworks in the region, thereby institutionalising producer accountability for plastic packaging waste across the full product lifecycle. Approximately 3 years following its implementation, the framework has demonstrated quantifiable early progress. The national recovery rate reported at the 2026 EPR Recognition Program was 55.98%, surpassing the 50% statutory target for 2025. This achievement is further underscored by the diversion of 246 million kilograms of plastic by 1,017 registered entities operating across 201 EPR programmes. In Chapter 4, Tanchuling, Anteza, Bularan, and Requejo presented a thorough examination of the EPR Act's legal framework, financial mechanisms, operational design, stakeholder landscape, and early performance. This analysis identifies the achievements and structural limitations of the Philippine model. The efficiency of collection exhibits significant variation according to the degree of urbanisation, ranging from 95% in Metro Manila to 15–50% in rural regions (developing areas). This discrepancy highlights the inherent spatial inequalities that EPR must address in order to optimise waste management infrastructure. The informal waste sector – junk shops, waste pickers, and itinerant scrap buyers – performs a critical role in material recovery that is acknowledged in the regulatory framework but insufficiently compensated or integrated in practice. Promised fiscal incentives for EPR investment, including tax deductions and credits, have yet to be operationalised through the required inter-agency regulatory instruments, currently driving compliance towards lower-cost strategies such as plastic crediting and co-processing rather than the more ambitious upstream investments in eco-design and reusable systems that systemic circularity requires. The study recommends

operationalising fiscal incentives through joint administrative orders issued by the Departments of Finance and Bureau of Internal Revenue; incorporating formal recognition and equitable compensation mechanisms for informal workers into EPR programme design; standardising auditing procedures through independent third-party verification; and expanding the scope of EPR beyond plastic packaging to include glass, paper, metal, and textiles.

5.4. Thailand: Voluntary Foundations and the Legislative Path to Mandatory EPR

Thailand occupies a distinctive position in the regional EPR landscape. The country has developed relatively sophisticated voluntary EPR infrastructure, including the PRO Thailand Network, the PPP Plastics Multi-Stakeholder Initiative, and TIPMSE's PackBack Pilot Project. However, its mandatory legal framework remains under legislative development. In Chapter 5, Chavanich, Vassanadumrongdee, Darumas, Chantima, and Viyakarn thoroughly examined Thailand's plastic waste situation, policy evolution, voluntary EPR initiatives, and the progression of the Draft Act on Sustainable Packaging Management. This analysis is supported by extensive national data from the Pollution Control Department and sector-specific sources. Thailand's plastic waste profile is characterised by its scale and complexity. In 2025, the country generated approximately 2.94 million tonnes of single-use plastic waste, of which 75% was directed to disposal sites or leaked into the environment. Plastic waste represents the second-largest category of municipal solid waste nationally. The country's Bio-Circular-Green Economy Model, elevated as a national strategic priority under the 13th National Economic and Social Development Plan, has provided an overarching framework within which EPR sits as a core enabling instrument. The Draft Sustainable Packaging Management Act, developed from 2023 onwards through extensive stakeholder consultations and public hearings, proposes mandatory producer obligations through a licensed PRO mechanism overseen by the Pollution Control Department. It builds on the groundwork laid by voluntary initiatives such as the PRO Thailand Network, with eco-modulated fees (a dual-fee structure that differentiates between standard and difficult-to-recycle packaging) and life cycle–based responsibilities for packaging. Following the submission of the Act to the Cabinet and the subsequent dissolution of Parliament, a second submission is anticipated in 2026. Parliamentary consideration is expected in 2027, with mandatory enforcement anticipated from 2028. Chapter 5 identifies systemic barriers spanning legal, technical, economic, and social dimensions – including regulatory fragmentation, infrastructure limitations, insufficient economic incentives for compliance, and low public awareness of EPR mechanisms – and concludes that successful transition requires integrated inter-ministerial co-ordination, sustained investment in waste management infrastructure, and active stakeholder engagement across the value chain.

5.5. Viet Nam: A Comprehensive Legal Framework in Search of Implementation Effectiveness

Viet Nam's economy has undergone rapid growth in recent years, with an average annual increase of 6.2% from 2021 to 2025. This growth has been accompanied by a substantial increase in plastic consumption and waste generation, leading to significant concerns regarding marine plastic leakage in the Asia-Pacific region. It is noteworthy that Viet Nam's gross domestic product per capita has also reached an average of $5,026 by 2025, indicating a substantial level of economic development. The nation's EPR system, operationalised under the Law on Environmental Protection of 2020 and subsequently delineated through Decree No. 08/2022 and its subsequent amendment, Decree No. 05/2025, is regarded as one of the most legally comprehensive EPR frameworks in the ASEAN region (Government of Viet Nam, 2022; 2025). The law imposes mandatory recycling obligations on producers and importers of four categories of packaging materials and six product groups. It establishes mandatory recycling rates of up to 22% for aluminium packaging and rigid PET bottles. Compliance can be achieved through self-recycling, contracting certified recyclers, delegation to PRO Viet Nam, or financial contribution to the Viet Nam Environmental Protection Fund (VEPF). Manh, Huyen, and Nga (Chapter 6) employed a qualitative policy analysis approach to evaluate the design, initial performance, and stakeholder dynamics of this system. Despite its comprehensive legal framework, the effectiveness of EPR remains constrained by limited awareness amongst enterprises – particularly small and medium-sized enterprises, which face challenges related to financial capacity, administrative complexity, and access to recycling infrastructure; reliance on financial contributions rather than direct recycling; fragmented recycling infrastructure; and the structural exclusion of the informal sector from access to EPR funds, despite the critical role of informal workers in material recovery. PRO Viet Nam, formally recognised as the first authorised intermediary organisation in 2023, achieved collection and recycling of over 64,000 tonnes of packaging waste in 2024, representing significant progress, but system-wide performance gaps remain. Chapter 6 calls for a dedicated EPR decree to consolidate regulatory provisions and enhance financial transparency of the VEPF. It also shows investment incentives for pioneer recycling enterprises, deposit-return scheme pilots for glass packaging, and formal mechanisms for integrating informal sector workers into EPR governance and funding flows.

5.6. Consumer Preferences Across Five ASEAN Member States: Evidence from a Conjoint Survey Experiment

Chapter 7 addresses a dimension of EPR policy analysis that has been systematically underexplored in the existing literature: the preferences of consumers and citizens regarding the design of EPR systems whose costs they ultimately bear. Uji, Song, and Iwasaki (Chapter 7 in this report) reported the results of a survey-embedded conjoint experiment administered to 2,100 adult respondents in each of five ASEAN countries –

Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam – conducted in December 2025. The conjoint design presented respondents with six sequential paired comparisons of hypothetical EPR policy packages, each characterised by five dimensions: (i) key policy instrument (unrecyclable plastic fees, mandatory recycled content, or deposit-refund system); (ii) additional monthly household costs at varying multiples of a local plastic bottle price baseline; (iii) policy enforcement approach (voluntary without incentives, voluntary with incentives, or mandatory); (iv) EPR fund allocation target (ranging from upstream R&D to downstream cleanup); and (v) EPR fund management body (industry-led PRO, national government agency, or local government). This design yields a dataset of 25,200 observations per country, enabling causal identification of the marginal effect of each policy attribute on public support. The study generates two principal findings of direct policy relevance. First, public support for EPR decreases linearly with increasing household costs across all five countries, confirming that cost transparency is central to political acceptability, but with significant cross-national variations in price sensitivity: Malaysian respondents exhibit the highest cost sensitivity, while Vietnamese respondents demonstrate the greatest resilience to higher cost levels. Second, contrary to the dominant policy narrative that emphasises downstream waste management infrastructure as the primary regional constraint, respondents in several countries show a strong preference for allocating EPR funds to upstream and midstream recycling activities – such as building modern sorting and recycling facilities, investing in R&D on substitute technologies, and promoting of the use of recycled plastics – rather than to downstream waste collection or environmental cleanup. These findings have direct implications for the design of EPR schemes, enforcement of communication, and the political management of cost pass-through across the five countries examined in this study.

6. Structure of the Publication

The six studies are organised in a manner that transitions from a country-level institutional analysis to a cross-national comparative analysis of consumer preferences. Chapters 2 to 6 present the country case studies in the following order: Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. Each chapter reflects a rough progression along the spectrum from longer-established, currently voluntary frameworks transitioning towards mandatory implementation (Indonesia, Malaysia, Thailand) through hybrid systems in transition (Viet Nam) to a more mature mandatory framework (the Philippines). Chapter 7 presents the cross-national conjoint survey experiment, drawing on the institutional context established in the preceding country studies to interpret patterns of variation in consumer preferences.

A comparison of the country studies reveals a broadly comparable structure, with each study examining the following: (i) the national socio-economic and plastic waste profile that contextualises EPR; (ii) the legal and institutional framework governing EPR; (iii) the design of the existing EPR scheme and its implementation mechanisms; (iv) the

stakeholder landscape, including producers, PROs, the informal sector, civil society, and government agencies; (v) available evidence on system performance and innovation; and (vi) lessons learned with policy recommendations. This structural parallelism facilitates comparative reading across chapters, while the individual studies retain the contextual specificity necessary to do justice to the distinctive features of each national case.

The studies in this publication argue for a reorientation of EPR policy analysis and design in the ASEAN region. The prevailing producer–government paradigm has yielded significant insights; however, it has systematically disregarded the consumer dimension of EPR governance as a primary stakeholder. As AMSs contemplate the transition from voluntary to mandatory EPR frameworks, the designs they select will influence not only the environmental effectiveness of these systems but also their political resilience, social legitimacy, and distributional equity. The incorporation of consumer preferences into the analytical and policy design toolkit is not merely academic refinement; it is a precondition for the development of EPR systems that can ensure the necessary public and political support to generate enduring reductions in plastic waste, which continues to pose a threat to the region's environments, economies, and communities.

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Chapter 2

Six Years of Extended Producer Responsibility Implementation in Indonesia: Progress and the Way Forward

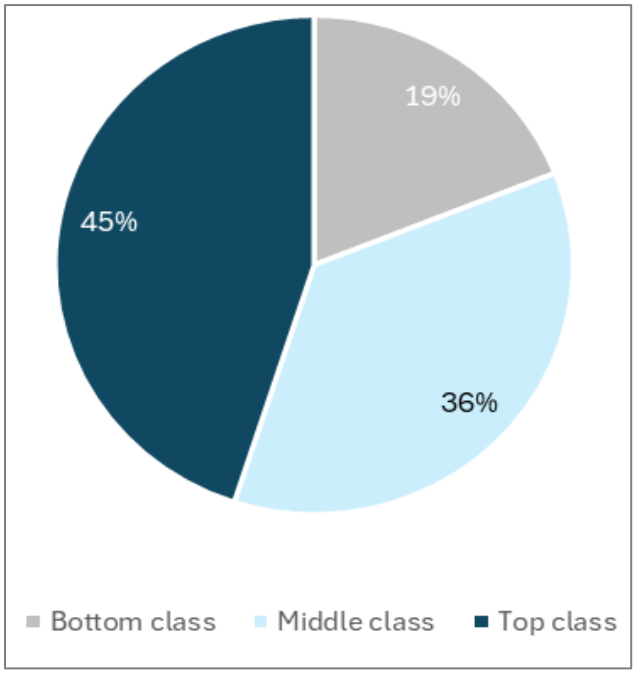
Aulia Ulfatunnisa and Aulia Salsabella Suwarno

1. Introduction

Indonesia is a developing country with relatively stable economic growth, with gross domestic product growing by around 5% in 2024, supported by household consumption, investment, and infrastructure development (Sulaiman and Suroyo, 2025). However, despite accommodative fiscal and monetary policies and resilient private demand, structural challenges remain embedded in the socio-economic landscape (Ablaza, Alladi, and Pape, 2023). According to national labour statistics, the average net monthly wage across sectors was about Rp3.27 million in 2024, with pronounced wage disparities across sectors; agriculture records the lowest average wage at around Rp1.75 million (BPS, 2024a). Moreover, informal employment remains widespread, accounting for approximately 59.4% of the workforce, where jobs are typically low-wage and lack social protection (Ablaza et al., 2023).

The distribution of economic welfare based on monthly household spending in Indonesia still shows significant inequality, where Statistics Indonesia classifies the population into the bottom 40% (poor), the middle 40% (middle), and the top 20% (rich) (BPS, 2024b). As of March 2025, the top-class accounts for 45% of national expenditure, as shown in Figure 2.1, reflecting a significant concentration of consumption amongst higher-income groups (Liman, 2025). With regard to Indonesia, the employment rate reached 95.15% in August 2025, while the unemployment rate stood at 4.85% (BPS, 2025).

Figure 2.1. Distribution of National Expenditure in Indonesia



Source: Liman (2025).

As employment and income levels influence consumption patterns, they also affect waste generation, with plastic waste emerging as a major environmental challenge. Indonesia generates a substantial amount of plastic waste, which accounts for approximately 20.11% of total municipal solid waste, or around 6.74 million tonnes in 2025, making the country one of the largest producers of plastic waste (MoE, 2025). Yet, plastic waste management remains a major challenge, with approximately 4.52 million tonnes of plastic waste left uncollected each year, much of which is dumped on land or in water bodies, openly burned, or buried in the terrestrial environment (World Bank, 2021). Only about 3.23 million tonnes of plastic waste are collected each year, of which around 1.1 million tonnes are recycled, resulting in an overall plastic recycling rate of just 14% (World Bank, 2021). As a result of this mismanagement, Indonesia experiences significant plastic leakage into rivers and coastal environments, with land-based sources contributing an estimated 300,000 tonnes of plastic to the marine environment each year.

(World Bank, 2021).

As a response to this, the country has enacted a voluntary EPR scheme through Ministry of Environment and Forestry Regulation No. 75/2019 (MoEF Regulation No. 75/2019 or P75/2019), which requires producers to develop waste reduction road maps and reduce waste from products and packaging by 30% by 2029; however, to date, producer participation is still limited and largely dominated by large or multinational companies (IBCSD, 2022). Some examples of EPR implementation can be found in voluntary corporate initiatives and pilot projects at the local level. But overall, EPR in Indonesia remains in a

transitional phase, moving from voluntary action towards an effective enforcement mechanism.

2. Policy Context and Institutional Framework

Indonesia has established a range of regulations that form the policy basis for EPR, spanning from national laws, presidential regulations, to ministerial decrees. Table 2.1 outlines key policies that define producer obligations under the principle of EPR.

Table 2.1. EPR Legal Framework in Indonesia

Policy	Context
Law No. 18/2008	- Mandates producers take responsibility for managing packaging and products that are difficult to decompose naturally. - Mandates producers to reduce packaging, use environmentally friendly materials, recycle packaging, and implement take-back systems for packaging waste. - Mandates producers to implement waste reduction measures in collaboration with business actors, communities, and local governments.
Government Regulation Number 81 of 2012 on the Management of Household Waste and Household-Like Waste	- Imposes an obligation on producers to reduce, reuse, and recycle (3R) waste. - Requires producers to support waste reduction through product design, packaging design, and production processes. - Facilitates producers' implementation of waste reduction through partnership development, incentives and disincentives, and technical support.
Minister of Environment Regulation No. 13 of 2012 on Guidelines for the Implementation of 3R through Waste Banks	- Promotes collaboration between producers and community-based waste banks to facilitate waste collection and recycling. - Encourages producers to develop mechanisms for the take-back of post-consumer products and packaging. - Encourages producers to participate in public awareness campaigns and educational programmes on waste reduction. - Encourages producers to co-ordinate with municipalities in implementing waste reduction initiatives.

Policy	Context
Presidential Decree No. 97/2017 on National Policies and Strategies for the Management of Household Waste and Household-like Waste	- Mandates the reinforcement of business sector commitment by enforcing producer responsibilities for reducing household and household-like waste. - Sets targets to reduce waste generation at source by 30% and ensure the proper management of 70% of waste by 2025. - Promotes waste reduction through improved product design, reduced packaging, the use of environmentally friendly materials, the development of take-back systems, and support for recycling systems.
Presidential Regulation Number 83 of 2018 on Marine Debris Management	- Mandates the establishment of regulations aimed at reducing waste generated by producers. - Encourages upstream and downstream industries to produce biodegradable and recyclable plastic polymer materials.
MoEF Regulation No. 75/2019 on Waste Reduction Roadmap by Producers	- Requires certain producers to develop waste reduction road maps covering products, packaging, and/or containers that are difficult to decompose, recycle, or reuse. - Requires producers to implement the road maps, submit periodic progress reports, and demonstrate waste reduction performance - Requires the ministry to monitor and evaluate producer compliance and progress towards waste reduction targets.

Source: Republic of Indonesia (2008, 2012, 2017, 2018); MoEF (2019).

Despite having formally established the listed regulations as the backbone for the voluntary EPR scheme, critical gaps remain unaddressed within Indonesia's policy design (Isroi, 2025):

A. Absence of a national framework for eco-modulated fees

An eco-modulated fee system has not yet been regulated to differentiate producer contributions according to the environmental performance or recyclability of packaging. Consequently, financial motivation to shift towards a more sustainable packaging design is limited.

B. Ambiguity of status of alternative materials

The regulatory position of bioplastics and packaging containing environmentally friendly additives remains unclear within the EPR scheme, leading to ambiguity in compliance and waste management practices.

C. Incomplete standards and national certification

Indonesian National Standards related to biodegradability, compostability, and scientific validation remain incomplete, limiting the ability to verify environmental claims and ensure consistency.

D. Absence of producer responsibility organisations (PROs)

The mandate and operational structure of PROs have not been elaborated in detail, including the specific mechanisms through which organisations can facilitate producers' obligations.

E. Limited end-of-life management systems

Clear frameworks for the collection, treatment, and processing of flexible packaging and biodegradable materials at the post-consumer stage have yet to be fully developed.

F. Weak enforcement and compliance

Enforcement mechanisms, including sanctions for non-compliant producers, remain relatively weak as they are still based on ministerial regulations.

The primary institutional authority for EPR implementation is the Ministry of Environment (MoE), formerly the Ministry of Environment and Forestry (MoEF), which issued P75/2019. MoE is responsible for policy formulation, road map approval, monitoring, and evaluation. At the subnational level, local governments play a supporting role by integrating EPR into municipal waste management systems and partnering with producers. Article 10(4) of P75/2019 also requires producers to incorporate local regulations, including bans on single-use plastic bags and other packaging materials enacted by provincial and district governments, into their EPR planning. The private sector, including producers and emerging PROs, is expected to finance and operationalise EPR activities in collaboration with government-registered waste banks, waste processing facilities (TPS 3R), and recycling centres (P75/2019 Article 7[4]).

3. EPR Scheme Design and Implementation

Under P75/2019, the obligation to reduce packaging waste falls on business entities in these three sectors:

A. Manufacturing industry, which entails food and beverage industry, other consumer goods industry, as well as cosmetics and personal care industry.
B. Food and beverage services, covering diners, cafes, restaurants, catering services, and hotels.
C. Retail, which includes shopping centres, modern shops, and traditional markets.

The Waste Reduction Roadmap by Producers under P75/2019, in effect from 2020 to 2029, is implemented in three phases: Phase 1 (2020–2022) targets 3–5% waste reduction per sector, Phase 2 (2023–2025) targets 10–15% waste reduction, and Phase 3 (2026–2029). This road map aims to achieve an overall 30% waste reduction by 2029. Producers are expected to carry out actions outlined in the following steps.

A. Plan: Submit a strategic waste reduction plan detailing current waste baseline, targets, timelines, and reduction measures.
B. Implement: Carry out activities to meet the waste reduction targets in the plan.
C. Monitor: Track production and reduction of products and packaging, with at least biannual monitoring.
D. Evaluate: Compare targets with achievements and identify implementation challenges.
E. Report: Provide updates on reduced raw materials, biodegradable packaging produced, reusable/recyclable materials used, and overall waste reduction plan.

Obliged producers as described under P75/2019 are required to develop and submit a 10-year waste reduction road map. Although some companies argue that the regulations lack clarity, particularly regarding the implementation of EPR schemes, the MoE provides coaching and consultation sessions to support producers in meeting their EPR obligations (WWF Indonesia, 2022).

To complement this road map requirement, EPR implementation is also guided by earlier regulatory frameworks, under MoE Regulation No. 13 of 2012, the EPR mechanism in Indonesia operates in two ways. First, producers are responsible for implementing a take-back scheme for products that have expired (out-of-date products). Second, for products that have already been used by consumers, EPR is implemented by involving the community in collecting waste. The collected waste is then transferred to designated collection facilities that have been officially provided (Prahara, n.d.). By 2021, producers are expected to develop packaging take-back schemes and to strengthen and establish partnerships with waste banks and other collection points (AZWI, 2022).

The costs of implementing P75/2019 for government are borne by national and local government budgets, while producers are responsible for expenses related to their waste reduction activities. Local governments may receive incentives through funding support based on their performance in waste reduction and waste management. They may also grant awards to associations, facility managers, or parent companies that demonstrate strong performance in implementing EPR. Besides, producers demonstrating good EPR practices can also be rewarded with recognition and publicity. On the other hand, producers may provide incentives – such as gifts, discounts, or lottery prizes – to consumers and distributors who actively participate in waste reduction efforts. Conversely, disincentives may be imposed on producers through public disclosures of unsatisfactory

performance (MoEF, 2019). The implementation of waste reduction for products and product packaging is monitored through periodic assessments of waste reduction performance, including the use of biodegradable materials and the quantity of materials that can be recycled (MoEF, 2019).

Efforts to advance EPR implementation in Indonesia included the establishment of the EPR Implementation Program Formulation Team (TP3 EPR Indonesia) in mid-2021, composed of academics, waste management practitioners, non-governmental organisations, and foundations. The team developed a Draft Government Regulation on EPR implementation, along with supporting documents outlining the proposed EPR programme, criteria for determining the environmental friendliness of residual packaging/products/waste, and the basis for packaging and product labeling. However, as of the end of 2022, there had been no official response to the proposal, and it remains unimplemented to date (Ahirullah, 2023).

4. Stakeholder Landscape and Public Perceptions

Since its inception in 2019, the P75/2019 and its related implementation has attracted diverse opinions from different stakeholder groups. Most notably, the regulation has gained nationwide support from civil society organisations (CSOs) that saw the producer responsibility scheme as an opportunity to strengthen waste management systems through the mobilisation of financial resources from producers. A number of CSOs, such as the Indonesian Forum for Environment (WALHI) and Greenpeace, have been conducting annual brand audits since 2019 for plastic waste found at beaches or rivers, listing the top 10 brand contributors and demanding their accountability for leaked plastic waste (Greenpeace Indonesia, 2022; Farahdiba, 2022). They noted that relying on reduction efforts led by consumers will never be sufficient to address the single-use plastics crisis, calling for reduction contributions from producers, especially in the fast-moving consumer goods sector.

Despite commending the government for initiating the producer responsibility scheme, some CSOs have also raised concerns over the lack of progress in its implementation. Greenpeace highlighted weak law enforcement and a lack of ambitious reuse targets as ongoing barriers to the implementation, even 6 years after the regulation was introduced (Greenpeace Indonesia, 2025b). Furthermore, WALHI and the Zero Waste Community criticized the limited transparency surrounding waste reduction road maps submitted by producers, which hinders public oversight and efforts to hold producers accountable (Farahdiba, 2022; Herlina, 2024). These CSOs even organised public campaigns, such as gathering for the Plastic Free Parade on 24 July 2022 and sending back single-use plastics to Unilever on 20 June 2024, to demand this transparency and urge stronger actions from the producers (Farahdiba, 2022; Greenpeace Indonesia, 2024).

The academia shared the CSOs' view of Indonesia's producer responsibility scheme still being far from ideal. Fajri Mulya Iresha, PhD, an environmental engineering lecturer in Islamic University of Indonesia, observed that the P75/2019 is still implemented on a compromise basis. Instead of establishing reverse supply chain to take back post-consumer packaging, producers' efforts are mostly confined to providing support to waste banks in a similar fashion to corporate social responsibility (Herlina, 2025). At the same time, Fajri acknowledged that placing the burden of waste management solely on producers could lead to stark increases in product prices, underscoring the need for a win-win solution involving multiple stakeholders.

Producers, on the other hand, are split into two groups of opinions regarding the P75/2019 regulation. One group responded to the obligation with a commitment to handle packaging waste collectively under the Indonesia Packaging Recovery Organisation (IPRO) (Gunawan, 2022). The Association of Indonesian Bottled Drinking Water Companies even held a seminar on 22 March 2024 to explain the regulation to their members, providing support for its members in preparing plans for compliance (Purwantono, 2024). In contrast, the other group showed hesitation to complying with the regulation, as evidenced by only 10% of packaging producers in the country having participated in the producer responsibility scheme (Ayuningrum, 2025). Some producers represented by the Association of Indonesian Food and Beverage Producers even propose changing the term 'producer' responsibility to 'stakeholder' responsibility, emphasising the role of stakeholders aside from producers in reducing plastic waste together (Prasetyo, 2025).

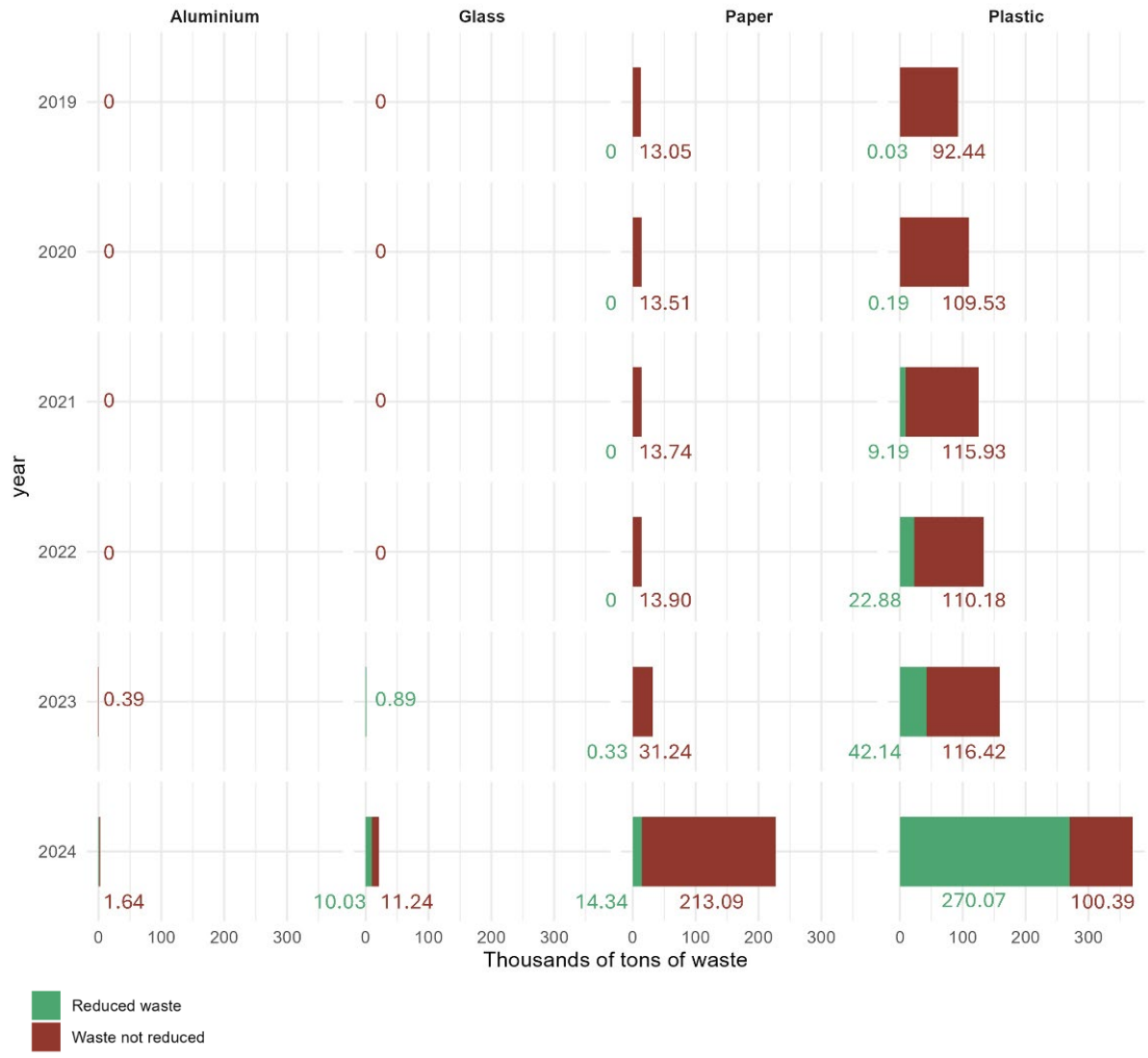
5. Performance, Innovations, and Challenges

Prior to the enactment of the P75/2019, six companies in Indonesia had already initiated responsible waste management efforts (WWF Indonesia, 2022). These companies are members of the Packaging and Recycling Association for Indonesia's Sustainable Environment (PRAISE), which further strengthened its commitment to addressing Indonesia's waste challenges by launching the Indonesia Packaging Recovery Organisation (IPRO) (WWF Indonesia, 2022). IPRO is a voluntary organisation, consisting of 25 member companies, dedicated to improving packaging waste collection and recycling efforts while also promoting awareness of packaging recovery and recycling practices across the country (IPRO, n.d.).

Following the P75/2019 enactment, the MoE publishes the annual performance of producers in reducing their waste in the National Waste Management Information System (*Sistem Informasi Pengelolaan Sampah Nasional,* SIPSN). As of February 2026, SIPSN reported that 204 producers had completed account registration on MoE's portal for producers' waste reduction actions as of 2024. However, only 38 of these producers had submitted their waste reduction road maps, and just 24 had reported implementing their

programmes during the same year (SIPSN, n.d.). Reports submitted by 36 producers in 2024 documented a total reduction of 295,588 tonnes of waste, of which 270,069 tonnes are plastic waste. Figure 2.2 illustrates the documented annual waste reduction and the remaining waste that was not reduced reported by producers from 2019 to 2024. Aluminium is the least reported waste, while plastic waste constitutes the most abundant waste generated and reduced. Overall, the amount of waste reduced has increased each year, indicating growing producer participation in, and compliance, with EPR responsibilities. In appreciation of producers' compliance efforts, the MoE has hosted an annual awards ceremony. At the ceremony held on 9 October 2024, the MoE recognised 20 companies for their exemplary contributions to waste reduction (Dian, 2024).

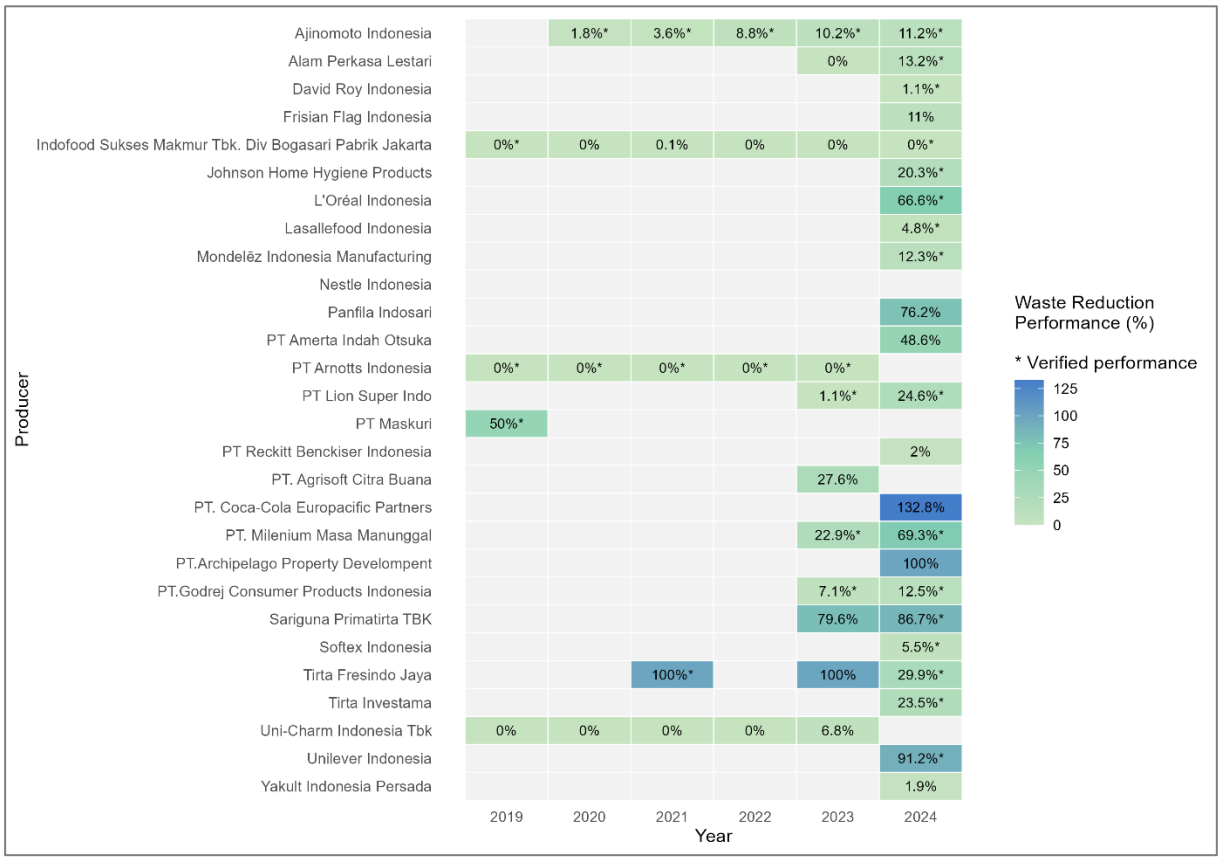
Figure 2.2. Waste Reduction Reported by Producers by Waste Type under Regulation P75/2019



Source: Authors, based on SIPSN (n.d.)

Figure 2.3 shows the further breakdown of producers' waste reduction performance from 2019 to 2024 based on reports submitted to the MoE. Of the 28 companies listed, 24 are from the manufacturing sector, two are from the retail sector, and the remaining two do not fall within any of the three categories of obligated producers defined under Regulation P75/2019. This waste reduction performance ranges from 0% to 132.8%, with PT Coca Cola Europacific Partners reporting the highest performance in 2024. In terms of temporal variation, 2024 recorded the highest number of submitted reports, with a total of 24, representing a substantial increase from 11 reports in 2023 and only six reports in 2022. This further strengthens proof that the implementation of producer responsibility in Indonesia has progressed positively, albeit at a rather slow rate.

Figure 2.3. Waste Reduction Performance Based on Producer-Submitted Reports, 2019–2024



Note: Nestle Indonesia submitted a verified report in 2024, but there is no information on its waste reduction performance on the SIPSN website.

Source: Authors, based on SIPSN (n.d.).

The mechanism through which Indonesian companies comply with Regulation P75/2019 vary widely but can be grouped into three categories based on the three measures: reduce, reuse, and recycle. Table 2.2 summarises the approaches and measures through which companies, both that have submitted waste reduction reports to the MoE and those that have not, implement their 3R plans based on public news and sustainability reports. Waste recycling activities, including post-consumer packaging take-back and collection, the construction and supervision of waste management facilities, and recycling, constitute the most common approach, with 21 companies implementing programmes of this kind. Waste reduction measures, such as the use of compostable or recycled materials and packaging redesign to reduce the use of unsustainable materials, are the second most common approach, with 12 companies implementing such measures. Waste reuse is the least common approach, with only five companies adopting this strategy. In addition, eight companies complement these efforts by organising educational and public awareness campaigns on proper management.

Table 2.2. Overview of the Approaches and Measures Used by Companies to Implement Their 3R Plans, Based on Publicly Available Information

No.	Companies	Waste Reduction	Waste Reuse	Waste Recycling	Education & Social
A	Companies that have submitted waste reduction reports to the MoE				
1	PT. Coca-Cola Europacific Partners	✓		✓	
2	Unilever Indonesia	✓	✓	✓	
3	Tirta Investama (Danone)	✓	✓	✓	✓
4	Nestle Indonesia	✓	✓	✓	
5	Indofood Sukses Makmur Tbk Div Bogasari Pabrik Jakarta	✓		✓	✓
6	L'Oréal Indonesia	✓		✓	
7	Mondelēz Indonesia Manufacturing	✓		✓	✓
8	Frisian Flag Indonesia			✓	
9	Uni-Charm Indonesia Tbk	✓			✓
10	Ajinomoto Indonesia	✓		✓	
11	PT Amerta Indah Otsuka	✓			✓
12	Alam Perkasa Lestari	✓		✓	
13	Panfila Indosari				✓
14	PT Lion Super Indo			✓	
15	PT Reckitt Benckiser Indonesia		✓		
16	PT Godrej Consumer Products Indonesia	✓		✓	

No.	Companies	Waste Reduction	Waste Reuse	Waste Recycling	Education & Social
17	Yakult Indonesia Persada			✓	
B	Companies that have not submitted waste reduction reports to the MoE				
1	Tetra pak			✓	
2	Pepsico			✓	
3	SC Johnson			✓	
4	Suntory Garuda Beverage			✓	
5	The Body Shop		✓	✓	
6	P&G Indonesia			✓	
7	Nutrifood			✓	✓
8	Garudafood Putra Putri Jaya			✓	✓
9	Beiersdorf			✓	
Total		12	5	21	8

Source: Authors, compiled from online sources.

Examples of programmes that these companies have initiated in implementing their 3R plans are described in Table 2.3.

Table 2.3. Examples of Programmes Implemented by Producers as Part of Their 3R Plans

3R Strategy	Example of Programmes
 Waste Reduction	Waste reduction measures focus on upstream actions that minimise waste before it enters the disposal stage. One of these actions include redesigning and resizing product packaging to minimise its weight, which is what Indofood Sukses Makmur Tbk has explored (Indofood CPB Sukses Makmur, 2025). Another method adopted by Danone Indonesia, the producer of the bottled mineral water 'AQUA,' to reduce waste generation is the use of recycled materials in its packaging. Its 600 mL and 1,500 mL water bottles contain 35% recycled polyethylene terephthalate (PET), while its Bali-exclusive 600 mL water bottles are made from 100% recycled materials (Danone Indonesia, 2025).
	Reuse and refill systems extend the useful life of products and packaging, thereby reducing the amount of single-use packaging discarded. However, they remain amongst the least adopted waste

3R Strategy	Example of Programmes
Waste Reuse	reduction strategies. Nevertheless, some companies in Indonesia have conducted trials and even implemented refill systems for their products. Nestlé Indonesia, for instance, conducted several studies on refill systems for products such as Milo, Dancow, and Koko Krunch with Siklus in 2021 and with Qyos in 2023 (Nestlé Indonesia, 2021; IPRO, 2023). Moreover, Unilever Indonesia has successfully established 1,500 refill stations called U-Refill that are now spread across Greater Jakarta and Surabaya. In 2024 alone, these stations sold more than 330,000 litres of products, effectively reducing about 23 tonnes of plastic waste (Unilever Indonesia, 2025).
 Waste Recycling	Waste recycling is the last line of defence against plastic pollution, achieved by maximising waste collection and reprocessing waste into new products. Many companies prioritise improvements in waste collection through collaboration with existing waste collection systems, such as those led by the informal sector and waste banks. This approach has also been adopted by Coca Cola Europacific Partners (CCEP) Indonesia, which works with waste pickers, referred to as 'recycling heroes', to collect PET bottles. Once collected, the bottles are transported to PT Amandina Bumi Nusantara, a recycling facility established by CCEP Indonesia and Dynapack Asia in 2023, where they are recycled into recycled PET (r-PET) pellets (CCEP Indonesia, 2023). In 2024, CCEP Indonesia collected 148.6% of the packaging they produced to be recycled (CCEP Indonesia, n.d.). Other companies adopt a more direct approach in taking back their post-consumer packaging waste through campaigns that encourage consumers to bring their waste to drop-off points in exchange for points. The Body Shop Indonesia (PT Monica Hijau Lestari) launched the 'Bring Back Our Bottles' campaign in 2008 and has since collected 10 million units of packaging waste, which have been repurposed into a variety of products, including 100% recycled soap dishes, pocket mirrors, and multipurpose jars. (The Body Shop Indonesia, n.d.). Similarly, Beiersdorf, the producer behind brands like NIVEA and Hansaplast, launched the 'Care for Yourself, Care for the Environment with Beiersdorf' programme in February 2025 (Aprilyani, 2025). This programme enhances consumers' access to recycling by providing

3R Strategy	Example of Programmes
	strategic waste stations to drop Beiersdorf packaging waste.
 Education and Social Campaigns	Although education and social campaigns are not part of waste reduction measures included in Regulation P75/2019, several companies also implement these actions to complement their efforts. For example, Mondelez Indonesia initiated the *#BijakPlastikSejakDini* (Wise Use of Plastics from an Early Age) movement in 2021 that has since educated 5,700 students to manage waste properly and collected 27.5 tonnes of plastic waste (Tim Media Service, 2024). Similarly, Garudafood Putra Putri Jaya also led community engagement and educational programmes by providing dropboxes for packaging waste in schools with the aim of raising awareness on waste segregation among students (Garudafood, 2024).

Source: Authors' compilation.

Although enforcement has been conceptually established in the regulatory framework, its implementation continues to face challenges, including low levels of industry compliance, weak monitoring mechanisms, insufficient incentives, and the lack of firm sanction enforcement (Shalmont et al., 2025). The private sector's hesitation to fully adopt producer responsibility policies is often driven by financial concerns (Santoso, 2025). Implementing sustainable packaging and effective waste management systems involves substantial costs, and in the absence of strong government incentives or enforcement measures, many companies tend to favour immediate financial returns rather than long-term environmental sustainability (Santoso, 2025). To respond to this challenge, Indonesia's Ministry of National Development Planning introduced a business matchmaking programme aimed at directing investment into the circular plastics sector (Sustainability Directory, 2025). Through this initiative, funding is strategically allocated to expand infrastructure for recycled plastics and bioplastics, helping to close the logistical and financial gaps (Sustainability Directory, 2025).

One of the most prominent issues also lies in the regulation's voluntary nature. There is a lack of a strong carrot-and-stick element that is sufficient to push producers' compliance. In 2024, the MoE stated that they had not enforced the law to non-compliant producers because they were still focused on collecting producers' waste reduction commitments (Mubarok, 2024). At the same time, some producers still believed that the MoE lacks the authority to regulate industry players, arguing that this responsibility should lie with the Ministry of Industry (Greenpeace Indonesia, 2025a). The voluntary nature of Indonesia's

producer responsibility scheme also hampers the creation of a level playing field for producers, discouraging compliant ones from improving their performance. This highlights the limitations of the current regulation, which is mandated under a ministerial regulation, in enforcing a cross-ministerial system such as EPR.

In recognition of this limitation, the MoE has announced plans to transition to a mandatory EPR system by elevating the regulation from ministerial to presidential (Susianti, 2025). The proposed regulatory upgrade was first announced by the Minister of Environment, Hanif Faisol Nurofiq, during the commemoration of World Environment Day in May 2025 (Violleta, 2025). In the following months, the MoE initiated the following actions (Sudarno, 2025):

1) Establishment of an EPR Working Group, managed by Indonesia's National Plastic Action Partnership, comprising representatives from relevant ministries and the private sector
2) Establishment of a Producer Responsibility Supervisory Board involving multiple ministries
3) Development of an EPR Management Information System (EPR-MIS), an integrated data platform covering daily waste management operations and transparent EPR fund distribution.

Key changes to the new regulation encompass elements on stronger law consequences on non-compliant producers, EPR fund collection and distribution mechanisms, and a mandate for submitting producer's waste reduction road map as part of environmental approval processes (Ayuningrum, 2025; Susianti, 2025; Sudarno, 2025). Through this new scheme, producers will be responsible for collecting, sorting, recycling, and ensuring the safe disposal of plastic packaging waste. The introduction of this policy is expected to encourage companies to improve the recyclability of their packaging and adopt more sustainable materials (Sustainability MEA, 2025). The new EPR regulation is expected to be completed by the first quarter of 2026, which will help the Indonesian government's efforts in achieving a 100% waste management rate by 2029.

6. Conclusion: Lessons Learned and Policy Recommendations

Indonesia generates a substantial amount of plastic waste, estimated at approximately 7.8 million tonnes annually, making it one of the world's largest plastic waste producers. To address this challenge, several regulatory mandates have been introduced, most notably Regulation P75/2019, which requires producers to develop waste reduction road maps and achieve a 30% reduction by 2029. Under this framework, the government provides recognition and rewards to producers and supporting actors that demonstrate good EPR practices.

In 2024, 36 producers reported the implementation of their waste reduction programmes, which collectively contributed to a total reduction of 295,588 tonnes of waste. With waste reduction performances ranging from 0% to 132.8%, these producers employed different strategies from waste reduction, waste reuse, to waste recycling to achieve this. For instance, Indofood Sukses Makmur Tbk redesigned and resized their product packaging to minimise its weight, while Danone Indonesia utilised recycled materials in their packaging – both focusing on upstream measures that reduce waste. Although reuse and refill systems are the least explored strategies for waste reduction, Nestlé Indonesia and Unilever Indonesia have conducted pilot projects on refill systems and even established refill stations in some areas across the country. Meanwhile, many companies, such as CCEP Indonesia, prioritise improvements at the downstream stage of waste management by collaborating with existing waste collection systems or constructing recycling facilities that increase the uptake of recyclable materials.

The MoE has announced plans in 2025 to transition towards a mandatory EPR system by elevating the legal basis from a ministerial regulation to a presidential regulation. Additional institutional measures are also planned, including the establishment of an EPR Working Group, a Producer Responsibility Supervisory Board, and an EPR-MIS.

Although EPR implementation in Indonesia has shown some progress, disincentives and enforcement mechanisms remain largely conceptual, resulting in low compliance levels, weak monitoring systems, insufficient sanction enforcement, and a lack of accountability. Some producers continue to perceive that the MoE lacks sufficient authority to regulate industry actors. To address these challenges, several policy recommendations are proposed as follows:

A. Enhance guidance for effective EPR implementation.

   The government can provide a cross-sector consultation platform with producers and supporting actors to guide EPR implementation pathways. Such consultations can help align improvements across multiple sectors and prevent an overreliance on limited interventions, such as waste banks and public campaigns, thereby ensuring the improvement of the overall EPR system.

B. Strengthen regulatory sanctions, implementation, and enforcement.

   Although disincentive mechanisms are already stipulated under MoEF Regulation No. 75/2019, it is largely limited to public disclosure of unsatisfactory performance. As the regulation transitions into a mandatory framework, the introduction of firm and enforceable sanctions that create a deterrent effect are necessary to scale up EPR implementation and enhance its overall impact. Sanctions such as administrative penalties, financial fines, restrictions on market access, or other regulatory consequences would encourage higher compliance levels and support broader and more effective participation by producers. However, the effectiveness

of these sanctions in generating a deterrent effect is highly dependent on the strength of monitoring and enforcement systems. In addition to this, it is essential to systematically collect and verify data on non-compliant producers and to consistently apply these disincentives.

C. Foster collaboration with the Ministry of Industry.

As regulations imposed on industry actors primarily fall under the authority of the Ministry of Industry, the forthcoming presidential regulation on EPR should serve as a formal mandate for the Ministry of Industry to actively engage in EPR implementation. Such a mandate would help bridge institutional roles between the MoE and the Ministry of Industry, enabling shared responsibilities and more effective enforcement of EPR obligations across industrial sectors.

D. Improve EPR monitoring and transparency through the EPR-MIS.

Weak monitoring currently hinders the effective implementation of EPR in Indonesia. With the planned introduction of the EPR-MIS, EPR progress and the distribution of EPR funds are expected to become more transparent and publicly disclosed. Making such data accessible to the public is critical to improving accountability, as it allows stakeholders – including government agencies, industry actors, civil society, and the general public – to better understand how EPR obligations are being fulfilled and how financial flows are being utilised. Improved data availability can also help address existing gaps in transparency related to the implementation of waste reduction road maps. Moreover, strengthened monitoring and greater transparency can serve as a positive signal to industry actors, encouraging broader participation, improving compliance, and supporting more robust evaluation of EPR schemes.

E. Institutionalise PRO with a clear operational scheme.

Although Indonesia has established the IPRO, its current role remains voluntary and is primarily focused on promoting awareness and supporting recycling initiatives. A formally mandated and operational PRO that collectively manages the full EPR chain – covering collection, sorting, recycling, end-of-life treatment – has yet to be established. The absence of such a centralised mechanism limits standardisation, and prevents the achievement of economies of scale, as individual companies are required to develop and operate their own EPR systems independently. This fragmented approach increases administrative and operational costs while weakening overall system efficiency. Therefore, formalising a PRO with a clear governance structure is essential to enable a more co-ordinated, cost-effective, and scalable EPR system.

F. Establish a system for eco-modulated fees.

An eco-modulated fee system adjusts the level of financial contribution paid by

producers to the PRO according to the environmental performance and recyclability of their packaging materials. Under this approach, packaging that is difficult to recycle is subject to higher fees. This system creates a direct economic incentive for producers to redesign products and packaging in line with circular economy principles. Over time, this mechanism can reduce pollution at its source and improve overall recycling efficiency.

G. Integrate the informal sector into the EPR system.

Informal waste pickers play a prominent role in Indonesia's recycling ecosystem. A mandatory EPR system that formalises waste management without inclusive design could marginalise waste pickers. Therefore, future EPR reforms should incorporate mechanisms to formally recognise informal waste pickers within the EPR value chain.

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Chapter 3

Potential Hurdles to EPR Implementation in Malaysia

Dato' Agamuthu Pariatamby, Ong Joo Hock, and Ts Lee Ching Hao

1. Introduction

In recent years, Malaysia has emerged as a significant player in Southeast Asia's plastic consumption, with plastic waste becoming one of the most pressing environmental issues. With approximately 1.07 million tonnes of plastic waste produced annually, nearly half of which consists of single-use plastics, the country faces serious challenges in managing its waste (KASA, 2020). Despite various initiatives on promoting sustainability, Malaysia's existing waste management systems are still facing considerable operational challenges. This backdrop explicitly shows an urgency of transitioning towards a more sustainable waste management system.

Extended producer responsibility (EPR) is an environmental protection strategy and framework aimed at decreasing total environmental impact from a product and its packaging, by ensuring that the producers of the product take responsibility for the entire life cycle of their products especially in the take-back, recycling, and final disposal of their products, including its packaging (Nnorom and Odeyingbo, 2020). Malaysia's EPR policy is evolving, transitioning from a voluntary model led by industry players to a more formalised, mandatory system expected to be fully implemented by 2030.

Despite the country's efforts, challenges persist in ensuring the effectiveness of EPR implementation (Gupta and Dash, 2023). The lack of strong civic education, underdeveloped recycling infrastructure, and insufficient enforcement mechanisms remain key obstacles. Additionally, integrating the informal waste sector into formal EPR systems is crucial for ensuring equitable and sustainable waste management practices. The government's approach includes tackling issues of plastic consumption at the source, mandating plastic producers to contribute to waste recovery systems, and providing regulatory frameworks to incentivise compliance. However, these efforts are often hindered by resistance from industries and insufficient integration of advanced digital tracking systems to ensure transparency and accountability.

With a growing focus on the reduction of single-use plastics and efforts to build a circular economy, Malaysia's EPR policy aims to not only improve recycling rates but also to shift consumer and corporate behaviours towards sustainability. As Malaysia continues to develop its waste management infrastructure, the role of EPR in supporting these initiatives will be vital in tackling the nation's plastic waste crisis, promoting innovation, and ensuring that both producers and consumers take greater responsibility for plastic waste management.

In relation to the circular economy for plastic waste management policy in Malaysia, there were three major national initiatives. First, Malaysia has been enhancing its waste management system to facilitate a transition to a circular economy, especially with plastic waste management. Nonetheless, despite several national policies and attempts, considerable structural and operational issues persist. These problems impact the efficacy of EPR adoption. This backdrop outlines significant national efforts accompanied by pertinent facts and percentages. Other than that, Malaysia is one of the largest plastic consumers in Southeast Asia, with an estimated 1.07 million tonnes of plastic waste produced annually, with nearly half of this amount consisting of single-use plastics (KASA, 2020). Malaysia has been producing approximately 39,078 tonnes of municipal solid waste daily, averaging approximately 1.17 kg per person (The Star, 2024). At the same time, Malaysia Plastics Sustainability Roadmap 2021–2030 (KASA, 2020) outlines EPR, better design, collection, innovation, and recycling (including capacity building in recycling infrastructure developing and recycled products manufacturing) with harmonised regulations on key resins like PP (Polypropylene), PET (Polyethylene Terephthalate), HDPE (High-Density Polyethylene), and LDPE/LLDPE (Low-Density and Linear Low-Density Polyethylene). Holding producers accountable for plastic waste towards 2026–2030, EPR will become mandatory to realise reuse/refill systems.

Based on the national road map, Plastics Neutrality Masterplan 2024–2030 (MPMA, 2023) promotes the reduction of single-use plastics through measures such as stricter import controls, including allowing plastic waste imports only from parties to the Basel Convention from 2025 to help curb plastic waste colonialism. The masterplan also sets out short-, medium-, and long-term circularity action plans, facilitating local governments to impose levies (e.g., RM0.20 charge in the Federal Territories), making EPR mandatory in Malaysia. Reducing raw material use, extending product lifespans, and stimulating innovation are central elements of this circular economy approach. Besides, National Solid Waste Management Policy and National Cleanliness Policy (KPKT, 2019) provide~~s~~ governing frameworks for integrated waste management with accompanying behavioural change. However, a report on Solid Waste and Public Cleansing Management Act 2007 (KPKT, 2007) did clearly note the local authorities' enforcement challenges concerning manpower, training, and budget allocations.

In Malaysia, the transition of EPR from a voluntary framework, championed by the Malaysian Recycling Alliance (MAREA), to a government-mandated policy is a significant shift aimed at holding plastic producers accountable for the entire life cycle of their products. This policy is expected to be fully implemented by 2030. Malaysia's EPR policy framework is built on a non-linear circular economy model, which is informed by national road maps, blueprints, action plans, and various regulations. These include import rules, plastic bag regulations, and pollution charges. The overarching goal of this policy is to manage plastic waste more effectively, focusing on the reduction, reuse, and recycling of plastics.

As shown in Table 3.1, the Malaysia Plastics Sustainability Roadmap 2021–2030 aims to improve product design, increase collection rates for recycling, and phase out single-use plastics. This road map serves as a cornerstone in Malaysia's efforts to transition towards a circular economy, ensuring that plastic production, consumption, and disposal are managed more sustainably. Similarly, the Roadmap Towards Zero Single-Use Plastics 2018–2030 aims to phase out single-use plastics across the country by 2030. This road map incorporates initiatives like the 'No Plastic Bag' campaign and introduces pollution charges that affect both consumers and producers, thus encouraging greater responsibility across all sectors. Additionally, the Circular Economy Blueprint for Solid Waste (2025–2035) outlines the long-term strategy for reducing landfill waste. This blueprint focuses on materials reuse, recycling, and upcycling, and is an initiative of the Ministry of Housing and Local Government (KPKT). It forms part of Malaysia's larger commitment to reducing plastic waste through systematic recycling efforts. To tackle marine pollution, the National Marine Litter Policy and Action Plan 2021–2030 was introduced. This plan aligns Malaysia's efforts with the broader regional initiatives set by ASEAN to combat marine debris, which has become a significant environmental challenge across Southeast Asia. The Solid Waste and Public Cleansing Management Act 2007 (Act 672) regulates waste management practices in Malaysia, particularly in the states of Perlis, Kedah, Melaka, Negeri Sembilan, Pahang, Johor, and the Federal Territories. This ~~a~~ct mandates the separation of waste at the source and ensures the proper disposal of solid waste, making it a critical element of the country's waste management strategy. Starting in July 2025, Malaysia will implement stricter import rules that require all plastic shipments to meet a 99.5% purity level before entering the country. These stricter guidelines, which also mandate SIRIM (Standards and Industrial Research Institute of Malaysia) approval and overseas inspections, are part of a larger effort to manage the quality and sustainability of plastic waste entering the country. Furthermore, various states in Malaysia have introduced single-use plastic bans that apply to food premises, where plastic straws and polystyrene containers have been prohibited. This ban will be expanded in 2026 to include national parks, forest reserves, and marine parks, further reinforcing the nation's commitment to reducing plastic consumption. Lastly, pollution charges have been introduced at the state level in areas like Penang and Kedah. These charges, which range from RM0.20 to RM1.00 per plastic bag, are intended to discourage the use of plastic and promote sustainable alternatives, thus playing a vital role in Malaysia's efforts to reduce plastic waste and encourage environmental responsibility.

Table 3.1 Policy Instruments Supporting EPR Implementation in Malaysia

Policy	Policy Framework	Year	Key Objective	Role in EPR/Circular Economy
Malaysia Plastics Sustainability Roadmap	Roadmap	2021–2030	Plastics Sustainability Roadmap (2021–2030) to promote a circular plastic economy and improve plastic production, recycling, and waste management (KASA, 2020)	In 2021, the Ministry of Environment and Water (KASA) launched the Malaysia Plastics Sustainability Roadmap 2021–2030
Roadmap Towards Zero Single-Use Plastics	Roadmap	2018–2030	Gradual elimination of single-use plastics through campaigns such as No Plastic Bag Day and pollution charges (UNEP, 2018)	Reduces plastic consumption and encourages producers to adopt sustainable packaging
Circular Economy Blueprint for Solid Waste	Strategic Blueprint	2025–2035	Promote waste reduction through reuse, recycling, and upcycling while minimizing landfill disposal (MPMA, 2023)	Provides long-term strategy to integrate circular economy and strengthen producer responsibility
National Marine Litter Policy and Action Plan	National Policy	2021–2030	Reduce marine plastic pollution and align Malaysia with ASEAN marine debris strategies (Bernama, 2021)	Encourages waste reduction, recycling, and improved plastic waste management

Policy	Policy Framework	Year	Key Objective	Role in EPR/Circular Economy
Solid Waste and Public Cleansing Management Act (Act 672)	Federal Law / Regulation	2007	Regulates solid waste management and enforces waste separation at source in several Malaysian states (Adsale, 2025)	Provides legal foundation for EPR mechanisms such as take-back schemes and improved waste management
Stricter Plastic Waste Import Rules	Regulatory Measure	2025	Require SIRIM approval, overseas inspection, and 99.5% purity standard for imported plastic waste	Prevents Malaysia from becoming a dumping ground for contaminated plastic waste
Single-Use Plastic Bans	Implementation Programme / Regulation	Ongoing (expanded 2026)	Ban plastic straws and polystyrene containers in food premises and protected areas such as national parks (Geena, R., 2025)	Reduces plastic waste generation and encourages sustainable alternatives
Plastic Bag Pollution Charges	Economic Instrument	State-level policy	Charge RM0.20–RM1.00 per plastic bag to discourage usage (Buletin Mutira, 2020)	Applies the polluter-pay principle, supporting EPR by reducing plastic consumption

Source: Authors.

2. Country and Policy Context

2.1. Socio-Economic Background

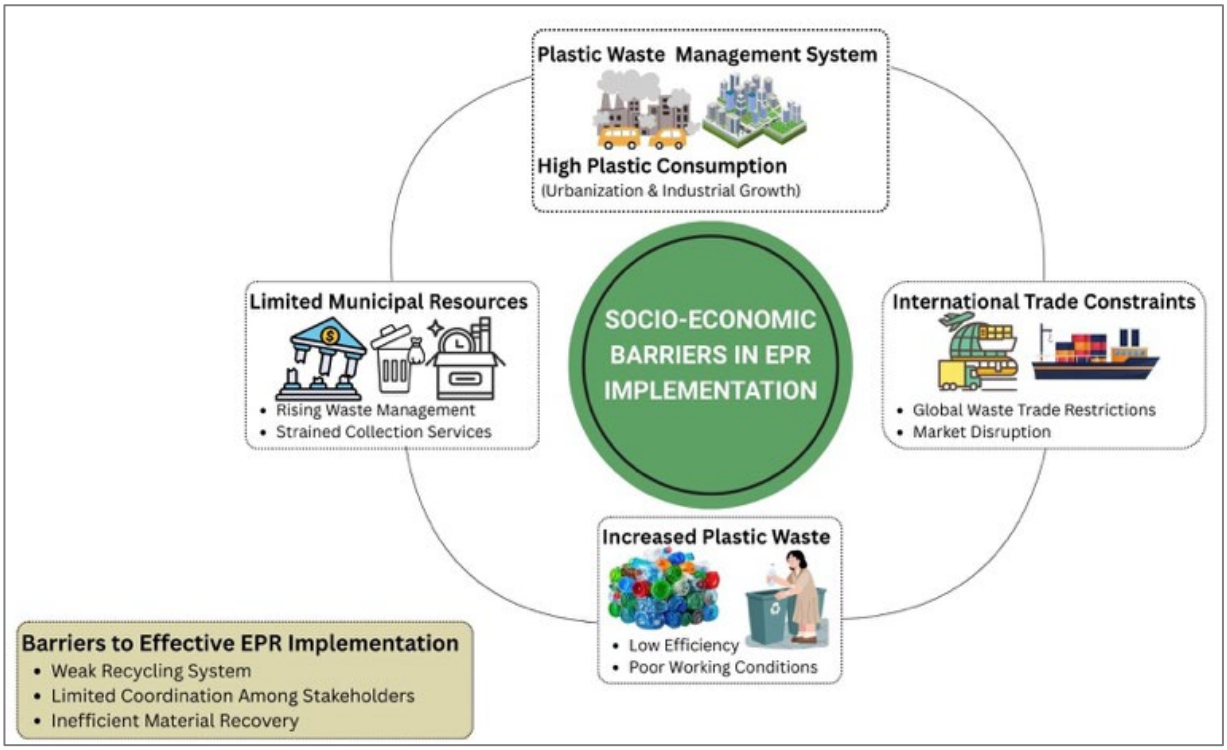
EPR fundamentally shifts the responsibility for managing plastic waste from municipalities and consumers to producers. Under EPR, producers are required to bear both financial and physical responsibility for the products they manufacture, especially at the post-consumer stage. This responsibility encompasses the entire life cycle of the product, including its collection, recycling, and safe disposal, extending to practices such as eco-design, reduced packaging, and circular economy principles (WWF-Malaysia, 2021). In Malaysia, EPR has been adopted as part of a broader policy approach aimed at shifting plastic waste management responsibilities to producers, with a mandatory EPR for plastic packaging set to be fully implemented by 2026 (Abu Bakar, Mohamed, and Kishita, 2025; ERIA, 2025; WWF-Malaysia, 2021).

The socio-economic landscape of Malaysia plays a critical role in shaping the country's plastic waste profile and waste management system. Rapid urbanisation and industrial growth have led to a high consumption of single-use plastics, making Malaysia one of the major Southeast Asian countries heavily reliant on plastic packaging (Abu Bakar, Mohamed, and Kishita, 2025). Local governments face significant challenges in managing the increasing waste volumes, with rising costs for waste collection and disposal being largely externalised by plastic producers (Howard and Che, 2025). The limited resources of local municipalities exacerbate this issue, as they struggle to keep up with the demand for efficient waste management.

Additionally, the informal waste sector plays a major role in recycling efforts, but it is largely inefficient. Waste pickers and recyclers often operate under poor working conditions and lack the necessary infrastructure to maximise recovery rates (Thi Thanh et al., 2024). This informal sector is essential in collecting recyclable materials, but its inefficiency and lack of formal integration with waste management systems hinder effective plastic recycling in Malaysia.

Malaysia's domestic waste management system has also been impacted by international trade constraints, particularly China's National Sword policy, which restricts the import of plastic waste. This policy shift has significantly affected Malaysia, as it had previously relied on China as a major destination for its plastic waste exports (Wahab and Lim, 2022). The rapid urbanisation and industrial growth in Malaysia have, therefore, substantially increased the consumption of single-use plastics, exacerbating the challenge of plastic waste generation. This has placed additional pressure on the country's plastic waste management system, making it increasingly difficult to manage the volume of waste produced, particularly in urban areas (Chen et al., 2021).

Figure 3.1. Socio-Economic Barriers to Effective EPR Implementation in Malaysia



Source: Authors.

The implementation of EPR in Malaysia faces several socio-economic challenges. Local municipalities, for example, are burdened with a lack of financial and technical resources. The costs of waste collection and disposal continue to rise, while the recycling infrastructure remains insufficient (Rana, 2026). Additionally, the informal recycling sector, which plays a critical role in the recovery of recyclable materials, often operates with low efficiency. This sector also suffers from poor working conditions and lacks adequate integration with formal waste management systems, making it less effective in addressing the country's waste management needs (Ampong et al., 2024). China's National Sword policy has had a significant impact on domestic recycling efforts because Malaysia previously relied on exporting a substantial portion of its plastic waste to China (Eia, 2025; Kiernan, 2025). Together, these challenges hinder the effectiveness of Malaysia's recycling systems, reduce material recovery efficiency, and complicate the successful implementation of EPR policies.

2.2. Plastic Waste Profile

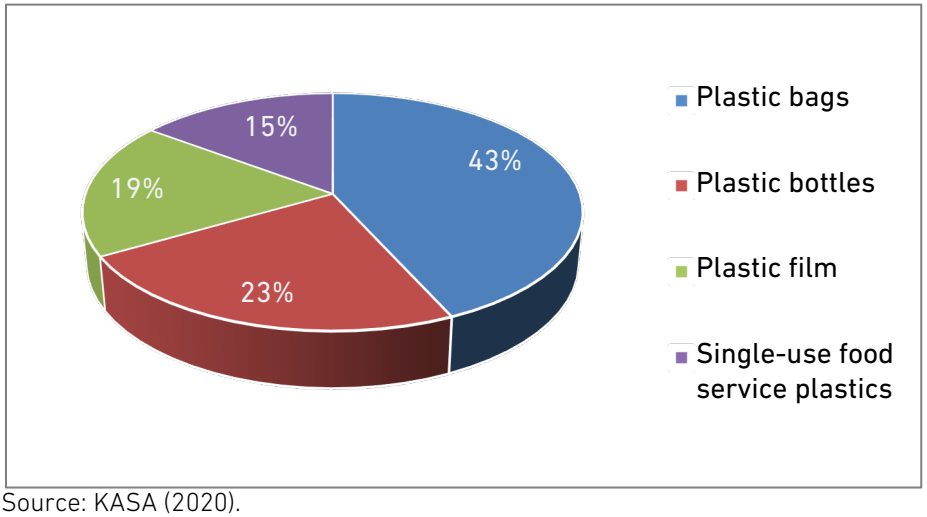
Malaysia's plastic waste profile reveals key trends that contribute to the challenges faced by the EPR system. Food and beverage containers dominate the plastic packaging waste stream, accounting for a significant portion of the country's plastic waste (Abu Bakar, Mohamed, and Kishita, 2025). However, the country struggles with low recycling rates, largely due to underdeveloped recycling infrastructure. As a result, much of the plastic waste ends up in landfills and waterways, contributing to environmental pollution (Mihai

et al., 2022). Moreover, plastic waste mismanagement has caused serious ocean pollution, impacting fisheries and tourism, further exacerbating the country's environmental challenges (Thushari and Senevirathna, 2020).

Single-use plastics, such as plastic bags, bottles, and disposable food containers, remain the main targets for Malaysia's EPR schemes, as they represent the largest portion of waste that can be addressed through policy interventions (KASA, 2020). Despite being a significant player in the global plastic industry, with over 1,300 producers and exports valued at approximately RM30 billion (US$7 billion), Malaysia continues to grapple with the environmental consequences of its plastic waste. The country is ranked amongst the top 10 nations for mismanaged plastic waste, generating an estimated 0.94 million tonnes annually, with between 0.14 and 0.37 million tonnes of this potentially entering the ocean (UNESCAP, n.d.). In response to China's 2018 ban on plastic waste imports, Malaysia has implemented measures to prevent its country from becoming a global dumping ground for plastic waste, highlighting the urgent need for comprehensive and effective waste management policies.

In Malaysia, Figure 3.2 plastic waste is primarily comprised of single-use packaging materials. Plastic bags constitute the predominant portion (43%), signifying the extensive utilisation of lightweight plastic packaging in retail and domestic practices. Subsequently, plastic bottles account for 23%, primarily linked to the use of beverages and liquid products. Plastic film accounts for around 19%, primarily derived from wrapping materials and flexible packaging utilised in the food and retail industries. Moreover, single-use food service plastics constitute almost 15% of the plastic waste stream, indicating a growing dependence on disposable containers and takeout packaging. The composition indicates that a sizeable portion of plastic waste comprises low-value and single-use plastics, which are challenging to recycle and thus remain primary focuses for waste reduction and EPR policies (KASA, 2020; Premakumara et al., 2020).

Figure 3.2. Plastic Waste Composition in Malaysia



Source: KASA (2020).

2.3. Legal and Institutional Frameworks

Malaysia's legal and institutional frameworks for implementing EPR are shaped by various national strategies and regional commitments aimed at fostering a circular economy. The National SCP Blueprint (2016–2030) outlines the roles of both consumers and producers within the circular economy framework, promoting sustainability through better resource management (ERIA, 2025). The Green Technology Master Plan (2017–2030) further supports EPR policies, focusing on enabling resource recovery and holding stakeholders accountable for their environmental impacts (ERIA, 2025). Additionally, the Roadmap Towards Zero Single-Use Plastics (2018–2030) is a critical policy initiative that not only imposes pollution charges but also sets specific targets for reducing single-use plastics, driving the country towards more sustainable consumption practices (ERIA, 2025).

The National Cleanliness Policy (2020–2030) actively supports the adoption of EPR as a means of promoting recycling and achieving a circular economy, emphasising the need for cleaner urban spaces and better waste management practices (ERIA, 2025). In line with this, Malaysia has committed to Mandatory EPR for Plastic Packaging (2026), which requires producers to finance and manage the collection and recycling of used plastic packaging, ensuring that plastic waste is properly handled and reduced (Abu Bakar, Mohamed, and Kishita, 2025).

Furthermore, MAREA plays a pivotal role in Malaysia's waste management system. As an industry-driven PRO, MAREA was established to facilitate the voluntary collection and recycling of plastic packaging, laying the groundwork for the transition towards a mandatory EPR system (MAREA, 2023).

At the regional level, Malaysia participates in the ASEAN Regional Action Plan for Addressing Marine Debris (2021–2025), which promotes standardised EPR frameworks across Southeast Asia. This regional collaboration aims to enhance plastic waste management and develop co-operative strategies to mitigate marine plastic pollution (EU-ASEAN Business Council, 2025). Through these regulations and strategic plans, the Malaysian government aims to set the legal groundwork for effective waste recovery, with producers funding the collection and recycling processes, and waste operators (including the informal sector) contributing to the recovery and management of plastic waste (WWF-Malaysia, 2021).

3. EPR Scheme Design and Implementation: Scope of Products, Financial and Operational Mechanisms, Compliance and Enforcement Strategies

Malaysia's EPR design primarily focuses on plastic packaging, producer-funded recycling, and robust compliance mechanisms. The scope of products under the policy includes plastic packaging such as bottles, bags, food containers, and other single-use plastics, as well as fast-moving consumer goods, which typically have intense packaging. The policy

also enforces eco-design requirements, mandating designs that reduce waste and incorporate recyclable features to minimise environmental impacts. Transparency in labelling and packaging is another critical aspect, ensuring that recyclable goods are clearly identified to improve sorting and recycling efficiency (Bernama, 2025b; WWF-Malaysia, 2021; MAREA, 2020).

The financial mechanisms of Malaysia's EPR system rely on producer funding, which covers the costs of collection, recycling, and disposal, thereby relieving municipalities of the financial burden. This shared responsibility model involves the government, producers, and consumers, ensuring that the system remains sustainable. PROs, such as MAREA, help align financial contributions with recycling targets, and funds are directed towards developing recycling infrastructure and creating a secondary materials market (MAREA, 2020).

Operationally, producers are required to establish nationwide plastic waste collection and recovery systems. The inclusion of the informal waste sector, such as waste pickers and recyclers, is also essential for improving operational efficiency and ensuring social equity (The Circulate Initiative, 2025). Digital technology, including tracking systems to monitor waste flows and recycling rates, plays a pivotal role in the operational mechanism, and the alignment of EPR with Malaysia's National Circular Economy Council (NCEC) strategies further reinforces the circular economy approach (Bernama, 2025b).

Compliance and enforcement strategies are vital to ensuring that EPR objectives are met. Producers are mandated to submit reports on the types of packaging in the market and their recovery rates, with audits and independent monitoring conducted to ensure transparency and accountability. The KPKT and NCEC oversee enforcement, and the system is harmonised with ASEAN and European Union (EU) standards to ensure consistency across markets. Penalties for non-compliance include fines or market access restrictions, and national benchmarks and key performance indicators are established to evaluate the success of EPR implementation (SWITCH-Asia, 2025).

4. Stakeholder Landscape and Public Perceptions

4.1. Roles of Producers, the Informal Sector, NGOs, and Public/Business Opinions on WTP and Trust

In Malaysia's EPR system, various stakeholders play distinct and crucial roles. Producers are primarily responsible for financing the collection, recycling, and disposal of plastic packaging. They are also expected to adopt eco-design principles to reduce waste and enhance recyclability. PROs, such as MAREA, assist in ensuring industry-wide compliance with these regulations. Meanwhile, the informal waste sector plays a vital role in collecting and sorting recyclable plastics, providing livelihoods for waste pickers, who are often not formally recognised. The integration of these informal workers into formal EPR schemes is essential for improving recovery efficiency and ensuring social equity.

Non-governmental organisations (NGOs) advocate for inclusive EPR mechanisms that protect vulnerable waste workers and promote transparency, accountability, and consistency. They emphasise that EPR should be a cornerstone of sustainable waste management practices, aligning with broader circular economy goals. NGOs, such as WWF-Malaysia, have been vocal in promoting transparency within the EPR system and ensuring that it is inclusive of all sectors involved in waste management.

From the business perspective, companies acknowledge the need for EPR but are cautious about the associated costs. Many businesses express concerns about the financial burden, the need for data transparency, and the readiness of infrastructure to support the transition. As a result, many businesses prefer a phased implementation of EPR, allowing more time to adapt to the new system.

Regarding public willingness to pay (WTP), public and stakeholder perceptions on recycling/EPR surveys show a moderate level of support for improving recycling systems, particularly when the benefits to the environment are visible. Public WTP is strongly influenced by trust in government enforcement and the transparency of the system. Consumers tend to be more supportive of EPR when the costs are not disproportionately passed on to them (Abas et al. 2021).

Trust and transparency are crucial components of the EPR system's success. Public trust hinges on clear reporting, independent audits, and tangible recycling outcomes, which demonstrate the system's effectiveness. Businesses also stress the need for reliable data to prove compliance and ensure the system's integrity. Without sufficient trust in the system, both public WTP and business compliance will be undermined.

Key insights from surveys and reports highlight that while producers must take the lead in financing and managing the system, the success of EPR in Malaysia also depends on integrating informal sector workers and the effective advocacy of NGOs. Public WTP is conditional upon transparent governance and measurable environmental impacts, while businesses support EPR in principle but seek a cost-shared, phased rollout (ISIS, 2024; Kamaruddin, Muhamad, and Marwan, 2022).

4.2. Opinion Polls or News Articles in Native Languages as References

Several local news outlets and reports in Malaysia provide valuable insights into the nation's approach to EPR and its evolving regulatory framework. Malay Mail highlighted Malaysia's plan to finalise an EPR law that would require producers to collect and recycle plastic packaging, signalling a significant step towards a more sustainable waste management system. The article emphasised the urgency of implementing EPR laws to address the growing plastic waste issue (Malay Mail, 2025).

Similarly, Enviliance Asia reported on Malaysia's efforts to establish an EPR regulation specifically for packaging materials, with a voluntary phase-in starting in 2026 and mandatory compliance expected by 2030. This phased approach has been identified as a

key aspect of the country's strategy to transition towards a circular economy (Enviliance Asia, 2025).

Additionally, The Edge Malaysia, a prominent business and ESG (environmental, social, and governance) outlet, discussed a tailored EPR framework that includes the integration of the informal waste sector, enhancing data transparency, and aligning with regional standards like those of ASEAN and the EU. The report captured feedback from businesses and NGOs, emphasising the need for a transparent and inclusive system that would foster greater co-operation across all sectors (The Edge Malaysia, 2025).

4.3. Insights from Local Coverage

Local news articles provide important context and insights into Malaysia's EPR landscape. Malay Mail emphasised the urgency of EPR laws, underlining the need for swift action to mitigate plastic pollution. Enviliance Asia outlined the government's phased implementation timeline for voluntary and mandatory EPR compliance, while The Edge Malaysia captured feedback from businesses and NGOs, focusing on the importance of data transparency and inclusivity, and ensuring that Malaysia's system aligns with ASEAN and European Union standards.

4.4. Socio-economic and Cultural Perceptions Related to EPR and Waste Management

In Malaysia, socio-economic and cultural perceptions around EPR and waste management have been shaped by rapid urbanisation, a heavy reliance on single-use plastics, informal recycling practices, and traditional attitudes towards cleanliness and responsibility. The fast-paced urbanisation, accompanied by rising incomes, has led to an increased dependence on plastic packaging, further exacerbating the waste management challenges in the country (Southeast Asia Infrastructure, 2026). Local municipalities, in turn, have borne the high costs of waste collection and disposal, while these financial burdens are externalised by producers (WWF-Malaysia, 2021). The informal waste sector, primarily composed of waste pickers, has contributed to recycling efforts, but these workers receive little recognition or a steady income (Southeast Asia Infrastructure, 2026). As part of Malaysia's EPR efforts, policies like the National Cleanliness Policy and the Roadmap Towards Zero Single-Use Plastics focus on shifting the financial responsibility to producers and promoting greater recycling practices (WWF-Malaysia, 2021).

Culturally, the perception of waste management is strongly influenced by social values and community norms. Despite the low participation rates in recycling, the cultural value placed on community cleanliness plays a significant role in the growing public support for waste reduction initiatives. However, the convenience of single-use plastics has been prioritised over sustainability, with the widespread consumption of such plastics being a result of the 'out of sight, out of mind' mentality (Omar et al., 2025). Peer norms and local

campaigns have often proved more influential than individual initiative highlighting the importance of community-driven efforts in improving waste management (Omar et al., 2025). Public trust in EPR and WTP for recycling depend largely on the transparency of government enforcement (Southeast Asia Infrastructure, 2026). NGOs such as WWF-Malaysia have played an essential role in framing EPR as both a moral and environmental responsibility, helping shift cultural attitudes towards greater accountability for producers and fostering a stronger commitment to sustainability (WWF-Malaysia, 2021).

5. Performance, Challenges, and Innovations

Malaysia's waste management and recycling performance has shown some progress, but significant challenges remain. The municipal solid waste recycling rate is estimated at 28%, indicating room for improvement in the overall recycling system (Southeast Asia Infrastructure, 2026). However, when it comes to plastic waste, the recycling rate is much lower, with less than 15% of plastic packaging being recycled, and the majority of plastic waste ends up in landfills or waterways (Business Today, 2025). The informal sector plays a major role in handling recyclable plastics, but these workers are often not recognised or integrated into the formal EPR systems (Southeast Asia Infrastructure, 2026). Additionally, urban collection systems face challenges such as limited source separation and contamination of recyclable materials, even though waste collection coverage in major urban areas is relatively high (Yu et al., 2022).

In terms of design innovations, there has been a shift towards eco-designing in Malaysia. Producers have begun adopting lightweight, recyclable, and biodegradable packaging to reduce plastic waste, signalling a move towards more sustainable practices (Business Today, 2025). Furthermore, the implementation of recycled material mandates through material science innovation is being explored, and EPR laws are set to include recycled materials in packaging (UNDP, 2024). Digital tracking technologies, such as QR codes and blockchain, have also been piloted to monitor packaging flows and ensure recycling compliance (Business Today, 2025). In line with the circular economy model, some fast-moving consumer goods companies have tested refill stations and reusable containers as alternatives to single-use plastics (Southeast Asia Infrastructure, 2026).

Economically and socially, the EPR system has begun to push the responsibility for financing collection and recycling onto producers, shifting the financial burden away from municipalities (Business Today, 2025). The integration of informal workers into the formal EPR system could create more job opportunities in the recycling and recovery industries, contributing positively to the local economy (Southeast Asia Infrastructure, 2026). However, consumer costs remain a concern, as businesses are worried about passing on EPR-related costs to consumers without ensuring transparency. Surveys indicate moderate public willingness to pay for improved recycling, but trust in the system's fairness and efficiency is a key factor in supporting this initiative (UNDP, 2024). Finally, there are potential long-term community gains, as cleaner environments contribute to

supporting industries such as tourism, fisheries, and public health, ultimately reducing economic losses due to pollution (Southeast Asia Infrastructure, 2026).

6. Conclusion: Lessons Learned and Policy Recommendations

The implementation of EPR in Malaysia has revealed several valuable lessons that can inform both national and regional policy strategies. One of the key takeaways is the importance of transitioning from voluntary initiatives to a mandatory, nationwide EPR system that outlines clear obligations, timelines, and enforcement powers. This approach is consistent with Malaysia's plastics road map and aligns with the recommendations of the Organisation for Economic Co-operation and Development (OECD), which stress the need for a robust legal foundation to ensure the effectiveness of EPR systems.

To create a fair and efficient system, the law should clearly state that all actors in the supply chain – brand owners, first importers, fillers, retailers, and e-commerce companies – are responsible for managing packaging waste in Malaysia. This would eliminate any loopholes and ensure that all parties contribute to the solution, preventing unfair practices where some benefit from the efforts of others.

A critical step in enhancing the EPR system is the establishment of a clear and functional PRO. Malaysia's experience with MAREA, a business-led PRO, shows that such organisations can successfully handle the financing, collection, and recovery of waste, while also engaging stakeholders in the process. The next stage should involve strengthening the legal framework, closely monitoring performance, and ensuring transparency in reporting.

To further support the transition to sustainable packaging, it is recommended to introduce eco-modulated EPR surcharges, which would incentivise the design of recyclable and environmentally friendly packaging. In addition, deposit-return or take-back initiatives should be promoted for products that have high leakage rates, such as drink containers, cans, and bottles, to improve recovery rates and reduce litter.

Another key recommendation is to enhance the market for recycled plastics by implementing recycled-content mandates and encouraging sustainable procurement practices. This will help stimulate demand for recycled materials and promote a circular economy. Finally, regional co-operation within ASEAN should be strengthened to synchronise EPR policies and address transboundary plastic pollution, ensuring that efforts to reduce plastic waste are aligned across the region.

These policy recommendations, if implemented, will not only improve Malaysia's waste management system but also contribute to global efforts in managing plastic pollution and promoting sustainability.

6.1. Best Practices

Several best practices can guide Malaysia in implementing an effective EPR system for plastic waste management. A clearly defined responsibility for producers is essential, outlining their obligations for plastic packaging collection, recycling, recycled content, and reporting requirements. These responsibilities should be supplemented with independent audits and public disclosure to build trust and deter free-riding (WWF-Malaysia, 2021). Additionally, independent oversight is crucial. By licensing PROs with clear performance targets and fee structures, and by ensuring that transparent, audited accounts are publicly accessible, Malaysia can strengthen accountability within the EPR system (WWF-Malaysia, 2021).

To further incentivise sustainable practices, cost-modulated eco-fees should be implemented. These fees should vary based on recyclability, recycled content, and design choices to encourage eco-friendly packaging (EU-ASEAN Business Council, 2025). The implementation of EPR should be done in phased rollouts, starting with high-volume materials like PET, HDPE, and PP in regions with ready infrastructure, before gradually expanding to nationwide coverage with clear timelines (EU-ASEAN Business Council, 2025; Business Today, 2025).

Data integrity is another critical component. Standardising data definitions in producer declarations, using unique identifiers for packaging, and applying digital tracking technologies will help ensure mass balance and traceability, thus minimising underreporting (EU-ASEAN Business Council, 2025; Business Today, 2025). The integration of the informal sector into formal waste management systems is also essential, with buy-back centres to raise material quality, minimum pricing for sorted recyclables, safety standards, and social protection for waste pickers (WWF-Malaysia, 2021; Business Today, 2025). Furthermore, standardised environmental design protocols should be advocated, such as design-for-recycling principles, minimising multilayer plastics, and enhancing the recycled content in packaging (The Ministry of Economy, 2024; Bronsky, Nikou, and Jager, 2025). Lastly, deposit-refund schemes should be implemented for beverage containers and other valuable packaging to enhance collection and recycling rates (EU-ASEAN Business Council, 2025).

6.2. Transferable Insights

From global experiences, several insights can be transferred to Malaysia's EPR implementation. First, designing for recyclable outcomes has proven to be effective in countries where fee modulation is linked to recyclability and recycled content. This approach leads to faster shifts in packaging design and end-market development (EU-ASEAN Business Council, 2025). Another insight is the importance of stable and decisive financing. Predictable producer fees, ring-fenced specifically for collection and recycling, ensure that funds are not diverted to general budgets, reducing financial risk for private investment in sorting and reprocessing (EU-ASEAN Business Council, 2025).

Moreover, realistic target-setting is critical to achieving successful implementation. Initial targets should be based on current recycling capacity, with more ambitious goals set biennially to reduce the risk of non-compliance (EU-ASEAN Business Council, 2025; Business Today, 2025). Transparency also plays a key role. Public scoreboards, reliable audits, and local investments in community collection points increase WTP and encourage business buy-in (Business Today, 2025).

Phased policy implementation allows governments and companies to adjust gradually, enhancing institutional capacity while minimising disruptions (The Ministry of Economy, 2024). Centralised databases for company registration, uniform inspections, and penalties, supported by regular audits, can enhance transparency, oversight, and adherence in the EPR system, ensuring that producers fulfil their responsibilities and maintain system integrity (Tran et al., 2025). Finally, consumer education initiatives are essential to fostering trust and participation. Ongoing public instruction about sorting, recycling, and the role of EPR is crucial for achieving collection and recycling objectives (De Feo and Ferrara, 2024).

6.3. National Policy Recommendations for Malaysia

Compliance and Governance

To strengthen the compliance and governance framework for Malaysia's EPR system, several key recommendations should be implemented. First, a national registry should be maintained, requiring all brand owners, importers, and online marketplaces to register and submit annual declarations tied to mass-balance reconciliation. Clear definitions of waste streams and accurate volume records are essential, as emphasised by Datuk P. Agamuthu, who expressed concerns about the proper categorisation and tracking of waste streams (WWF-Malaysia, 2021; Bernama, 2025a). Additionally, PROs should be licensed with established performance targets, standardised fee schedules, and audit requirements. Contingency plans must be in place to address underperforming PROs to ensure that they meet their recycling and recovery obligations (WWF-Malaysia, 2021).

An enforcement toolkit should be developed, which includes escalating penalties for non-compliance, as well as market restrictions to deter defaulting producers. Conversely, producers who meet their targets should be rewarded, and compliance lists should be published quarterly to provide transparency and act as a deterrence mechanism (WWF-Malaysia, 2021). Moreover, transparent reporting and public disclosure should be mandated. To enhance accountability and public confidence, periodic public disclosure of recycling performance, refuse recovery data, and EPR compliance results are essential (Tumu, Vorst, and Curtzwiler, 2023).

Operations and Finance

On the operational and financial side, Malaysia should introduce eco-modulated fees, which would impose lower fees on recyclable mono-materials and higher fees for

multilayer or carbon-black packaging. Additionally, producers should be granted fee credits for verified recycled content, stimulating demand for sustainable packaging (EU-ASEAN Business Council, 2025). It is crucial to ring-fence EPR funds, ensuring that producer fees are allocated exclusively for purposes such as infrastructure development, upgrades to material recovery facilities, reprocessing capacity, and end-market development, including the promotion of food-grade recycled PET (rPET) (EU-ASEAN Business Council, 2025; Perera et al., 2025).

To improve the inclusivity of collection networks, Malaysia should contract with co-operatives and buy-back centres. By setting minimum quality and safety standards and providing training or equipment to enhance recovery rates, Malaysia can improve social outcomes while strengthening the overall recycling system (WWF-Malaysia, 2021; Business Today, 2025). Digital management tools should be standardised, including unique identifiers for producers to measure packaging volumes and electronic manifests to ensure seamless tracking of waste from collection to reprocessing (Business Today, 2025).

Finally, collaboration with local governments is essential for enhancing operational efficiency and expanding collection coverage. By co-ordinating EPR financing with municipal waste management programmes, Malaysia can maximise resource use and ensure broader participation in the system (Ezeudu and Bristow, 2024; Hammoud et al., 2025).

Design for Growth

To foster growth in recycling systems and packaging sustainability, Malaysia should implement several key strategies. First, national guidelines should be published and updated annually to provide recycling design guidance, taking into account local capabilities in areas such as label adhesives, colorants, and barrier layers. This will help accommodate growth in recycling infrastructure and ensure that packaging is designed with recyclability in mind (EU-ASEAN Business Council, 2025). Content targets should also be set, with material-specific recycled content requirements that are progressively increased over time. Compliance with these targets should be verified through chain-of-custody audits to ensure that recycled materials are genuinely incorporated into packaging (EU-ASEAN Business Council, 2025).

Furthermore, public procurement strategies can be leveraged to stabilise demand for recycled materials. For example, the public procurement system should require recycled content in non-food applications such as bins and outdoor furniture, creating a steady market for recycled goods (EU-ASEAN Business Council, 2025). Recyclability standards should advocate for packaging designs that prioritise mono-material structures and minimise multilayer plastics, which present significant recycling challenges (Bronsky, Nikou, and Jager, 2025). Additionally, to incentivise recyclable packaging, Malaysia should encourage mono-material packaging by offering lower EPR fees for commonly recyclable

materials such as PET, HDPE, and PP packaging (Stefanini and Vignali, 2025; Mengozzi et al., 2025).

Regional Alignment Recommendations (ASEAN Focus)

For effective regional collaboration, Malaysia should focus on regional alignment in its EPR system, particularly with ASEAN member states. One crucial step is the mutual recognition of cross-border standards. Aligning recyclability criteria, labeling, and data definitions across ASEAN will help harmonise compliance requirements for producers and create a more cohesive regional approach (EU-ASEAN Business Council, 2025). In addition, there should be a harmonised region-wide fee modulation, with synchronised eco-fee bands for common polymers. This will prevent regulatory arbitrage and encourage consistent packaging design improvements across the region (EU-ASEAN Business Council, 2025).

To enhance regional co-operation further, cross-border traceability systems should be legislated. These interoperable data systems would track verified recyclable packaging in the market, enabling regional audits and facilitating the trade of secondary materials across ASEAN (UNECE, 2016). Shared end-market development is also recommended, with co-investment in regional food-grade rPET/rHDPE facilities. These advanced sorting facilities, coupled with transparent quality standards, would enhance intra-ASEAN recyclable trade and support the development of regional recycling markets (EU-ASEAN Business Council, 2025). Lastly, regional training and capacity development programmes should be developed to enhance the ability of policymakers, waste management operators, and recycling industries to implement EPR effectively (OECD, 2025).

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Chapter 4

Extended Producer Responsibility in the Philippines: Assessing Policy Gaps and Implementation Strategies

Maria Antonia N. Tanchuling, Aika Romae T. Anteza, Leocer John B. Bularan, Benedict A. Requejo

1. Introduction

Republic Act (RA) No. 9003, or the Ecological Solid Waste Management Act of 2000, established a comprehensive framework for solid waste management (SWM), empowering the local government units (LGUs) to establish and to enforce waste management plans in their respective jurisdictions. RA 9003 primarily aimed to address the Philippines' garbage crisis at the source by incorporating mandatory waste segregation and establishing material recovery facilities (MRF) to divert waste dumped in landfills. RA 9003 shifted the focus from a reactive approach where mixed trash was only segregated at disposal to a proactive approach where segregation is conducted at the source itself, covering residential, commercial, industrial and agricultural sources (Republic of the Philippines, 2001). The law effectively imposed a nationwide ban on open dumping and illegal burning, prompting the Philippines to transition to sanitary landfills (SLFs) for disposal and to increase efforts in material recovery and composting.

Key provisions of RA 9003 include the requirement for all LGUs to prepare 10-year SWM plans and to achieve at least 25% waste diversion from disposal facilities within 5 years of the law's effectivity. As of 2025, 89% of LGUs have approved SWM plans (DENR, 2025). From 2022 to 2025, the number of MRFs increased by 9%, serving 49% of all barangays nationwide (DENR, 2025).

Despite the establishment of this law, the Philippines continues to face significant waste management challenges. As of early 2026, the country had 378 operational SLFs, which received approximately 28,000 tonnes of waste per day and served 784 of the country's 1,642 LGUs, equivalent to 47% coverage. This represents a marked increase from 2021, when only 245 operational SLFs served 29% of LGUs. (NSWMC, 2026; COA, 2023). Although there is significant progress, the overall waste generation in the Philippines exceeds the designed capacities of the existing SLFs. Total projected waste generation for 2026 is estimated at approximately 61,000 tonnes per day, exceeding the daily volume received by existing SLFs. This disparity highlights the inadequacy of the country's landfill and

resource recovery facilities to manage the volume of waste generated (NSWMC, 2026). Even 25 years after the implementation of RA 9003, the Philippines continues to lack the capacity to recycle and properly dispose the wastes generated.

One of the key challenges is the widespread use of single-use plastics, which is one of the top wastes produced that has low recyclability. Sachets, a common form of single-use plastic packaging used to market consumer goods in small, affordable quantities, account for 52% of the Philippines' total residual waste(GAIA, 2020). To address this issue, several LGUs have enacted local ordinances to discourage the use of single-use plastics and reduce the generation of plastic waste. One example is Quezon City, which banned plastic shopping bags in commercial establishments through Ordinance No. SP- SP-2868, S-2019, and prohibited the use of disposable cutlery in hotels and restaurants under Ordinance No. SP-2876, Series of 2019 (Quezon City Government, 2019a; Quezon City Government, 2019b). However, not all LGUs have enacted ordinances restricting single-use plastics due to a lack of viable and affordable plastic alternatives. In most cases, reusable bags, containers, and cutlery are more expensive than their disposable counterparts. For low-income consumers, the increased cost of reusable materials is an added burden. Hence, the current direction of waste management policies in the Philippines is the regulation and reduction of plastics in general. Ultimately, it is apparent that there remains a lack of nationwide implementation and standardisation of SWM policies. This results in different LGUs having widely differing compliance records with RA 9003. Hence, there is an overall need for a nationwide policy to streamline waste management efforts and enforcement across all LGUs.

While RA 9003 focuses on the community-level segregation and recovery of waste, it has become clear over the years that diversion and recycling efforts cannot keep up with the huge volumes of plastic wastes. This results in large volumes of mismanaged waste, increasing the risk of leakage into the environment. The Philippines, in recent studies, has been identified as a significant contributor to marine plastic pollution, both in terms of coastal debris and riverine emissions into the ocean (Jambeck et al., 2015; Meijer et al., 2021)

This situation is the rationale for formulating RA 11898, or the Extended Producer Responsibility (EPR) Act of 2022, a major amendment to RA 9003. RA 11898 requires plastic producers, referred to as obliged enterprises (OEs), to assume greater responsibility by reducing and regulating plastic packaging waste throughout its life cycle, while contributing to the development of waste management facilities and resource recovery efforts. OEs are defined as (i) large enterprises that have total assets exceeding PHP100 million which are a major generator of plastic packaging, and (ii) micro, small, and medium enterprises where the total value of assets of all enterprises carrying the same brand, label, or trademark exceeds that of medium enterprises (DENR-EMB, 2023). The

EPR law also recognises producer responsibility organisations (PROs), which may fulfil EPR obligations on behalf of OEs and assist in monitoring compliance with EPR programmes. Three years after its implementation, the Philippines has made progress in plastic recovery; however, full compliance with the EPR programmes has yet to be achieved by all OEs.

2. Country and Policy Context

The Philippine economy heads closer to the upper-middle-income country status based on its economic performance in the recent years (PIDS, 2026). The economy shows modest growth as gross domestic product expanded by 5.7% in 2024, driven mostly by the service industry (PIDS, 2026). Wholesale and retail trade continues to grow along with the manufacturing sector (PIDS, 2026). Similarly, household consumption grew by 4.9% in 2024 despite inflation. Notably, household consumption of food and non-alcoholic beverages increased to 1.4% from 0.5% in 2024 (PIDS, 2026). With these increasing trends in manufacturing and consumption, waste generation is expected to also increase. This supports the findings of Break Free From Plastic (2023), which identify fast-moving consumer goods, particularly the food and beverage sector, as a major source of plastic waste in the Philippines. These industries continue to experience rising consumption, which suggests an increase in waste generation. These findings, along with poor infrastructure for waste collection, resource recovery and disposal, explain why the Philippines remains one of the world's major contributors to plastic waste entering the oceans (Lacang et al., 2025).

Waste analysis and characterisation studies (WACS) conducted in Metro Manila from 2014 to 2015 show that on average, waste consists mostly of biodegradables, followed by plastic and other recyclable materials (World Bank, 2022). WACS performed in 2017 to 2019 also reveal that most highly urbanised cities typically generate organic, biodegradable waste, followed by plastics (WWF Philippines, 2020). This reveals that plastic remains a major contributor to waste pollution over the years. Material flow analysis from 2019 shows that the Philippines has a 9% recycling rate with 33% disposed plastic waste (WWF Philippines, 2020). An estimated 35% of plastic waste leaks into the environment. This includes buried waste and wastes burned. Hence, there is an urgent need to strengthen plastic waste recovery.

Recovering waste starts at collection. As the Philippines is an archipelagic country, the transportation and collection of garbage in islands remains a challenge. Few islands have the capability to ship their waste to recycling facilities in the larger regional centres. The marine transport facilities of the country are also greatly lacking and outdated, inhibiting waste collection and transportation of goods (DOTr, 2025). Most residents of these islands are therefore forced to dispose of their waste by burning, burying, or discarding it into the

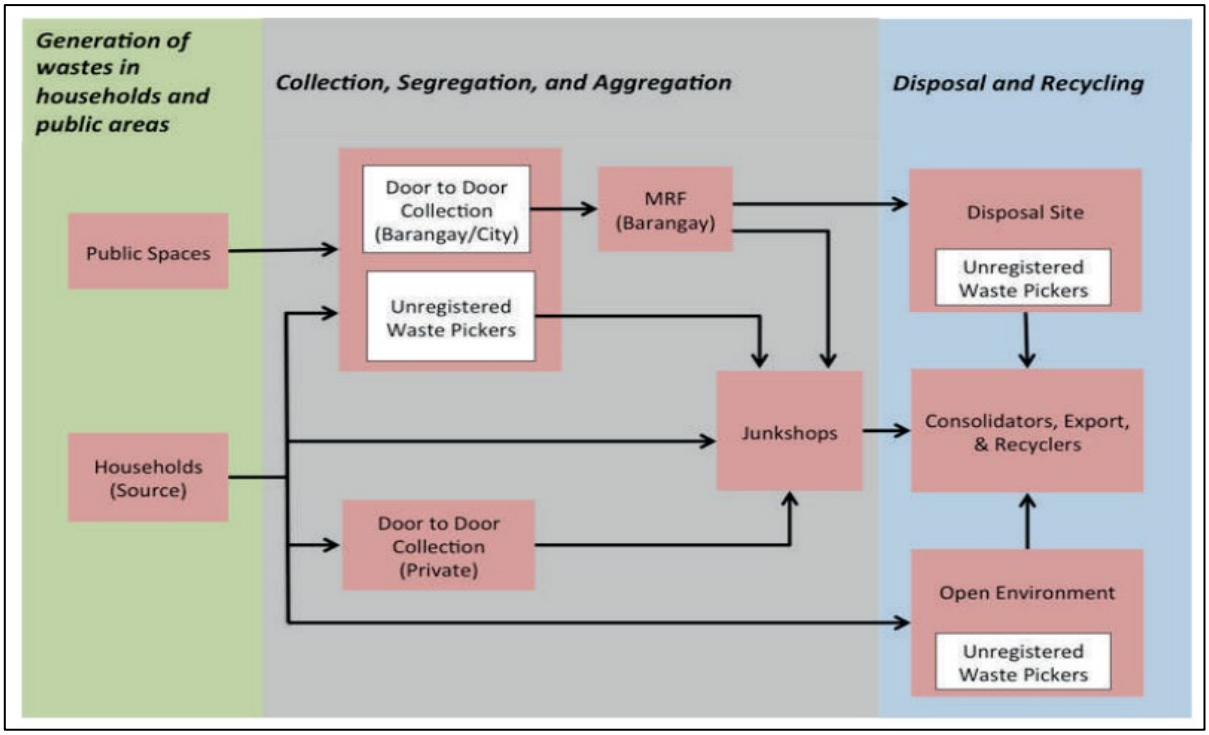
sea (WWF Philippines, 2020). Although the volume of waste generated on these islands is relatively small compared with that of urban areas, these disposal practices often contribute to marine pollution.

The high cost of collection and transportation is not only limited to the islands but also felt in the urban centres. From 2018 to 2022, the amount spent by the Metropolitan Manila Development Authority on waste collection increased by 84%, with a total of PHP3.336 billion spent on garbage hauling alone in 2022 (Reyes, 2023). In addition to the high costs associated with waste collection and transportation, the Philippines is estimated to lose 78% of the material value of plastics because they are left uncollected, unrecycled, or disposed of in landfills (World Bank, 2021). These costs highlight the critical need to develop proper solid waste management practices and to secure funding for this sector.

Increasing sorting efficiency and reducing the volume of trash collected results in significant savings. As an example, Quezon City spent PHP1.610 billion in 2019 for waste collection. Due to increased sorting efficiency, Quezon City saves up to PHP482 million per year, resulting in an almost 30% reduction in waste collection costs (World Bank, 2022).

SWM involves many stakeholders at every stage of the waste management process. Ideally, waste segregation starts in every household. Waste is then collected through the LGU collection system and transported to an MRF, where recyclable materials are separated from trash before the remaining waste is sent to the final disposal site. It should also be noted that the informal waste sector, including unregistered waste pickers and junk shops, plays a crucial role in waste collection and diversion, often at no additional cost to the government (World Bank, 2021). Managing the needs and responsibilities of these stakeholders requires support from government bodies, especially the National Solid Waste Management Commission (NSWMC), which is the main entity for solid waste management implementation and development.

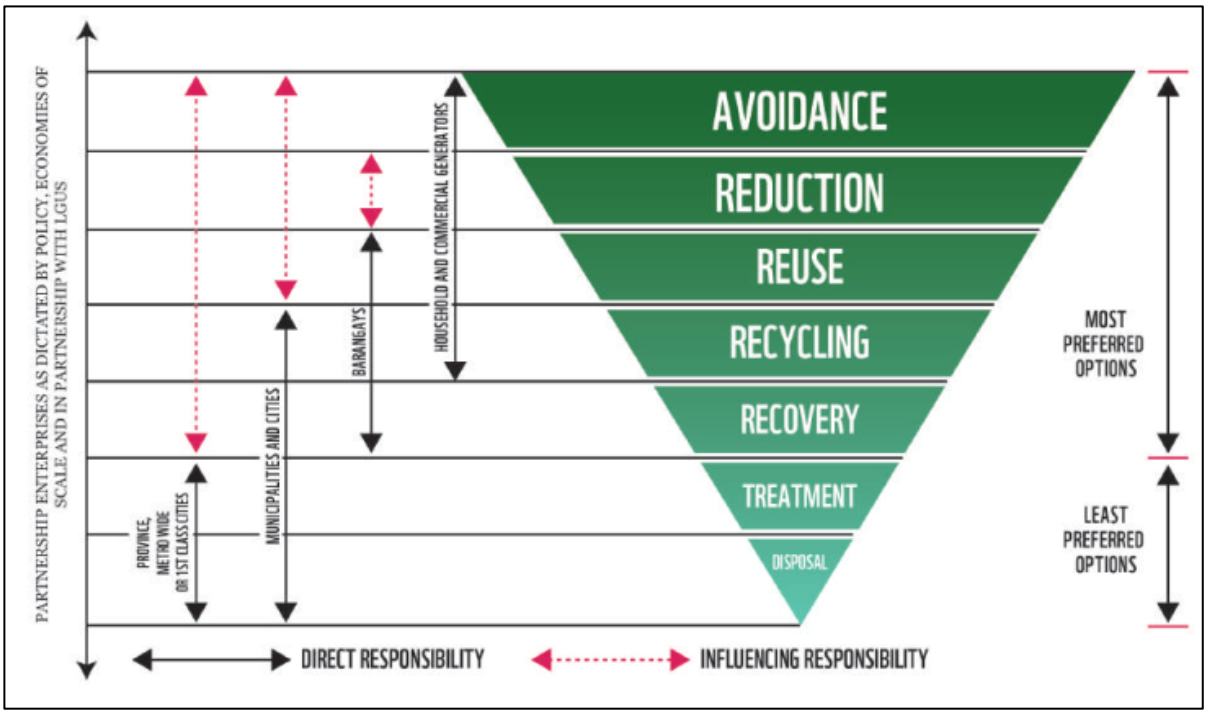
Figure 4.1. General Flow of Waste Collection and Disposal



Source: WWF Philippines (2020).

The main body responsible for waste management policymaking and monitoring is the NSWMC established through RA 9003. The legal framework of RA 9003 identifies waste avoidance and reduction as the highest priorities for waste management. While RA 9003 focuses on segregation and the 3Rs (reduction, reuse, recycling), the EPR Act further reinforces circular economy principles where the produced plastic is eventually recovered. The Department of Environment and Natural Resources (DENR) Administrative Order (DAO) No. 2023-02, which sets out the Implementing Rules and Regulations (IRR) of the EPR Act, outlines the exact steps that OEs must undertake. In addition to promoting the recycling and diversion of recovered plastic waste, DAO 2023-02 encourages the reduction of environmentally harmful packaging, the inclusion of recycled materials into packaging, and the adoption of product refill systems. The EPR Act focuses on plastic packaging, including flexible packaging (e.g. sachets and laminates), rigid plastic packaging (e.g. shampoo bottles), plastic bags, and polystyrene (DENR, 2023). Under the EPR Act and DAO 2023-02, OEs are required to record their plastic packaging footprint by weight, and to set plastic packaging weight recovery targets (DENR, 2023). OEs must register their EPR programmes with the National Ecology Center (NEC) to monitor their compliance with the EPR Act, RA 9003, and plastic waste reduction targets (DENR, 2023). Companies with approved EPR programmes receive tax incentives and deductions, while companies that fail to comply incur penalties (DENR, 2023).

Figure 4.2. Waste Management Hierarchy Framework based on NSWMC



Source: WWF Philippines (2020).

Several companies have existing programmes that are aligned with the EPR law. Nestlé has the 'Bear Brand Tibayanihan' and 'Laki sa Tibay' projects, which provide schools with benches and chairs made of upcycled Bear Brand packs (Aberilla et al., 2023; Manila Bulletin, 2022; Nestlé, 2017). Meanwhile, Unilever promotes a circular economy by reducing the amount of plastic in their products and packaging, while incorporating recycled materials into their packaging. Currently, 57% of their packaging is either recyclable or compostable (Unilever, n.d.). As Nestlé and Unilever are the second and third top global plastic polluters, respectively, they have a large impact on the plastic waste stream (Break Free From Plastic, 2023). Hence, the continued participation and compliance of major brands with the EPR Act is crucial for the reduction of plastic footprint.

The inception of the EPR law necessitated the creation of a separate body to monitor OEs and PROs. The responsibility for maintaining an EPR registry, monitoring the compliance of OEs and PROs, and preparing studies regarding waste generation and footprint was entrusted to NEC, an agency already established under RA 9003 to handle training, information dissemination, consultations, and advocacy programmes, so that the NSWMC may focus on framework development. Meanwhile, the Environmental Management Bureau (EMB) under DENR serves as the lead agency for pollution control and waste management and acts as the secretariat to the NSWMC. These government agencies collaborate with LGUs to implement and enforce RA 9003 and the EPR Act.

3. EPR Scheme Design and Implementation

The EPR framework in the Philippines primarily institutionalised under RA 11898 establishes a structured approach to waste management by assigning producers significant responsibility over the life cycle of their plastic products. Under Section 44-C of RA 9003, as amended by Section 6 of RA 11898, covered products include the following categories of plastic packaging: (i) sachets, labels, laminates, and other flexible plastic packaging products, whether single-layer or multilayer or combined with other materials; (ii) rigid plastic packaging products, including beverages and food containers, household product containers, plates, drinking straws, stirrers, tarpaulins, signages, or labels, and their lids, caps, and related promotional items; (iii) plastic bags, including single-use plastic bags provided or used at points of sale for carrying or transporting goods; and, and (iv) polystyrene products. (DENR-EMB, 2023). The scope is intentionally broad to capture high-leakage plastic waste streams, particularly those contributing to marine pollution.

The financial mechanisms underpinning the EPR system in the Philippines operationalise the principle that producers must internalise the environmental costs of plastic waste management, thereby ensuring sustainable financing for plastic recovery and waste diversion activities. At the core of this framework is the mandatory cost internalisation requirement under Section 6 of RA 11898, as amended by Section 44-D of RA 9003, which requires OEs to establish and implement EPR programmes and assume full financial responsibility for the life cycle management of their plastic packaging (DENR-EMB, 2023). This includes expenses related to collection, transport, sorting, recycling, treatment, and environmentally sound disposal. The law explicitly shifts the financial burden from government and taxpayers to producers, aligning with the 'polluter pays principle'.

The IRR further clarifies this obligation in Rule IV, Section 1 of DAO 2023-02, requiring OEs to allocate adequate and verifiable financial resources proportional to their declared plastic footprint. This footprint-based approach ensures that financial obligations scale with the volume of plastic introduced into commerce. Rule IV, Section 2 of DAO 2023-02 allows flexibility in compliance through two primary financing modalities: (i) individual compliance systems, where a company independently funds and manages its EPR activities; and (ii) collective compliance through PROs. PROs function as pooled financing mechanisms, enabling multiple companies to share costs for infrastructure, logistics, and recovery operations (DENR, 2023).

A significant financial instrument recognised under DAO 2023-02 is the use of market-based mechanisms, particularly plastic credits. Under Rule IV, Section 5 of DAO 2023-02, OEs may procure verified plastic credits to offset a portion of their recovery targets, provided that such credits represent actual and traceable waste diversion activities. This introduces a system where third-party organisations generate plastic credit through waste recovery projects, which are then purchased by OEs. The IRR, however, imposes

strict conditions, including third-party verification and documentation to prevent double counting and ensure environmental integrity (DENR, 2023).

Another key financial mechanism is the requirement for investment in waste management infrastructure and systems. While not framed as a tax or fee, Section 6 of RA 11898 implicitly mandates capital expenditures for establishing collection networks, MRFs, recycling partnerships, and logistics systems (DENR-EMB, 2023). DAO 2023-02 requires EPR plans to detail these investments (DENR, 2023), which transforms EPR into a mechanism for using private sector capital to strengthen the waste management sector.

Penalties for non-compliance function as an indirect financial mechanism. Under Section 8 of RA 11898, OEs that fail to register under Section 44-E of the amended RA 9003 or fail to comply with the EPR Act may incur administrative fines ranging from PHP5 million (~US$83,000) to PHP20 million (~US$332,500), depending on the severity and frequency of violations (DENR-EMB, 2023). Under Section 8 of RA 11898, OEs that fail to register under Section 44-E of the amended RA 9003 or fail to comply with the EPR Act may incur administrative fines ranging from PHP5 million (~US$83,000) to PHP20 million (~US$332,500), depending on the severity and frequency of violations (DENR-EMB, 2023).

The operational mechanisms of EPR in the Philippines define how OEs translate financial responsibility into concrete actions for plastic waste recovery and life cycle management. The focus of EPR operationalisation is the requirement for registration and submission of EPR programmes. Under Section 6 of RA 11898, OEs must implement EPR programmes that achieve prescribed recovery targets. This is operationalised in Section 44-E of the amended RA 9003, which mandates that all OEs register with the DENR-EMB through an established EPR registry system. Registration includes the declaration of the enterprise's plastic footprint, which is used as baseline for their EPR programme (DENR-EMB, 2023).

Following registration, OEs are required within 6 months of the effectivity of RA 11898 to establish or phase in EPR programmes in accordance with Section 12 of DAO 2023-02. These programmes may include measures such as reducing environmentally harmful packaging through the adoption of reusable packaging or packaging designs that improve reusability, recyclability, or retrievability; incorporating recycled content into packaging materials; adopting appropriate product refill systems for retailers; implementing information, education and communication campaigns; and introducing appropriate product and packaging labels to facilitate the recovery, reuse, recycling, and proper disposal of packaging waste (DENR, 2023).

The EPR programmes may also focus on recovery aimed at effectively preventing waste from leaking into the environment. These programmes may include waste recovery schemes, such as redemption, buy-back, offsetting, or other method or strategy that will efficiently result in high levels of retrievability, recyclability, and resource recovery; the diversion of recovered waste into value chains and adding value to useful products

through recycling and other sustainable processes; the transportation of recovered waste to appropriate composting, recycling, or other waste diversion or disposal facilities within the Philippines; the clean-up of waste leaked into coastal areas, public roads, and other sites; the establishment of commercial- or industrial-scale recycling, composting, thermal treatment, and other waste diversion or disposal facilities; and partnership programmes with LGUs, communities, and the informal waste sector.

A central operational requirement is the achievement of increasing recovery targets. Under Section 44-F of RA 9003, as amended by RA 11898 and Section 18 of DAO 2023-02, OEs must recover a percentage of their plastic product footprint, as follows (Table 4.1).

Table 4.1. Prescribed Recovery Targets by the EPR Act of 2022

Year	Plastic Product Footprint Recovery Target
2023	20%
2024	40%
2025	50%
2026	60%
2027	70%
2028 and Every Year Thereafter	80%

Source: DENR-EMB (2023).

These targets dictate the scale and scope of operational activities and require continuous expansion of recovery systems. DAO 2023-02 recognises a range of recovery and diversion activities, including waste collection and aggregation through community-based and institutional collection systems; sorting and processing at MRFs; mechanical and chemical recycling; co-processing in cement kilns and similar industrial applications; and waste-to-energy processes that meet environmental standards (DENR, 2023).

Operational mechanisms also include the option to engage PROs, as provided under Section 44-H of the amended RA 9003, and implemented operationally in accordance with DAO 2024-04. PROs act as centralised entities that manage collection and recovery operations on behalf of multiple OEs. They coordinate logistics, contract service providers, and consolidate reporting. Monitoring and reporting are also included in the operations under the EPR law. Under Section 44-G of the amended act and DAO 2023-02, OEs must submit an annual EPR Compliance Audit Report detailing their operational performance, including quantities of plastic footprint introduced, recovered, and diverted. These reports are subject to third-party audits that verify the reported values and operational performance (DENR, 2023).

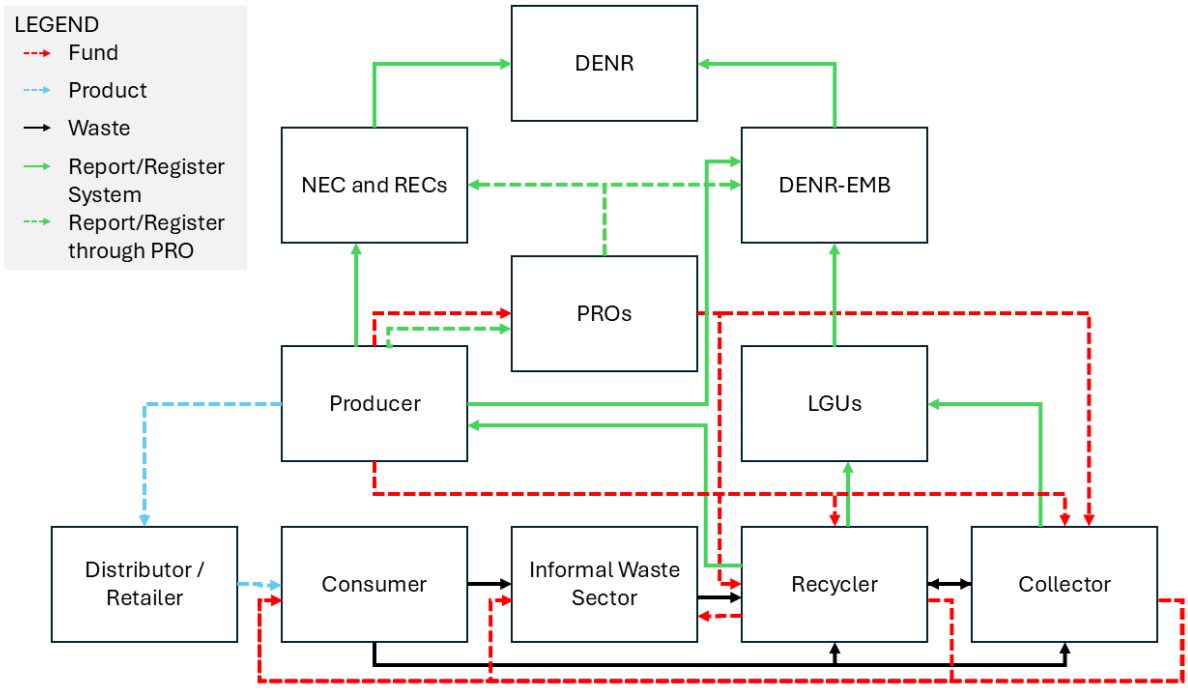
The operational mechanisms under the EPR Act of 2022 are reinforced through the oversight and field validation of the DENR and its offices. Under Section 4 of RA 11898, the composition of the NSWMC was amended to include representatives from NGOs; from the recycling, composting, or resource recovery and processing industry; and from the manufacturing industry, packaging industry, or OEs to represent the private sector (DENR-EMB, 2023).

Section 5 of RA 11898 established the NEC under the NSWMC to provide technical expertise, training, and networking services. Its key functions including establishing and managing a solid waste management information database, which shall include information on solid waste generation and management techniques and operational approaches to resource recovery; maintaining lists of processors and recyclers, including the materials they recycle or purchase, prevailing prices, and plastic waste recovery wastes; promoting the development of recycling markets through a national network to enhance recycling opportunities; maintaining the EPR registry for programmes submitted by OEs and PROs; monitoring and evaluating compliance; receiving and acting on sampling, assessment, and complaint reports; providing assistance for pilot SWM facilities; and developing model on waste minimisation and reduction auditing procedures (DENR-EMB, 2023).

4. Stakeholder Landscape and Public Perceptions

The implementation of the EPR framework under RA 11898 is shaped by a diverse set of stakeholders whose roles, interests, and perceptions influence the effectiveness and inclusiveness of the system. These include OEs, the formal and informal waste sector, NGOs, government institutions, and the public. Currently, the interrelationships amongst the EPR stakeholders can be summarised as follows (Figure 4.3).

Figure 4.2. Stakeholder Interrelationships under the EPR Act of 2022



Source: Created by the authors.

Producers, particularly large enterprises, are the primary actors under the EPR framework. Their responsibilities include financing, organising, developing EPR programmes, and achieving plastic recovery targets either individually, collectively, or through PROs. The number of registered enterprises increased from 667 in 2023 to 917 in 2024 and 1,017 in 2025, based on the recent 2026 EPR Recognition Program (DENR, 2026). This trend indicates that businesses have recognised the EPR law as part of corporate environmental responsibility. Stakeholder consultations in 2025 highlight that while businesses are generally compliant, with some instances of going beyond targets, they face operational concerns such as high logistics and limited recycling infrastructure outside Luzon and in suburban and rural municipalities.

Under the regulatory framework of the EPR Act of 2022, the informal waste sector (IWS) is clearly acknowledged as a key stakeholder in plastic waste recovery, with this recognition further reinforced under RA 9003. Implementation guidelines under DAO 2023-02 and DAO 2024-04 include provisions that recognise the role of the IWS (DENR, 2023), although its actual integration in practice remains limited. Organisations, such as the Philippine National Waste Workers Association, demonstrate the sector's vital contributions, particularly in early waste segregation, handling of hazardous waste, and grassroots collection through house-to-house collection activities (Global Alliance for Incinerator Alternatives, 2025).

Despite these contributions, many IWS groups continue to experience exclusion from

formal EPR processes. Key concerns include insufficient recognition, lack of fair compensation, limited direct engagement with producers, and barriers created by intermediaries. Although some localised collaborations exist, comprehensive inclusion is still constrained by inadequate institutional support, unclear sectoral representation, and limited cooperation and rampant discrimination from LGUs and offices. As a result, PNWWA and similar organisations persist in advocating for formal recognition, direct participation in EPR systems, equitable compensation, access to protective equipment, and clearer implementation guidelines (Mother Earth Foundation PH, 2025).

NGOs and advocacy groups play an important role in improving public awareness and supporting community-level waste management initiatives. Collaborations with organisations such as the Ecowaste Coalition on sachet collection initiatives; the World Wide Fund for Nature Philippines (WWF Philippines) on EPR implementation (WWF Philippines, 2024); the Mother Earth Foundation, and other civil society organisations illustrate how these stakeholders contribute to plastic recovery and behavioural change at the grassroots level.

Several socio-economic and cultural factors affect stakeholder behaviour and perceptions in the Philippines. The widespread use of small, single-use plastic packaging, known as 'sachet economy', reflects affordability needs amongst low-income households but contributes significantly to plastic waste, which creates tension between economic accessibility and environmental sustainability (Break Free From Plastics, 2025).

The waste management systems in most LGUs in the country also highly depends on informal labour, which highlights the need for inclusive EPR systems that recognise and compensate IWS' contributions (Philippine News Agency, 2025). There also exist behavioural gaps in which although the awareness amongst Filipinos is high, actual practices, such as waste segregation and recycling, remain inconsistent because of infrastructure gaps and convenience-related factors (Galang, 2025). Local initiatives are also conducted in the Philippines but are only supported by the public when backed with incentives and awareness campaigns.

Public perception in the Philippines is generally supportive of stronger waste management and plastic reduction policies. Over 80% of Filipino consumers prefer environmentally friendly products (Philippine Daily Inquirer, 2023). Similarly, a survey by Greenpeace Philippines found that a large majority of Filipinos support reducing plastic production and banning single-use plastics (Greenpeace Philippines, 2024). These findings suggest that public sentiment aligns with the goals of EPR and may create a favourable environment for its implementation. From the business perspective, reports indicate a willingness to comply with EPR requirements, particularly as environmental responsibility becomes part of corporate branding and consumer expectations.

Empirical research on WTP for improved waste management provides further insight into

public support. A study published in the *Philippine Journal of Science* found that Filipinos are generally willing to contribute financially to community-based solid waste management systems (Eugenio et al., 2024). The study also noted that WTP is not strongly determined by income or education level, indicating broad-based support across socio-economic groups. This has implications for EPR, as it suggests that cost pass-through mechanisms, such as slightly higher product prices, may be socially acceptable if linked to visible environmental benefits. Trust, however, remains a critical factor. Public confidence in EPR depends on transparent reporting, visible outcomes, and accountability of both government and private sector actors. Gaps in implementation, such as perceived exclusion of informal workers and inefficiencies in waste management systems, may undermine this trust.

5. Performance, Challenges, and Innovations

EPR implementation in the Philippines remains at an early stage following the enactment of RA 11898, with initial compliance driven largely by large enterprises. Early indicators suggest growing participation amongst producers and progress towards meeting recovery targets. However, given the recent implementation of the law, a number of challenges have also emerged.

Latest statistics on the performance of EPR in the Philippines was reported by the DENR in the '2026 Extended Producer Responsibility (EPR) Recognition Program' held on 30 January 2026 at the New World Makati Hotel (Manila Standard, 2026; Business Mirror, 2026). Organised by the DENR through the EMB, in collaboration with the Philippine Alliance for Recycling and Material Sustainability, the event served as a landmark assessment of the Philippines' progress in circular economy initiatives. The reported national recovery rate of 55.98% exceeded the defined target of 40% for 2025, corresponding to 246 million kilograms of plastics diverted. The recovery rates per plastic type can be further expressed as 56.93% for flexible plastics and 55.60% for rigid plastics. It was also reported that 1,017 entities are registered under the NEC, which include OEs, collectives, and PROs, all of which collectively are registered across 201 EPR programs (Business Mirror, 2026). This number is expected to increase as there are at least 4,000 large enterprises based on the data of the Department of Trade and Industry (Santos, 2024). This expansion reflects increased willingness of enterprises to join industry-wide compliance systems and signals rising maturity in Philippine waste governance.

However, several challenges were encountered in the implementation of EPR, including ambiguity regarding stakeholder responsibilities and an underdeveloped waste management system that hinders waste collection (Lacang et al., 2025; Aberilla et al., 2023). Collection efficiencies in the Philippines are highly dependent on the level of urbanisation of each area as seen in Table 5.2. Based on the waste analysis and

characterisation studies and field activities conducted from 2016 to 2020, metropolitan areas and first-class municipalities have high collection efficiencies reaching 90–95% while developing areas have efficiencies ranging from 15% to 50% (WWF Philippines, 2020). Although high waste-generating areas, such as urbanised cities, generally have good collection efficiency, it is also critical that waste is collected in developing and rural areas to prevent litter from entering nearby bodies of water. EPR itself can be an opportunity to increase collection efficiency especially in regions with low collection rates to ensure that the Philippines' waste management system is robust in all stages. The EMB has positioned LGUs as the bridge between large corporations and the community. By allowing OEs to partner with LGUs, the burden of waste hauling and disposal can be reduced (WWF Philippines, 2024).

Table 4.2. Collection Efficiencies by Region in the Philippines

Region	Degree of Urbanisation (%)	Collection Efficiency (%)
NCR	100	95
CAR	30	23
I - Ilocos	20	12
II - Cagayan	19	10
III - Central Luzon	62	56
IV-A CALABARZON	66	61
IV-B MIMAROPA	31	23
V - Bicol	23	15
VI - Western Visayas	38	31
VII - Central Visayas	49	43
VIII - Eastern Visayas	12	30
IX - Zamboanga Peninsula	38	31
X - Northern Mindanao	48	42
XI - Davao	64	58
XII - SOCCSKSARGEN	52	46
XIII - CARAGA	33	26
BARMM	23	15

Source: WWF Philippines (2020).

The role of the IWS in waste recovery and retrieval is undeniable. For instance, junk shops were responsible for the diversion of almost 11% of Iloilo's daily waste (Romallosa, Penetrante, and Ravena, 2024). Amongst plastics recovered by junks shops in Iloilo, high-density polyethylene (HDPE) plastics had the highest recovery followed by low-density polyethylene (LDPE) then polyethylene terephthalate (PET) plastics (Romallosa,

Penetrante, and Ravena, 2024). HDPE and LDPE plastics typically have low collection rates compared to PET plastics, since food-grade PET plastics are deemed as high-value recyclables (World Bank, 2021). Hence, the IWS addresses a significant gap in material waste recovery and recycling. In the current EPR law, OEs and PROs are encouraged to partner with the IWS. This not only integrates the IWS into a formal network where their contributions may be recognised but also provides them with employment opportunities that have benefits and safer working conditions (Philippine Daily Inquirer, 2003). Still, while junk shops are recognised as part of the waste recovery in the Philippines, there is a lack of provisions to support and to promote their significant role in waste diversion and recovery.

At present, plastic waste is collected through waste management entities and partners working with LGUs, which are then weighed, tested, and documented through notarised receipts and certificates. However, the current EPR system faces challenges due to the lack of standardised auditing procedures and clear methods to verify recovery performance. Some stakeholders also recommend embedding technically competent audits into the regulatory framework, along with standardised documentation, traceable incentives, and localised infrastructure planning to improve implementation. While progress is evident, the need for better data, infrastructure, and verification of whether companies meet their recovery targets is crucial.

As provided under Section 44-E of RA 11898, all obliged enterprises or their PROs are required to register their EPR programmes with the NSWMC through the DENR. The registration must include key information such as contact details, the specific types of plastic packaging covered under Section 44-C, product brands, implementation approach (individual, collective, or through a PRO), volume of plastic placed on the market, and recovery targets. It must also detail other programme components such as design for recyclability, labeling, implementation status, and compliance updates. As of early 2024, the EPR Registry is implemented as part of the law's enforcement mechanisms, and OEs are encouraged to register online though the official platform (Manila Bulletin, 2024). The EMB, in coordination with the NSWMC, is responsible for monitoring and evaluating compliance with enterprises or PROs required to submit annual compliance reports. However, public access to the registry is not automatic. One reason for this hindrance in full transparency is trade secrecy. As OEs are required to report their total plastic footprint, many argue that this data reveals their sensitive sales volumes to competitors. It is expected that EPR compliance audit reports that will be submitted in the future would also be publicly available for consumers to verify claims of EPR compliance and plastic neutrality.

Despite the provisions under RA 11898, both fiscal and non-fiscal incentives have yet to be fully operationalised, limiting the effectiveness of the policy in encouraging proactive

compliance. RA 11898 outlines a range of incentives, including tax deductions, tax credits, and other forms of support for investments in waste recovery and recycling systems. However, the absence of clear implementing guidelines and accessible mechanisms has resulted in these incentives remaining largely unavailable in practice, resulting in OEs currently absorbing the full operational cost of achieving the recovery targets without the relief of the promised fiscal framework. A probable reason for the delay is that while the DENR manages the environmental side, the fiscal side requires joint administrative orders or specific revenue memorandum circulars from the Department of Finance (DOF) and the Bureau of Internal Revenue (BIR). As a result, compliance is currently driven more by regulatory obligation than by positive economic incentives. This may discourage companies from investing in more capital-intensive, long-term solutions such as recycling infrastructure, and instead push them towards lower-cost, short-term compliance options such as plastic crediting or co-processing. Without tangible benefits to offset compliance costs, companies – particularly those with limited resources – may adopt a minimal compliance approach rather than pursue more ambitious waste reduction and circularity initiatives. To ensure that EPR compliance is also sustainable economically for the private sector, the DENR, DOF, and BIR must be able to enact joint guidelines to formalise the incentives promised in the law.

Such consequence is the current reliance of OEs on plastic crediting and co-processing as primary compliance strategies. While these mechanisms contribute to waste diversion in the short term, they do not necessarily lead to sustained improvements in recycling rates or material circularity. Critics of plastic crediting see it as a pathway that decouples responsibility from plastic production, which may lead to companies continued use of the same problematic materials as long as credits are available (SunStar Davao, 2023). Co-processing, meanwhile, is already an established pathway for waste diversion, whose guidelines are provided by DENR Administrative Order No. 2010 that specifies the requirement on the standard and procedures on the use of alternative fuel and raw materials for clinker in cement production (PCX, 2022). The process, being an energy recovery process, is a less desired pathway based on the waste hierarchy principle of RA 9003.

While RA 11898 considers eco-design as a strategy, the current EPR framework in the Philippines effectively focuses on downstream recovery metrics rather than rewarding upstream prevention. Because compliance is verified through recovery receipts for diverted waste, companies lack a fiscal incentive to invest in high-cost eco-design or refill models. Reducing plastic weight through redesign is often invisible to the current auditing system, which does not yet utilise eco-modulation to lower fees for sustainable packaging. This leads to a strategic imbalance where OEs prioritise immediate, lower-cost end-of-pipe solutions over systemic, long-term material innovations required for a truly circular economy.

It is understood that the current EPR law focuses on plastic waste. For the long-term implementation of EPR, expansion to other waste such as glass, metal, paper, and textiles must be considered (Asian Development Bank, 2025) as the formal and informal sectors not only divert plastic but also cover electronic waste, glass, and metals, which often have a higher value than plastics but are not yet covered by the EPR law.

6. Conclusion: Lessons Learned and Policy Recommendations

DENR Secretary Lotilla emphasised that EPR in the Philippines has moved from 'aspiration' to 'operational reality' (Manila Standard, 2026). Overall, EPR implementation in the Philippines since the enactment of RA 11898 in 2022 represents a significant policy shift towards shared responsibility in plastic waste management. As such, the EPR framework established under RA 11898 has strengthened producer accountability and promoted more structured waste diversion efforts.

Companies have adopted EPR, endeavoured clear reporting systems, and partnered with waste diverters to meet compliance. Moving forward, strengthening data systems, enforcement mechanisms, and investment in recycling infrastructure will be critical to achieving meaningful outcomes.

Community-based initiatives and informal waste collectors are beginning to receive more attention, though their roles remain undervalued in many areas. Integrating the informal sector and aligning national policies with local implementation will also be essential to ensuring that EPR delivers both environmental and socio-economic benefits.

The fiscal and administrative gaps are recognised, necessitating that the fiscal and non-fiscal incentives mandated by law, such as tax incentives and expense deductibility, be fully operationalised to ensure that EPR compliance is also economically sustainable for the private sector. By doing so, the current compliance landscape, which exhibits a downstream bias, can slowly encourage upstream innovations, such as material substitution, lightweighting, and refillable systems, that truly achieve systemic material circularity.

Despite transitional hurdles, the trajectory of the Philippines' EPR implementation remains positive. By bridging the gap between local government collection capabilities and private sector resources, the Philippines is establishing a scalable, market-driven model for waste responsibility. The progress achieved underscores a collective move beyond waste management toward a sustainable circular economy.

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Chapter 5

Closing the Loop: Thailand's Journey Towards a Mandatory Extended Producer Responsibility System for Plastic Packaging

Suchana Chavanich, Sujitra Vassanadumrongdee, Udomsak Darumas, Konchawan Chantima, and Voranop Viyakarn

1. Plastic Waste and Marine Debris Situation

1.1 Socio-economic Background and Plastic Waste Profile in Thailand

Thailand is a major petrochemical hub in Southeast Asia, with a well-developed plastics manufacturing sector supplying both domestic and export markets. Recent estimates indicate that total plastic resin production is approximately 8.8 million tonnes in 2023, while the country imported 2.4 million tonnes (Thiumsak, 2025). The plastics industry remains economically significant, with an estimated market value of ฿1.3 trillion in 2023 (Thiumsak, 2025). The country produces a wide range of polymers, including polyethylene, polypropylene, polyethylene terephthalate (PET), and polyvinyl chloride, which serve as key inputs across multiple industries.

A significant share of plastic production is export-oriented; however, domestic demand remains substantial due to Thailand's industrial base and consumption patterns. This positioning places Thailand as an upstream producer within the regional plastics value chain, with implications for both domestic waste generation and transboundary material flows.

Domestic plastic consumption in Thailand is estimated at approximately 6.23 million tonnes in 2025, reflecting strong demand from various economic sectors (Mordor Intelligence, 2026). The packaging sector dominates plastic consumption, accounting for the largest share of demand, followed by construction, automotive, electrical and electronic equipment, and consumer goods industries. Consumption patterns in Thailand are increasingly shaped by urbanisation, the expansion of e-commerce, food delivery services, and tourism, all of which contribute to the growth of short-lifetime plastic applications. Notably, approximately 40% of total plastic use consists of single-use or short-lived plastics, primarily associated with packaging and disposable products (Chulalongkorn University, 2022). This structural reliance on short-lived plastics significantly influences downstream waste generation and management challenges.

According to the Thailand Pollution Situation Report 2025 (PCD, 2026), Thailand generated 27.76 million tonnes of municipal solid waste in 2025, equivalent to 76,067 tonnes per

day, representing a 2% increase compared with 2024. Plastic waste represents the second-largest waste category, accounting for 28.13% of total municipal solid waste generated at the disposal sites (PCD, 2022).

The COVID-19 pandemic significantly altered consumption patterns, leading to a surge in plastic waste generation. Lockdown measures accelerated the shift from dining out to online food delivery, increasing the use of plastic bags, containers, and packaging (Johannes et al., 2021; Liu, Bunditsakulchai, and Zhuo, 2021). In Thailand, plastic waste reportedly rose to 1,500–6,300 tonnes per day during this period, much of it contaminated and disposed of as residual waste, with limited recycling and some leakage into marine environments. Following the reopening in 2023, economic recovery policies, particularly tourism promotion and labour market adjustments, further intensified consumption. Thailand recorded 35.54 million international arrivals and 198.69 million domestic trips in 2024, significantly increasing pressure on municipal waste systems (PCD, 2023b). Concurrently, the normalisation of online delivery services and digital commerce has structurally increased packaging waste, embedding higher waste generation into everyday consumption patterns.

In 2025, Thailand generated approximately 2.94 million tonnes of single-use plastic waste. Of this amount, about 0.74 million tonnes (25%) were recovered and utilised, while the remaining 2.20 million tonnes (75%) were sent to disposal sites managed by local administrative organisations or leaked into the environment (PCD, 2026). This corresponds to a per capita plastic waste generation rate of approximately 70–80 kg per person per year, which is relatively high compared to regional averages (OECD, 2026). Compared to 2024, plastic waste generation shows an increasing trend. This is primarily driven by economic recovery, with the plastics industry expanding towards the end of the year in line with the rebound of global markets particularly in higher value downstream products. At the same time, increased consumption of single-use plastics amongst the public has contributed significantly to this rise (PCD, 2026).

This increase can be attributed to several key factors. One major factor is the rise in the number of migrant workers, from 3.3 million to 3.9 million, contributing to a larger de facto population and increased consumption in urban areas. This trend is accompanied by expanding foreign investment and economic activities, which generate employment and increase resource use. Furthermore, consumption patterns that prioritise convenience particularly the growth of food delivery services and e-commerce have led to an increase in packaging waste, especially single-use plastics. Urban expansion and the organisation of large-scale events in many areas have also contributed to higher waste generation (PCD, 2026).

The majority of plastic waste originates from post-consumer packaging, particularly food-related plastics, plastic bags, and flexible packaging materials. These waste streams are typically characterised by low economic value and limited recyclability, especially in the case of multi-layer plastics. This low recycling rate, combined with accumulation of low-

density polyethylene, polypropylene, and multi-layer packaging at disposal sites, underscores the urgency of transitioning to a mandatory EPR framework that shifts financial and operational responsibility to producers.

In addition, downstream waste management remains a significant concern in Thailand. According to the latest data, Thailand has a large number of municipal solid waste disposal sites; as of 2025, a total of 15.90 million tonnes of municipal solid waste were sent to disposal sites across 2,045 facilities nationwide (a decrease of 0.58% from 2,057 facilities in 2024). Of these, only 119 facilities (6%) operated with proper, environmentally sound waste management practices (PCD, 2026). This reflects a persistent pattern in which the vast majority of sites operate under substandard or non-compliant conditions.

Waste disposal sites also contribute significantly to greenhouse gas emissions, particularly methane from landfills, and are increasingly vulnerable to the impacts of climate change. Extreme weather events, particularly severe flooding, have disrupted waste collection systems under the responsibility of local administrative organisations (LAOs). Flooding in several northern provinces has further intensified municipal solid waste management challenges by damaging infrastructure and delaying collection services. To illustrate, Chiang Rai province faces landfill capacity constraints and limited space to accommodate rising volumes of waste, underscoring the mounting pressure on downstream waste management systems amid climate-related stress. Another example is the aftermath of the 2026 flooding in southern Thailand, particularly in Hat Yai District, Songkhla Province, in 2026, where waste disposal processes were disrupted, resulting in the leakage or residual release of waste into the environment and posing risks to both the environment and human health. These impacts include foul odours caused by the accumulation and decomposition of organic waste, blockage of drainage systems by debris, and an increase in disease vectors (TSU, 2025).

1.2. Marine Debris Situation in Thailand

Marine debris has emerged as a critical environmental issue in Thailand, posing significant threats to marine ecosystems, biodiversity, coastal economies, and human health. The problem is largely driven by land-based waste mismanagement, with global and national evidence indicating that approximately 80% of marine debris originates from land-based sources, particularly through inadequate waste collection and disposal systems (United Nations, 2021). Thailand, as a coastal country with extensive river networks and high levels of plastic consumption, is particularly vulnerable to marine litter leakage. Rivers and canals act as major pathways transporting waste from inland urban areas to coastal and marine environments.

According to the latest data from the Department of Marine and Coastal Resources (DMCR), Thailand continues to face significant marine debris challenges:

(1) Coastal debris accumulation and clean-up: In fiscal year 2025, the DMCR conducted coastal clean-up activities across 295 locations in 23 coastal

provinces, removing approximately 465 tonnes (over 7 million items) of marine debris from coastal ecosystems. This reflects the persistence of accumulated (legacy) waste in coastal areas, including beaches, mangroves, and coral reef zones, despite ongoing clean-up efforts.

(2) Floating marine debris entering the sea: Monitoring of floating debris at five major river mouths discharging into the Upper Gulf of Thailand shows total debris = 83.6 million items (~9,866 tonnes); plastic debris = 81.7 million items (~6,942 tonnes); and share of plastics = 98.3% of total debris. These figures confirm that plastic waste overwhelmingly dominates marine litter in Thailand, consistent with global trends (DMCR and PCD, 2024).

(3) A 2017 study by the DMCR disaggregated the composition of land-based marine plastic debris in Thailand, identifying plastic bags (24%), plastic bottles (20%), glass bottles (18%), polystyrene foam (12%), plastic wraps (10%), plastic caps (6%), plastic straws (5%), and cigarette butts (5%) as the main items (DMCR, 2017, as cited in Marks, Miller, and Vassanadumrongdee, 2020).

While ongoing clean-up efforts and technological interventions contribute to mitigating impacts, long-term solutions require systemic upstream interventions, particularly in waste reduction, improved collection systems, and the implementation of EPR and CE strategies.

As of 2024, Thailand has improved its global plastic-ocean-pollution ranking from sixth (2015) to tenth, reflecting the impact of sustained policy and clean-up interventions (Nation Thailand, 2025). Data from 2016 to 2019 also indicates a rising trend in municipal solid waste generation across the 24 coastal provinces. Nevertheless, improvements in waste management practices, particularly enhanced source segregation and recycling efforts, contributed to a reduction in improperly managed waste between 2017 and 2019 compared to 2016.

In response, sectoral agencies have implemented targeted downstream and sea-based interventions. The Department of Fisheries launched the 'Garbage Return to Shore, Keep the Sea Clean by Our Hands' campaign in 2019, implemented across 23 coastal provinces through partnerships with fishing communities, local organisations, and business operators. This campaign specifically targeted the collection and management of abandoned, lost, or otherwise discarded fishing gear (ALDFG), which constitutes a significant and distinct source of marine debris. In Thailand, the Environmental Justice Foundation's Net Free Seas (NFS) project has demonstrated practical community-based solutions by establishing 20 collection centres where fishers can deposit used gear for recycling, successfully recycling over 200 tonnes of fishing nets through a partnership with a Thai recycling company and generating more than ฿2.3 million (approximately $70,000) in revenue for local communities (Environmental Justice Foundation, 2025) Despite this progress, comprehensive national data comparing ALDFG collection volumes

to estimated total ALDFG generation in Thai waters remain limited, representing an important data gap for future EPR-related policy development (EJF, 2025).

Similarly, the DMCR, in collaboration with regional marine and coastal resource offices, academic institutions, and private stakeholders, has conducted participatory coastal clean-ups, deployed technological innovations such as booms and SCGC–DMCR litter traps, and implemented priority-area measures in cooperation with the fishing and tourism sectors. Since 2020, the SCGC-DMCR Litter Trap system has been installed in 17 provinces, preventing over 90 tonnes of waste from entering the sea (Nation Thailand, 2025). A collaborative project between Chulalongkorn University, DMCR, and The Ocean Cleanup on the Chao Phraya River (2021–2024) aimed to intercept between 80 and 300 tonnes of plastic per year from one of Thailand's key river systems feeding into the Gulf of Thailand (ThaiPR.net, 2021). The Marine and Coastal Resources Research and Development Institute further strengthens policy responses through long-term monitoring and scientific research on floating debris, microplastics, and ecosystem impacts. While these clean-up efforts represent meaningful progress, they address a fraction of the estimated 34,000–51,000 tonnes of debris entering Thai waters annually, underscoring the need for upstream source reduction measures (MHESI, 2025)

However, these initiatives focus primarily on downstream mitigation and clean-up efforts. Therefore, strengthening CE and implementing a mandatory EPR system would complement existing marine litter initiatives by reducing plastic waste generation at source, improving collection efficiency in coastal provinces, and preventing land-based plastic waste from entering rivers and ultimately the sea. Integrating upstream policy instruments with downstream marine management measures is essential for achieving long-term and systemic marine pollution reduction in Thailand.

2. Policy and Legal Framework Development

2.1 Background of Thailand's Waste Management Regulatory and Policy Framework

Thailand's waste management regulatory framework has evolved progressively in response to global environmental challenges, with local authorities mandated to manage municipal and plastic waste. As concerns over plastic pollution intensified, the Roadmap on Plastic Waste Management (2018–2030), as illustrated in Figure 5.1, developed by the Ministry of Natural Resources and Environment through the PCD, was introduced as a national strategic framework. The roadmap aims to reduce and phase out problematic plastics, promote environmentally friendly alternatives, and ensure the reuse or recycling of all plastic waste by 2027 (Schulte and Busch, 2025)

Key operational objectives include (i) phasing out specific single-use plastics such as cap seals, oxo-degradable plastics, microbeads, foam food containers, plastic bags, and certain plastic cups; and (ii) achieving 100% recycling of seven major plastic packaging categories by 2030, including plastic bags, films, bottles, caps, cups, food containers, and cutlery (Samitthiwetcharong et al., 2023). The road map is aligned with major

international commitments, including the Bangkok 3R Declaration (2019), the ASEAN Declaration on Marine Debris (2019), the ASEAN Framework of Action on Marine Debris, and the United Nations Sustainable Development Goals (SDGs), particularly SDG 12 and SDG 14 (Greenpeace, 2021).

Building on this framework, Thailand implemented the Action Plan on Plastic Waste Management Phase 1 (ended 2022) and is currently implementing Phase 2 (2023–2027), both guided by the waste hierarchy principle, as illustrated in Figure 5.2. Phase 2 adopts a life cycle–based approach across three management streams: upstream (eco-design and production), midstream (collection and segregation), and downstream (waste treatment and recycling). The plan is supported by key policy instruments, including EPR, product standards, eco-labelling, green procurement, research and development, and a national plastic database (Jiaranaikhajorn, 2026).

The Phase 2 Action Plan focuses on four core measures: (i) responsible production, (ii) responsible consumption, (iii) post-consumption waste management, and (iv) marine litter prevention. It sets ambitious targets, including 100% of target plastic products entering recycling systems and a 50% reduction in ocean-bound plastic waste by 2027.

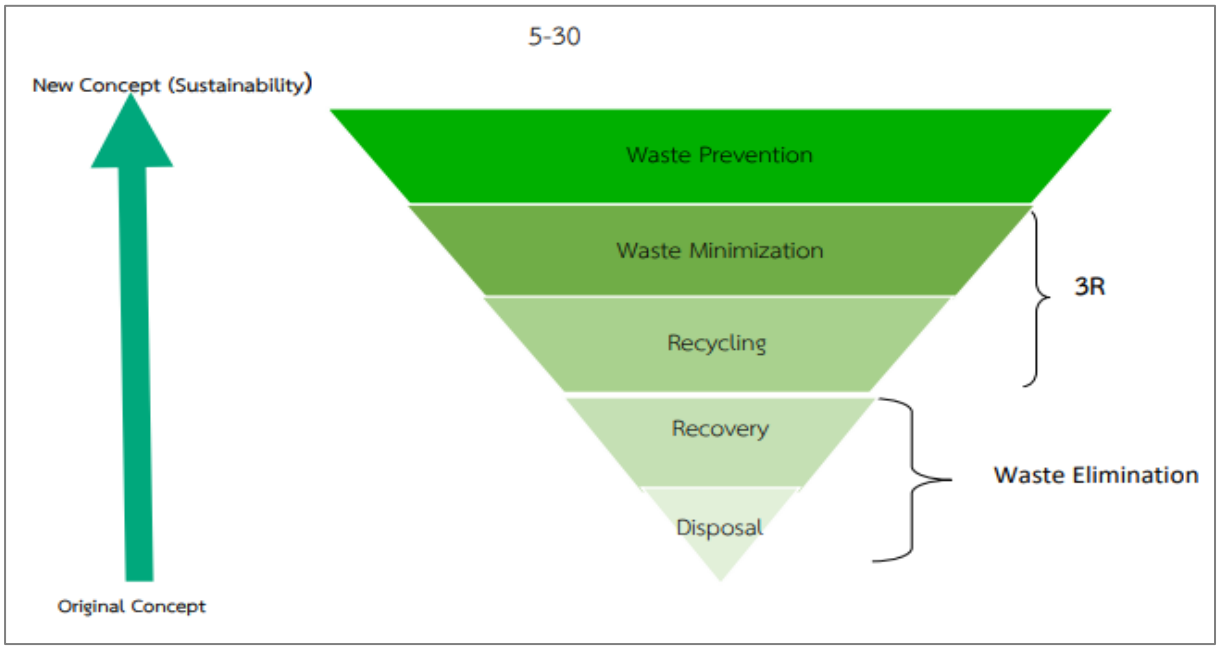
At the national level, the CE concept has been elevated as a strategic development priority under the Bio-Circular-Green Economy (BCG) Model. The 13th National Economic and Social Development Plan (2023–2027) integrates CE principles under its 10th national milestone on transforming Thai society towards a low-carbon and CE system. To operationalise this vision, government agencies and private sector stakeholders have developed action plans and projects aligned with the BCG framework. An inter-ministerial BCG committee has also been established to strengthen coordination and drive implementation across sectors.

Figure 5.1. Thailand Roadmap on Plastic Waste Management 2018–2030



Source: From *Thailand's Roadmap on Plastic Waste Management 2018–2030*, by Pollution Control Department (2019), Ministry of Natural Resources and Environment. https://www.pcd.go.th/wp-content/uploads/2021/10/pcdnew-2021-10-19_08-59-31_527174.pdf.

Figure 5.2. Waste Management Hierarchy



Source: From *Action Plan on Plastic Waste Management Phase II (2023–2027)* (pp.5–30), by Pollution Control Department (2023). https://www.pcd.go.th/wp-content/uploads/2023/06/pcdnew-2023-06-15_08-07-42_392659.pdf.

Thailand has made significant progress in applying CE principles to plastic packaging waste management, positioning CE as a key pathway for sustainable growth. Since 2018, the concept has been embedded in national policy through the BCG Economy Model under the Thailand 4.0 Strategy. The BCG framework integrates three pillars: the bio economy (value creation from biological resources), the circular economy (waste reduction through reuse and recycling), and the green economy (environmental protection and low-carbon development).

The BCG Strategic Plan (2021–2027) promotes life cycle–based management, public–private partnerships, and regulatory instruments such as EPR. By incorporating EPR into this framework, Thailand aims to shift responsibility to producers, enhance material circularity, and accelerate sustainable plastic management. Overall, these efforts reflect Thailand's transition from a linear 'take–make–dispose' model towards closed-loop systems and a carbon-neutral society (Arthur et al., 2022).

In addition, following China's National Sword Policy in 2018, plastic waste flows shifted to Southeast Asia, including Thailand, leading to environmental and social impacts such as pollution, landfill overflow, and exploitation of waste workers (Morita and Hayashi, 2022; SWITCH-Asia, 2025). In response, Thailand elevated plastic waste imports to the national policy agenda and introduced the Plastic Scrap Import Control Policy, effective 31 December 2024. The policy aims for a full ban on plastic waste imports by 2025. During the transition period (2023–2024), imports were restricted to 14 authorised factories in free trade zones and limited to actual production capacity, up to 100% in 2023 and reduced to 50% in 2024 under stricter environmental controls (MHESI, 2023). Imports were permitted only as raw materials for export-oriented production. From 2025 onwards, all plastic waste imports are prohibited. This positions Thailand as a regional leader in addressing 'waste colonialism' and creates an opportunity to strengthen ASEAN cooperation on controlling transboundary waste trade. The policy also shifts focus towards utilising domestic plastic waste, increasing demand for local recycling and improving end-of-life plastic management (SWITCH-Asia, 2025).

2.2. Overview of Thailand's CE and EPR Policy and Legal Landscape

Thailand is amongst the ASEAN member states making progress towards formalising an EPR framework as part of its broader transition towards CE. However, EPR implementation remains largely voluntary, and the institutional mechanisms for financing, enforcement, and performance monitoring are still under development.

To strengthen the legal foundation, the Draft Sustainable Packaging Management Act is currently being developed from 2023 to the present. On 31 August 2023, the PCD commissioned Mae Fah Luang University to prepare the draft legislation. The proposed law is based on the principles of Sustainable Consumption and Production, the CE, and EPR, aiming to ensure life cycle–based resource management, as stated in the 2025 an International Seminar on Microplastic Issues and Health. The draft seeks to engage

industry actors in managing packaging throughout its entire life cycle, from product design and distribution to consumption and end-of-life management (Jainontee, 2025).

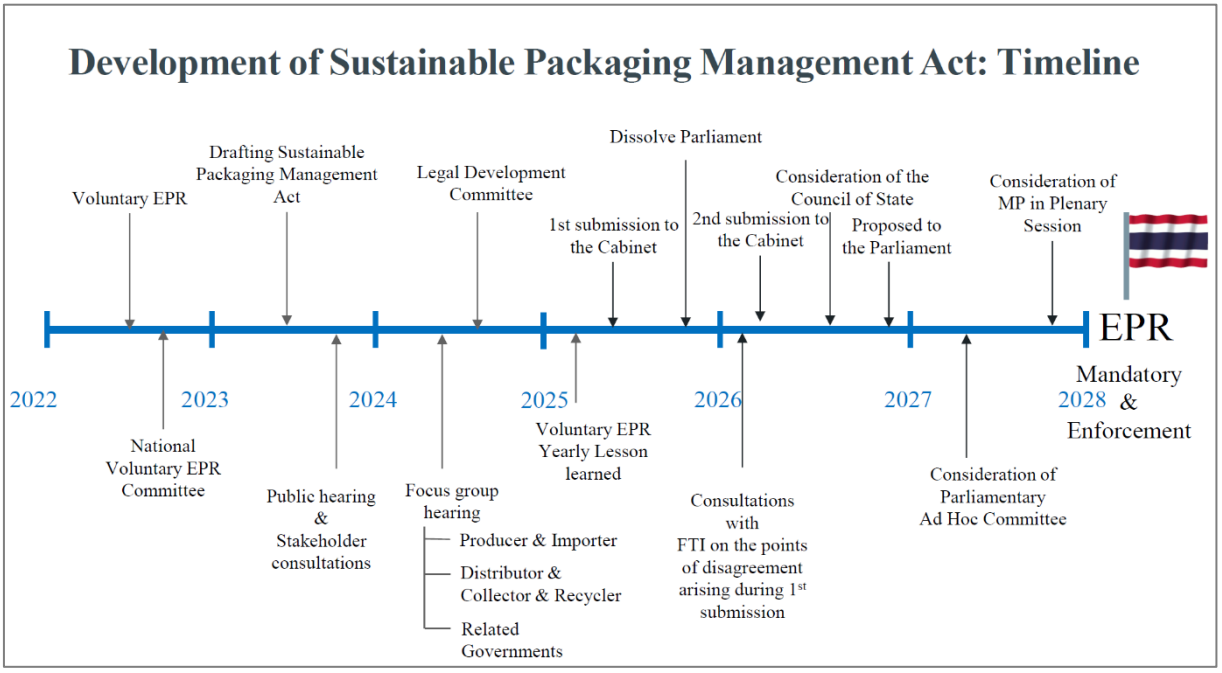
During the drafting process, a series of focus group consultations were conducted with key stakeholders, including packaging producers and importers, distributors, retailers, collectors, recyclers, and relevant public authorities to ensure inclusive participation. In March 2024, the Draft Act was published for online public hearing via Thailand's central legal database (https://law.go.th/). The draft law provides key definitions such as 'sustainable packaging management' and 'used packaging', and outlines the roles and responsibilities of obligated producers and regulatory authorities, including enforcement measures and penalties.

At the operational level, the draft introduces a collective compliance mechanism through the proposed PRO, referred to as the 'Packaging Recovery Organization Thailand Network (PRO-Thailand Network)', to represent businesses in fulfilling their collective EPR obligations. The framework also allows for elements of Individual Producer Responsibility. In parallel, the Thailand Institute of Packaging and Recycling Management for a Sustainable Environment, under the Federation of Thai Industries (FTI), has been engaged to support capacity building and promote comprehensive management of used packaging and recycled materials (Johannes et al., 2021).

However, the latest draft requires further refinement in several areas. These include clearer definitions of 'producers', the scope and criteria for exemptions of small and medium-sized enterprises, detailed implementation mechanisms, and more explicit delineation of the roles and responsibilities of producers and retailers, particularly in relation to eco-design requirements and the reduction of excessive packaging.

According to Thailand's updated legislative road map (Jiaranaikhajorn, 2026), the Draft Act was first submitted to the Cabinet before the dissolution of Parliament. It is currently undergoing a second Cabinet submission (2026), with parliamentary consideration expected in 2027 and mandatory EPR implementation anticipated from 2028 onwards. During the transition period through 2028, voluntary EPR programmes continue to operate, with yearly lessons learned feeding into the regulatory process.

Figure 5.3. Overview Timeline of the Draft Sustainable Packaging Act



Source: Jiaranaikhajorn (2026).

Stakeholder Landscape

Table 5.1 presents the implementation efforts of relevant government agencies, the private sector, and civil society in advancing CE and/or EPR (ThaiHealth and SERI, 2025).

Table 5.1. Roles of Key Stakeholders in Advancing the Circular Economy and Extended Producer Responsibility in Thailand

Stakeholder Group	Role in Circular Economy and/or Extended Producer Responsibility
Government Agencies	
Ministry of Higher Education, Science, Research and Innovation (MHESI)	- Integrates circular economy (CE) into national science, research, and innovation strategies under the Bio-Circular-Green (BCG) Economy Model - Provides funding through National Science and Technology Development Agency (NSTDA) and related agencies to support CE technologies, eco-design, recycling innovation, and material efficiency - Supports evidence-based policymaking through research, pilot projects, and innovation platforms
Ministry of Industry	- Lead agency for CE implementation in the industrial sector - Develops national strategies, standards, and regulatory frameworks to promote circular production

Stakeholder Group	Role in Circular Economy and/or Extended Producer Responsibility
	- Supports industry transition through innovation, data systems, and new circular business models - Coordinates with the Federation of Thai Industries (FTI) and academia to drive sector-wide adoption
Department of Primary Industries and Mines	- Develops CE assessment tools and indicators for enterprises (self-assessment frameworks) - Provides advisory services and technical support for CE adoption at firm level
Department of Industrial Works	- Regulates industrial waste and hazardous substances - Promotes Green Industry certification and eco-industrial transformation - Encourages waste minimisation, recycling, and cleaner production systems
Industrial Estate Authority of Thailand	- Develops eco-industrial estates and promotes industrial symbiosis - Facilitates resource sharing, waste exchange, and circular infrastructure within industrial clusters
Ministry of Natural Resources and Environment	- Leads national environmental and waste management policy, including plastic waste and EPR development - Oversees the Pollution Control Department (PCD) in setting standards and implementing waste strategies - Coordinates marine debris, municipal waste, and circular economy policies
Ministry of Agriculture and Cooperatives	- Integrates CE principles into agricultural systems under the BCG Model - Promotes biomass utilisation, organic waste recovery, and circular bio-economy practices
Department of Local Administration, Ministry of Interior	- Responsible for municipal solid waste management at the local level - Implements the 'Clean Province' initiative and supports local administrative organisations (LAOs) in waste collection, segregation, and disposal - Plays a key role in enabling EPR implementation through local collection systems
Board of Investment	- Provides fiscal incentives (tax exemptions, duty reductions) for CE-related industries - Promotes investment in recycling, waste-to-energy, eco-design, and sustainable materials

Stakeholder Group	Role in Circular Economy and/or Extended Producer Responsibility
Office of SMEs Promotion	- Integrates CE into small and medium-sized enterprises' (SMEs') development strategies - Provides training, advisory services, and financial support for SMEs to adopt circular business models
Food and Drug Administration	- Regulates packaging safety, standards, and labelling - Enables use of recycled materials in food packaging under controlled conditions - Influences design-for-recycling and material circularity
Private Sector	
PPP Plastics (Public–Private Partnership for Sustainable Plastic and Waste Management)	- Drives transition to circular plastics through multi-stakeholder collaboration - Supports data systems, material flow analysis, and policy development - Conducts public awareness campaigns on waste reduction and segregation
Federation of Thai Industries (FTI)	- Represents industry in CE and EPR policy processes - Promotes resource efficiency, eco-design, and sustainable production - Facilitates collective compliance mechanisms and industry coordination for EPR
Thailand Institute of Packaging and Recycling Management for Sustainable Environment (TIPMSE)	- Acts as a technical and coordinating body for packaging EPR - Develops recycling systems, infrastructure models, and packaging design guidelines - Supports establishment of PROs
PRO Thailand Network	- Industry-led platform (est. 2019) to operationalise packaging EPR - Pilots collection and recycling systems for PET, beverage cartons, and flexible plastics - Develops financing mechanisms (e.g., buy-back subsidies) and value-chain coordination
Global Compact Network Thailand	- Promotes corporate sustainability aligned with Sustainable Development Goals and CE - Encourages environmental, social, and governance integration, resource efficiency, and waste reduction commitments

Stakeholder Group	Role in Circular Economy and/or Extended Producer Responsibility
Circular Economy in Construction Industry	- Advances circular construction practices (reuse, recycling, eco-design) - Develops standards and promotes industrial symbiosis in the construction sector
Academic and Civil Society Organisations	
Kasetsart University (Faculty of Environment)	- Conducts research on waste management, resource efficiency, and CE policy - Provides technical expertise and policy recommendations
Chulalongkorn University (Sustainable Environment Research Institute: SERI)	- Develops CE frameworks and policy tools - Leads pilot projects and supports EPR policy design and evaluation
University of the Thai Chamber of Commerce	- Operates CE Academy for businesses and consumers - Provides training, networking platforms, and practical tools for CE adoption
Environmental Justice Foundation (EJF)	Net Free Seas (NFS): - Demonstrates EPR-relevant model for fisheries waste by collecting and recycling >200 tonnes of ghost gear, establishing community-based recovery systems and circular value chains Bottle Free Seas: - Demonstrates upstream waste prevention through reuse systems - Installs refill stations, reduces ~100,000 bottles/month, and supports city-wide refill infrastructure and behavioural change - Provides practical models for integrating reuse and sector-specific EPR into policy design
Repair Community Thailand	- Promotes repair-based circular economy and reuse culture - Advocates for right-to-repair policies and community-level repair networks

Source: Authors' compilation based on ThaiHealth and SERI (2025) and other relevant institutional sources.

3. Voluntary EPR Schemes and Other Measures

Although Thailand's legal framework for mandatory EPR for packaging is still under development, several voluntary EPR-like initiatives have been implemented over the past 5 years. These initiatives serve as transitional mechanisms, piloting operational models, financing approaches, and stakeholder coordination that can inform the design of a future statutory EPR system. These efforts include the use of recycled materials, the development of appropriate waste management systems, the establishment of packaging take-back schemes, and enhanced collaboration amongst relevant stakeholders. Key initiatives include the PackBack Project under TIPMSE (Federation of Thai Industries), the PPP Plastics platform, the PRO Thailand Network, and a material-specific initiative for aluminium cans known as LOOP, led by Thai Beverage Can (TBC). Collectively, these initiatives demonstrate emerging forms of industry-led responsibility, stakeholder collaboration, and experimentation with collection and recycling systems, although they remain limited in scale, coverage, and enforceability. These voluntary initiatives are helping to prepare the private sector for the implementation of mandatory policy instruments, particularly under the proposed Sustainable Packaging Management Act, which incorporates EPR principles.

3.1. PackBack Project (TIPMSE, FTI)

The PackBack Project, implemented by the Thailand Institute of Packaging and Recycling Management for Sustainable Environment (TIPMSE) under the FTI, aims to pilot a PRO model and develop a prototype system for post-consumer packaging take-back in line with EPR principles. The project has been piloted in Chonburi Province since 2021. The project aims to promote sustainable packaging management by fostering collaboration amongst stakeholders across the packaging value chain, including local communities, informal recyclers, scrap dealers, and waste collectors. Implemented in three municipalities – including Saen Suk, Ban Bueng, and Ko Si Chang – the initiative focuses on take-back mechanisms for hard-to-collect packaging materials, particularly multi-layer plastic pouches, beverage cartons, and PET bottles.

A key feature of the project is its effort to integrate the informal sector into formalised collection systems, thereby improving recovery rates while supporting livelihoods. From a system design perspective, PackBack functions as a testing ground for future EPR implementation. Overall, the project provides a practical prototype of EPR system elements, including take-back logistics, stakeholder coordination, and data generation, which are essential for scaling up to a nationwide regulatory system.

3.2. Public–Private–People Partnership for Plastics (PPP Plastics)

The PPP Plastics was established in 2018 as a national multi-stakeholder platform to address plastic waste challenges in Thailand through collaborative action. Initiated by the

Thailand Environment Institute in response to the national Roadmap on Plastic Waste Management (2018–2030), and led by the FTI and the Thailand Business Council for Sustainable Development, the initiative promotes a circular plastics economy by reducing plastic use, increasing recycling, and strengthening the role of the informal sector.

PPP Plastics aims to enhance coordination across the plastics value chain – from production and design to collection, recycling, and the use of recycled materials. It brings together key stakeholders, including industry, government, recyclers, local authorities, academia, and civil society.

Its activities focus on four main areas: (i) pilot projects and system innovation (e.g., Smart Recycling Hub) to improve collection and recovery efficiency; (ii) stakeholder engagement and partnerships through a structured membership model; (iii) knowledge generation and capacity building via research and best practice dissemination; and (iv) public awareness and behavioural change to promote waste segregation and recycling.

Overall, PPP Plastics supports national policy development, including EPR, recycled content standards, and CE frameworks, and contributes to building the institutional and market readiness for a future mandatory EPR system in Thailand.

3.3. Pro Thailand Network: Industry-led Platform for EPR Readiness

The PRO Thailand Network was established in 2022 as an industry-led collaborative platform to prepare for the implementation of EPR for packaging in Thailand. The network was initiated by leading multinational and domestic brand owners in the fast-moving consumer goods sector as part of broader efforts to advance CE practices and reduce plastic leakage into the environment. The PRO Thailand Network focuses on advancing a CE for post-consumer packaging, initially targeting PET bottles, UHT cartons, and multi-layer plastic packaging. The initiative promotes collaboration across stakeholders, including the private sector, government agencies, informal waste collectors (*saleng*), junk shops, and the public to develop systems for collection, sorting, and recycling.

PRO Thailand Network's primary objective is to develop the foundational elements of a PRO model in the country. It aims to build consensus amongst producers, pilot operational mechanisms, and generate practical insights to support the transition from voluntary initiatives to a mandatory EPR system under future legislation, such as the Draft Act on Sustainable Packaging Management.

PRO Thailand Network adopts a producer-centric approach, focusing on the role of obligated companies, particularly brand owners and importers, in financing and organising the collection, sorting, and recycling of post-consumer packaging waste. At the same time, it recognises the importance of integrating existing actors in Thailand's waste management system, including local authorities and the informal sector, to ensure both efficiency and social inclusiveness.

3.4. Aluminium Closed-Loop Packaging System (LOOP Initiative)

The Aluminium Loop (LOOP) initiative, led by the TBC, represents one of Thailand's most advanced examples of a closed-loop recycling system for beverage packaging. The initiative aims to establish a fully integrated 'can-to-can' recycling model, whereby used aluminium cans are collected, processed, and remanufactured into new cans within the domestic system, thereby enabling infinite recyclability without loss of material quality. The LOOP system operates through collaboration across the entire value chain, including packaging manufacturers (TBC), collection networks (e.g., Thai Beverage Recycle), recyclers (e.g., Anglo Asia), and raw material producers (e.g., UACJ Thailand), ensuring that post-consumer aluminium packaging is efficiently recovered and reintroduced into production.

Since its implementation, the initiative has demonstrated significant environmental outcomes. For example, more than 1.5 billion used aluminium cans (over 22,000 tonnes) have been collected and recycled through the LOOP system, achieving a 100% closed-loop recycling rate with traceability mechanisms. In addition, the use of recycled aluminium can reduce energy consumption by up to 95% compared to primary production, contributing substantially to greenhouse gas mitigation and supporting Thailand's net-zero ambitions (TBC, 2025).

Importantly, the LOOP initiative also reflects key EPR principles by integrating product design, take-back systems, collection infrastructure, and recycling processes into a single coordinated system. It further promotes stakeholder engagement through partnerships with beverage companies, recyclers, and communities, as well as public awareness campaigns such as 'Can-to-Can Journey' and 'Recycle for Life', which encourage consumer participation in recycling systems (TBC, 2025).

Figure 5.4 illustrates a pilot voluntary EPR system for packaging in Thailand, implemented by the private sector as a transitional mechanism towards a mandatory EPR framework. The system adopts a value-chain approach linking producers, retailers, consumers, local authorities, informal waste actors, and recyclers, coordinated through a multi-stakeholder voluntary EPR committee.

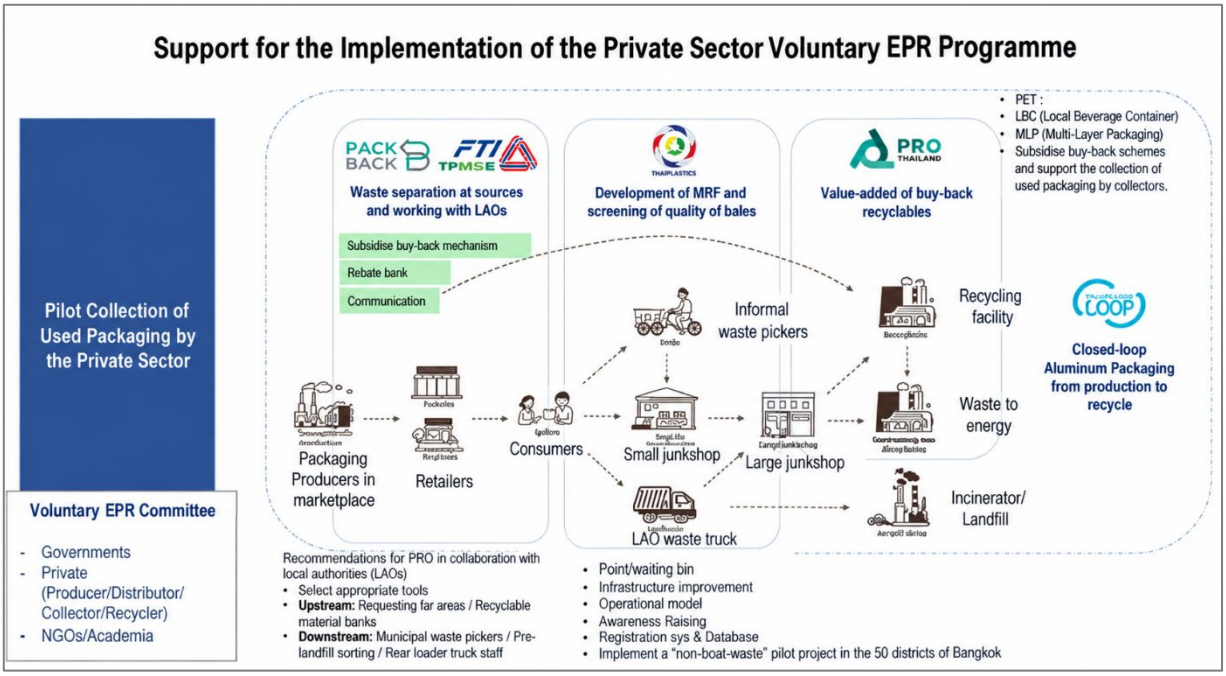
Upstream, producers and retailers support source segregation through buy-back schemes, waste banks, and awareness campaigns, often in collaboration with local authorities, reflecting an initial shift in responsibility from municipalities to producers. At the consumption stage, households are expected to separate and return recyclable materials, with system performance depending on behavioural change supported by incentives and communication.

Downstream, the system reflects Thailand's hybrid waste management structure, integrating formal services and informal actors such as waste pickers and junkshops, who play a key role in material aggregation and pre-sorting. Non-recyclable waste is directed to waste-to-energy or landfill, highlighting ongoing recovery limitations.

PROs play a central role in financing and coordination, including providing buy-back incentives, investing in recovery infrastructure, and supporting informal sector integration. The pilot focuses on key materials such as PET, beverage cartons, and multi-layer plastics.

Overall, the voluntary EPR system demonstrates a transitional governance model that combines market-based incentives with multi-stakeholder collaboration, helping to build institutional, financial, and operational readiness for a future mandatory EPR system in Thailand.

Figure 5.4 Voluntary EPR Programme for Packaging Management in Thailand



Source: Jiaranaikhajorn (2026).

3.5. Other Supporting Measures: Differentiated Fees Incentivising Source Segregation

Launched in October 2025, the 'Bangkok (BKK) Waste Pay' platform is implemented by the Bangkok Metropolitan Administration (BMA) under the No Mixed Waste Household initiative. The scheme aims to reduce waste management costs, improve recycling performance, and promote behavioural change amongst households. Under this system, households are required to separate waste into four categories: food waste, recyclables, general waste, and hazardous waste (where applicable).

Households that comply with source segregation and generate less than 20 litres of waste per day are eligible for a reduced fee of ฿20 per month, whereas those who fail to segregate or do not register on the platform are charged the full rate of ฿60 per month. As of 25 December 2025, 1,053,308 households across 4,423 locations had registered, indicating strong public participation. Of these, 378,258 are individual households (e.g.,

single houses, housing estates, and condominiums without juristic persons), while 675,050 are registered under group schemes, including housing estates, condominium buildings, and regulated communities (Bangkok Metropolitan Administration, 2025; Tantivangphaisal, 2025).

The scale of participation highlights strong public responsiveness to incentive-based instruments. The initiative represents an emerging pay-as-you-throw (PAYT)-inspired model that aligns economic incentives with improved source segregation, while supporting material recovery and advancing Thailand's transition towards a CE and future EPR framework.

4. Development of the Draft Act on Sustainable Packaging Management and Stakeholder Perceptions

4.1. Key Content of the Draft Act

The Draft Sustainable Packaging Management Act (March 2025 version submitted to the Cabinet in 2025) represents a significant step in reforming Thailand's packaging and waste management system towards a circular economy framework. The Act establishes a comprehensive life-cycle approach to packaging management, covering stages from design and production to post-consumer collection, recycling, and final disposal. Its primary objective is to reduce environmental impacts from packaging waste, improve resource efficiency, and align Thailand's policy framework with international trends, particularly in relation to circular economy principles and global plastic governance.

At the core of the Act is the introduction of EPR, which shifts financial and operational responsibility for post-consumer packaging waste from local authorities to producers, including importers and brand owners. Obligated producers are required to register, report the volume and types of packaging placed on the market, and meet legally defined collection and recycling targets. Compliance can be achieved either individually or collectively through PROs, which are formally recognised under the Act as key system operators responsible for organising collection, recycling, and financial management across the value chain.

Figure 5.5 illustrates the proposed mandatory EPR framework for packaging in Thailand, highlighting its scope, governance structure, and financing mechanism. In terms of scope, the system covers a wide range of packaging materials, including plastics, glass, metals, paper, and composite materials, reflecting a comprehensive, material-neutral approach aligned with CE principles. The governance structure is designed as a multi-tier system, comprising a central Policy Board responsible for setting strategic directions such as bans, restrictions, and financial mechanisms, supported by an Administrative Board and an Expert Committee that provide operational oversight and technical guidance. The PCD serves as the focal implementing agency, ensuring coordination, monitoring, and enforcement across the system.

A key feature of the framework is the introduction of a dual-fee EPR structure, which differentiates producer obligations based on the environmental performance of packaging. Type A (Standard EPR Fee) applies to recyclable packaging and represents the general compliance obligation for producers. In contrast, Type B (Difficult-to-Take-Back Fee) imposes an additional surcharge on packaging that is difficult to collect or recycle and is more likely to leak into the environment, such as small flexible plastics. This differentiated fee structure reflects the principle of eco-modulation, creating financial incentives for producers to improve packaging design, enhance recyclability, and reduce environmental impacts. Revenue generated through these fees is intended to support waste collection systems, recycling infrastructure, and capacity building at the local level, while also facilitating the integration of informal waste actors into the formal system.

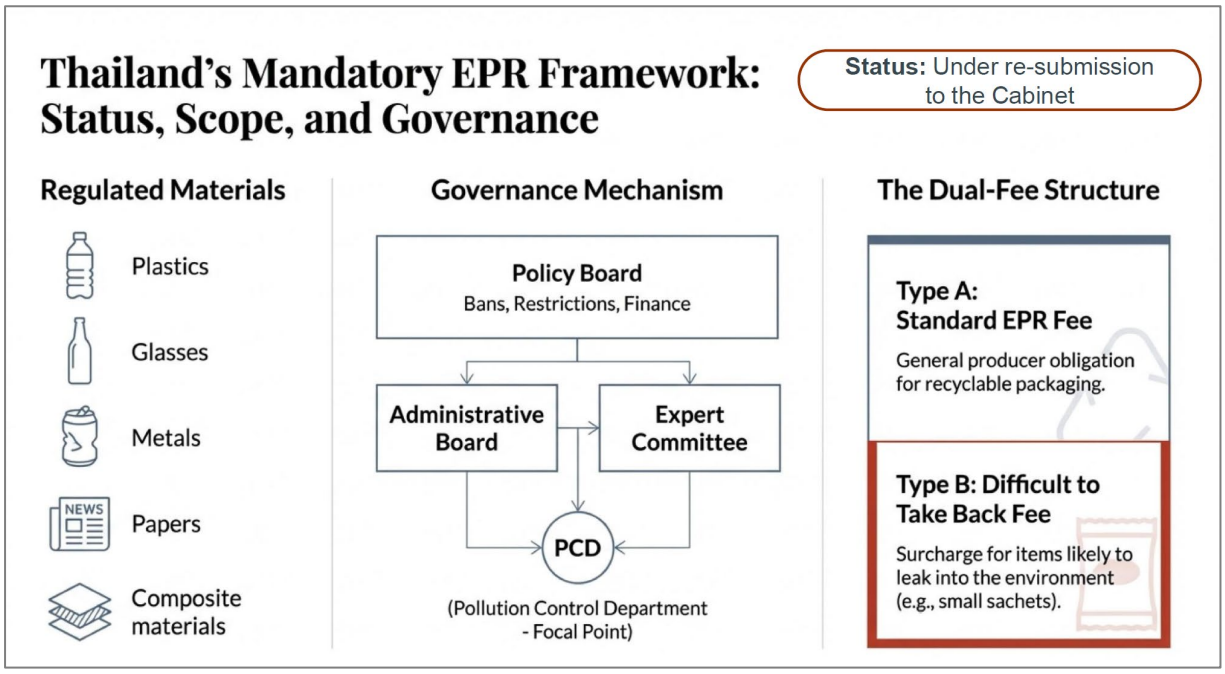
In addition to downstream waste management, the Act places strong emphasis on upstream measures, including requirements for packaging design to improve recyclability, reduce unnecessary material use, and increase the use of post-consumer recycled content. It also provides a basis for restricting or phasing out problematic materials that are difficult to recycle or have significant environmental impacts. These provisions reflect a shift from end-of-pipe solutions towards preventive and systemic interventions.

Institutionally, the Act assigns regulatory oversight to a designated national authority, responsible for target setting, monitoring, enforcement, and the licensing of PROs. LAOs continue to play an important operational role in waste collection but are expected to be supported financially and technically through EPR mechanisms, thereby improving system efficiency and reducing the fiscal burden on municipalities. The Act also explicitly recognises the role of the informal sector, including waste pickers and junk shops, and promotes their integration into formal waste management systems through improved working conditions and fair compensation.

The implementation framework includes provisions for data reporting, auditing, and enforcement, with penalties for non-compliance to ensure accountability across the system. Transitional measures are also adopted to allow a gradual shift from existing voluntary initiatives to a mandatory EPR system, enabling stakeholders to build capacity and adapt to new regulatory requirements.

Overall, the Draft Act represents a structural transformation of Thailand's packaging waste governance, moving from a fragmented, end-of-pipe approach towards a more integrated, producer-responsibility-based system. While the framework is broadly aligned with international best practices, its effectiveness will depend on the strength of institutional coordination, enforcement mechanisms, and stakeholder engagement. If successfully implemented, the Act has the potential to significantly improve recycling rates, reduce environmental leakage, and accelerate Thailand's transition towards a CE.

Figure 5.5. Thailand's Mandatory EPR Framework: Status, Scope, and Governance



Source: Jiaranaikhajorn (2026).

4.2. Stakeholder Perceptions and Feedback on the Draft Act

In May 2025, the Sustainable Environment Research Institute (SERI), Chulalongkorn University, organised a series of eight capacity-building training workshops to enhance stakeholder understanding of CE, EPR, and the draft Sustainable Packaging Management Act. The training workshops were part of the sub-project 'Sustainable Packaging including Plastics Management Reinforcement in Thailand: Legislation Enhancement, Stakeholder Capacity Building, and EPR Fee' under the GIZ's MA-RE-DESIGN project (MFU, 2025; SERI, 2025).

The training covered eight key stakeholder groups, including government agencies; producers from the food and beverage, cosmetics and personal care, and other packaging-related industries; local governments, including BMA, waste collectors and recyclers; civil society organisations; and retailers and service sector actors. The workshops aimed to strengthen knowledge on EPR principles, clarify roles and responsibilities under the proposed legislation, and provide international best practices relevant to Thailand's context. They also served as a platform for stakeholders to exchange perspectives, identify implementation challenges, and provide feedback on the draft law.

Following the training workshops, stakeholders demonstrated improved understanding of EPR concepts and regulatory objectives, which translated into greater acceptance of the policy direction. However, this increased awareness was accompanied by more nuanced and, in some cases, heightened concerns regarding implementation. Key issues

raised across groups include the need for clear legal definitions (particularly of 'producer' and packaging scope), transparent and accountable governance of PROs, and well-defined financial mechanisms, especially eco-modulated EPR fees that incentivise design for recycling and the use of post-consumer recycled materials.

Producers, particularly in the food and beverage and retailers and service sectors, expressed concerns about cost implications and operational feasibility, while local governments and BMA officials emphasised the importance of aligning EPR systems with existing municipal waste collection infrastructure and clarifying roles between local authorities and PROs. Across all groups, the most critical concern relates to effective and equitable enforcement, including the prevention of free riders. Additional cross-cutting issues include the need to ensure consumer participation in waste separation and return systems, integration with complementary policy instruments (such as PAYT and single-use plastic reduction measures), and stronger data systems and infrastructure, particularly material recovery facilities (MRFs). Stakeholders also highlighted the importance of capacity building, phased implementation, and continuous communication to support a smooth transition.

Table 5.2. Stakeholder Perspectives on CE, EPR, and the Draft Sustainable Packaging Management Act

Stakeholder Group	Perceptions and Support	Key Concerns	Suggestions/Recommendations
1. Government agencies	Strong support for CE and EPR; recognise the need for systemic reform and alignment with global trends	Enforcement capacity; inter-agency coordination; clarity of institutional roles	Establish clear governance structure; strengthen enforcement mechanisms; accelerate legislation with clear subordinate laws
2. Food & beverage producers	Acknowledge the importance of EPR but concerned about operational impact (high packaging intensity)	EPR fees and cost burden; impact on product prices; eco-design feasibility; free riders	Introduce eco-modulated fees; provide incentives for post-consumer recycled and mono-materials; ensure level playing field across all producers
3. Cosmetics & personal care producers	Moderate support; recognise brand and sustainability value	Complex packaging design (multi-material); unclear recyclability criteria; labelling standards	Develop clear eco-design guidelines; harmonise recyclability standards and labelling systems
4. Other product & service	Supportive but cautious; need	Scope of 'producer' definition; EPR fee	Clarify legal definitions and scope (primary/secondary/tertiary

Stakeholder Group	Perceptions and Support	Key Concerns	Suggestions/Recommendations
packaging producers	clarity on obligations	calculation; uncertainty in compliance requirements	packaging); provide detailed guidelines and transition roadmap
5. Local governments (LAOs)	Strong support; see EPR as reducing municipal burden	Role clarity between LAOs and PROs; financial flows; system integration with existing collection	Define operational roles clearly; ensure funding flows to local level; align EPR with existing waste systems and infrastructure
6. Waste collectors, recyclers & civil society organisations	Strong support; recognise opportunity for system improvement and inclusion	Risk of exclusion of informal sector; access to funding; market stability for recyclables	Ensure inclusion of informal sector; channel subsidies to small collectors (e.g., *saleng*); strengthen recycling markets and MRF systems
7. Retailers & service sector	Supportive but highly concerned due to role as 'producers' under law	High use of single-use packaging; cost burden; operational constraints; reusable system feasibility (cost, hygiene)	Provide transition support; clarify obligations for service packaging; develop reuse infrastructure and hygiene standards
8. Bangkok Metropolitan Administration (BMA) officials	Strong support; view EPR as critical to improving urban waste management and reducing fiscal burden	Integration with existing collection system; material flow (risk of diversion from municipal system); infrastructure readiness (MRFs); coordination with PROs	Align EPR with Bangkok's source separation and collection system; invest in MRFs; clarify coordination between BMA and PROs; build capacity of district-level officers

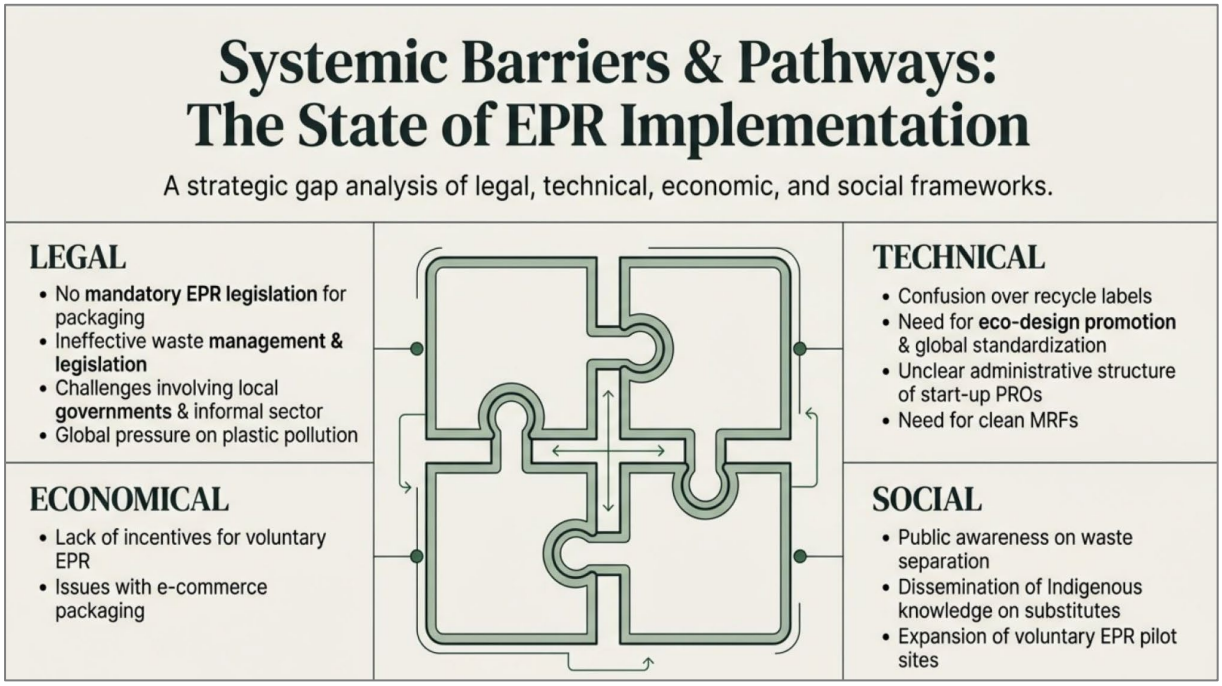
Source: SERI (2025).

5. Systemic Barriers and Pathways for EPR Implementation

Thailand's waste management system has long faced structural challenges at the municipal level, including limitations in governance, public participation, operational capacity, and waste management practices (Yukalang et al., 2017). The current state of EPR implementation in Thailand reveals a range of systemic barriers across legal, technical, economic, and social dimensions, as identified by the PCD. These challenges underscore the complexity of transitioning towards a circular plastics economy. As illustrated in Figure 5.6, the barriers are highly interconnected and necessitate a

comprehensive, system-level response rather than isolated interventions (Jiaranaikhajorn, 2026).

Figure 5.6. Systemic Barriers in EPR Implementation in Thailand



Source: Jiaranaikhajorn (2026).

From a legal perspective, the absence of mandatory EPR legislation for packaging remains a fundamental constraint. Existing waste management laws are fragmented and largely ineffective in addressing the full life cycle of packaging waste. Moreover, institutional challenges persist in coordinating roles between central authorities, local governments, and the informal sector, which continues to play a critical role in material recovery. At the same time, increasing global pressure to address plastic pollution, including international commitments and emerging regulatory frameworks, is intensifying the need for coherent national legislation.

On the technical front, several operational gaps hinder system performance. These include widespread confusion over recycling labels, which affects consumer behaviour and sorting efficiency, as well as the lack of standardised eco-design requirements aligned with global practices. In addition, the administrative structure for start-up PROs remains unclear, creating uncertainty for implementation. Infrastructure limitations are also evident, particularly the need for improved and 'clean' MRFs capable of handling source-separated waste with higher efficiency and quality.

Economically, the transition towards EPR is constrained by a lack of effective incentives, particularly under existing voluntary schemes. Without clear financial mechanisms such as eco-modulated fees or subsidies, producers have limited motivation to redesign

packaging or invest in collection and recycling systems. Furthermore, the rapid growth of e-commerce has introduced additional challenges, including increased volumes of complex and hard-to-recycle packaging, which are not yet adequately addressed within current economic instruments.

From a social perspective, behavioural and awareness-related factors remain critical bottlenecks. Public understanding of waste separation is still limited, affecting the quality of collected materials and overall system efficiency. There is also a need to promote alternative materials and practices, including the integration of local or indigenous knowledge where appropriate. While voluntary EPR pilot projects have demonstrated promising results, their scale and coverage remain limited, highlighting the need for broader expansion and sustained engagement with communities.

Overall, the analysis underscores that EPR implementation in Thailand is not constrained by a single factor but by a combination of interdependent systemic barriers. Addressing these challenges requires an integrated policy approach that simultaneously strengthens legal frameworks, builds technical capacity, introduces effective economic incentives, and promotes social and behavioural change. The transition from voluntary initiatives to a mandatory EPR system will therefore depend on the ability to align these dimensions within a coherent and well-coordinated national strategy (Jiaranaikhajorn, 2026).

6. Way Forward

The analysis of Thailand's plastic waste situation, policy landscape, voluntary EPR initiatives, and systemic barriers highlights the urgent need to transition from fragmented and end-of-pipe waste management towards a comprehensive, mandatory EPR framework. This transition requires a coordinated set of legal, institutional, economic, and social interventions to ensure effective and equitable system transformation.

First, at the legal and institutional level, it is essential to accelerate the enactment of the Draft Sustainable Packaging Management Act and ensure that its provisions are supported by clear and detailed subordinate legislation. Particular attention should be given to defining key terms such as 'producer', clarifying the scope of obligated entities, and establishing transparent governance arrangements for PROs. Institutional roles and responsibilities, especially between central government agencies, LAOs, and PROs must be clearly delineated to avoid duplication and ensure accountability. Strengthening enforcement mechanisms, including monitoring systems and penalties for non-compliance, will be critical to preventing free-rider problems and ensuring a level playing field.

Second, from a technical and system design perspective, investments in waste management infrastructure are required, particularly in the development of efficient and 'clean' MRFs that can handle source-separated waste. Standardisation of eco-design criteria, recyclability guidelines, and labelling systems should be prioritised to reduce

confusion amongst producers and consumers. In parallel, the operational framework for PROs must be clarified, including their roles in financing, collection, data management, and coordination with existing waste management actors. Lessons learned from voluntary initiatives such as PackBack, PPP Plastics, PRO Thailand Network, and LOOP should be systematically integrated into the design of the national EPR system.

Third, economic instruments must be strengthened to create effective incentives across the value chain. The introduction of eco-modulated EPR fees is essential to encourage producers to adopt recyclable materials, reduce excessive packaging, and increase the use of post-consumer recycled content. Complementary measures such as tax incentives, subsidies for recycling infrastructure, and support for circular business models should be implemented to facilitate industry transition. In addition, mechanisms to address emerging waste streams, particularly from e-commerce and flexible packaging, should be incorporated into the EPR framework. Aligning EPR with existing economic instruments, such as PAYT schemes, can further enhance system efficiency and behavioural change.

Fourth, social and behavioural dimensions must be addressed to ensure the effectiveness of the EPR system. Public awareness campaigns and education programmes should be expanded to improve waste segregation at source, which is critical for maintaining material quality and reducing contamination. The integration of the informal sector waste pickers and junk shops should be formally recognised and supported through fair compensation mechanisms, capacity building, and inclusion in collection systems. Scaling up successful pilot projects and community-based initiatives will also be important to build public trust and participation.

Finally, data systems and monitoring frameworks must be strengthened to support evidence-based policymaking and system optimisation. The development of a national packaging database, material flow analysis, and digital tracking systems will enhance transparency, improve performance monitoring, and enable adaptive policy adjustments over time.

7. Conclusions

Thailand has made notable progress over the past decade in advancing waste management policies and promoting CE principles. However, the current system remains largely fragmented, under-incentivised, and heavily reliant on downstream disposal, resulting in persistent challenges in managing plastic waste and preventing environmental leakage. The continued growth of plastic consumption, particularly single-use and low-value packaging, combined with limited recycling capacity and weak economic incentives, underscores the structural limitations of the existing system.

Voluntary EPR initiatives have played an important role in piloting system components, fostering stakeholder collaboration, and building technical and institutional capacity.

Nevertheless, their limited scale and lack of enforceability highlight the need for a mandatory, nationwide EPR framework to achieve systemic change. The Draft Sustainable Packaging Management Act provides a strong foundation for this transition, introducing key elements such as producer responsibility, eco-modulated financing, and multi-stakeholder governance.

Looking forward, the successful implementation of EPR in Thailand will depend on the ability to address systemic barriers in an integrated manner. This includes strengthening legal frameworks, enhancing technical capacity, introducing effective economic incentives, and promoting behavioural change. Importantly, the transition must be managed carefully to ensure inclusiveness, particularly for local governments and the informal sector, while maintaining competitiveness for industry.

In conclusion, the move towards a mandatory EPR system represents a critical policy turning point for Thailand. If effectively designed and implemented, it can significantly improve resource efficiency, reduce environmental impacts, and accelerate the country's transition towards a CE and sustainable development pathway.

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Chapter 6

Implementation of Extended Producer Responsibility: A Case Study of Viet Nam

Lai Van Manh, Pham Anh Huyen, Do Thi Thanh Nga

1. Country and Policy Context

1.1. The Socio-economic Context

Economic growth remained relatively strong compared with regional and global averages, with gross domestic product (GDP) growth averaging approximately 6.2% per annum during 2021–2025. In 2025 alone, GDP growth reached 8.02%. The size of the economy also expanded substantially, with GDP increasing from US$346.6 billion in 2020 (ranking 37th globally) to more than US$514 billion in 2025, representing a 48% increase. This expansion elevated the country's global ranking to 32nd and positioned it the fourth-largest economy in ASEAN. GDP per capita increased by approximately 1.4 times, from US$3,552 in 2020 to around US$5,026 in 2025. Concurrently, gross national income per capita rose from US$3,400 in 2020 to approximately US$4,750 in 2025, bringing Viet Nam closer to upper-middle-income status. The ongoing process of industrialisation and modernisation has continued to drive economic restructuring in tandem with growth model transformation, yielding positive outcomes. The share of the industrial and service sectors in GDP increased from 78.6% in 2020 to 80.4% in 2025, while the agricultural sector declined from 12.7% to 11.6% (Communist Party of Viet Nam, 2026).

The economy has initially shifted towards digitalisation, green transformation, and diversification, thereby enhancing resilience and progressively deepening integration into global value chains, underpinned by science, technology, and innovation. The industrial sector's value added grew at an average annual rate of approximately 6.4%. The manufacturing and processing industries maintained robust growth, particularly in key sectors such as electronics, textiles, footwear, and wood processing. The share of manufacturing in GDP increased from 23.9% in 2020 to approximately 24.5% in 2025, with per capita value added exceeding US$1,230. Several large-scale industrial sectors have emerged with the capacity to compete in international markets, contributing to the gradual enhancement of economic self-reliance. Multiple industrial product groups achieved export turnover exceeding US$15 billion, ranking amongst the leading exporters regionally and globally. Accordingly, in 2025, seven categories of processed industrial goods each recorded export earnings exceeding US$15 billion: electronics, computers, and components (US$107.7 billion); telephones and components (US$56.7 billion); machinery, equipment, tools, and spare parts (US$59.1 billion); textiles and garments

(US$39.6 billion); footwear (US$24.2 billion); wood and wood products (US$17.2 billion); and transportation vehicles and parts (US$17.5 billion). The number and total area of industrial zones expanded from 117.3 thousand hectares in 2020 to approximately 140 thousand hectares in 2025. In 2020, Viet Nam had 380 industrial parks covering 117.3 thousand hectares. By 2025, this had increased to 478 industrial parks with a total area of approximately 146 thousand hectares. Two major industrial hubs – the Southeast region and the Red River Delta – became increasingly consolidated (Communist Party of Viet Nam, 2026).

1.2. Solid Waste Management and Plastic Waste

Waste management has shown notable improvements. The collection and treatment rates of municipal solid waste have steadily increased over the years, reaching 97.28% in urban areas and 80.5% in rural areas. Landfilling practices have been reduced, while recycling, reuse, and resource recovery from waste have been strengthened through various approaches, such as co-processing waste in cement kilns, utilising residual heat from waste incineration, and generating electricity from cement production processes. The accumulation of by-products such as ash, slag, and gypsum from thermal power plants, fertiliser production, and chemical industries has been significantly reduced through enhanced recycling and reuse as secondary raw materials. Sustainable economic growth models, including green economy, circular economy, sharing economy, and digital economy, are being actively promoted. In addition, a wide range of advanced technologies for waste recycling and treatment have been applied, scaled up, and disseminated (National Assembly of Viet Nam, 2025).

Despite these achievements, waste management continues to face several limitations and challenges. Environmental protection infrastructure, particularly for the collection and treatment of municipal solid waste and wastewater, remains inadequate and outdated, failing to meet current requirements. Although the proportion of direct landfilling of municipal solid waste has declined, it still accounts for a high share at 58.85%. In addition, 38 of the 435 facilities identified as causing serious environmental pollution have yet to complete comprehensive remediation, the majority of which are landfill sites. The circularity and recycling of certain types of industrial solid waste also remain limited. Some hazardous wastes generated from households are not separately collected and treated but are instead mixed with municipal solid waste. Furthermore, the illegal importation of outdated technologies has not yet been fully controlled or effectively prevented (National Assembly of Viet Nam, 2025).

Viet Nam generates approximately 25.3 million tonnes of municipal solid waste annually, including around 1.8 million tonnes of plastic waste. This substantial volume places significant pressure on existing systems for waste collection, segregation, and treatment. Despite ongoing efforts to improve waste management, several persistent challenges remain. In addition to delays in the implementation of certain regulatory and policy

frameworks, two major constraints can be identified. Firstly, technical infrastructure for waste collection, sorting, and treatment remains inadequate, underdeveloped, and poorly integrated. Secondly, household-level practices of waste separation at source have not yet been widely established, limiting the effectiveness of downstream waste management processes (Ho Chi Minh City Law Newspaper, 2025).

Currently, over 3,300 enterprises across the country are involved in plastic manufacturing. The plastics industry has experienced significant growth, encompassing four principal product categories: packaging materials, household goods, construction-related plastics, and engineering plastics. Plastic waste generation in urban areas is estimated at approximately 4,460 tonnes per day, equivalent to around 1.63 million tonnes annually. In rural areas, daily plastic waste generation is about 3,561 tonnes, corresponding to roughly 1.3 million tonnes per year. While collection systems in urban areas achieve relatively high recovery rates, collection efficiency in rural regions remains considerably lower (WWF, 2023).

In 2021, the total volume of plastic waste separated for recycling reached approximately 0.79 million tonnes per year through formal collection systems, with an additional 0.11 million tonnes per year originating from informal or uncollected sources. The quantity of plastic waste effectively recycled was estimated at about 0.78 million tonnes annually. Meanwhile, non-recyclable plastic waste from collected streams, together with losses incurred during recycling processes, amounted to approximately 1.81 million tonnes per year and was disposed of through landfilling or other treatment methods, including incineration and energy recovery. It is further estimated that 0.07 million tonnes of plastic waste entered aquatic environments each year (WWF, 2023).

1.3. Existing Legal and Institutional Frameworks for EPR

In Viet Nam, extended producer responsibility (EPR) was first introduced in principle under the Law on Environmental Protection 2005 and was subsequently incorporated into the Law on Environmental Protection 2014. In parallel, the Prime Minister promulgated regulations on the collection and treatment of end-of-life products in 2013,[1] which were later revised and supplemented in 2015.[2]

Nevertheless, EPR only became a fully operational environmental economic policy instrument with the enactment of the 2020 Law on Environmental Protection, under which its regulatory scope, targeted entities, and implementation road map have been clearly defined. Articles 54 and 55 of the Law on Environmental Protection 2020 stipulate the responsibilities for recycling products and packaging, as well as the responsibilities of producers and importers for waste collection and treatment. These provisions also

[1] Decision No.50/2013/QD-TTg dated 9 August 2013 of the Prime Minister prescribing retrieval and disposal of discarded products

[2] Decision No. 16/2015/QD-TTg dated 22 May 2015 of the Prime Minister prescribing retrieval and disposal of discarded products

assign the government to elaborate detailed regulations for their implementation.

The former Ministry of Natural Resources and Environment (now the Ministry of Agriculture and Environment - [MAE])) developed and submitted to the government for promulgation Decree No. 08/2022/ND-CP dated 10 January 2022, which provides detailed provisions for a number of articles of the Law on Environmental Protection (Decree No. 08/2022/ND-CP). This decree was subsequently amended and supplemented by a range of relevant legal documents [3] that has largely established a comprehensive legal framework for EPR implementation in accordance with the Law on Environmental Protection 2020. These legal documents have played a critical role in setting the legal foundation for enforcing producers' and importers' responsibilities in recycling and waste treatment, while also facilitating the initial operationalisation of EPR regulations in practice. On the other hand, the practical implementation has indicated that EPR is a relatively new policy with a broad scope of regulation, involving multiple stakeholder groups, including manufacturing enterprises, importers, and recycling enterprises. In practice, many businesses still face challenges in fully and accurately understanding EPR requirements. . At present, EPR-related provisions have been embedded within comprehensive environmental decrees.. According to MONRE (2025b), the development of a dedicated decree providing a complete set of EPR regulations is both necessary and appropriate. Consolidating all EPR-related provisions into a single legal document would not only address existing shortcomings but also ensure that regulations are systematised in a centralised, coherent, and transparent manner. This would facilitate compliance for enterprises, as well as improve the effectiveness of guidance, administration, and supervision by state authorities. Moreover, such an approach would allow for greater flexibility in future regulatory adjustments, if required. This is particularly important as Viet Nam is progressively transitioning towards a circular economy model, in which EPR serves as a core, enabling policy instrument. Furthermore, the promulgation of a dedicated decree on EPR carries strategic significance, demonstrating the Government of Viet Nam's clear commitment to achieving sustainable development goals, minimising waste generation, promoting recycling, and enhancing resource efficiency.

2. EPR Scheme Design and Implementation

2.1. Scope of EPR Scheme

Pursuant to Articles 54 and 55 of the Law on Environmental Protection 2020 (National Assembly of Viet Nam, 2020), producers and importers of products and packaging are obligated to take responsibility for the recycling of products and packaging they place on

[3] Decree No. 05/2025/ND-CP, dated 6 January 2025, revises and supplements several provisions of Decree No. 08/2022/ND-CP (Decree No. 05/2025/ND-CP), Decree No.110/2026/ND-CP, dated April 1, 2026 on elaboration of the Law on Environmental Protection on product and packaging recycling responsibility and waste treatment responsibility of producers and importers; followed by the Circular No. 24/2026/TT-BNNMT, dated 25 May 2026 of Ministry of Agriculture and Environment detailing and guiding the implementation of a number of articles of the Government's Decree No. 110/2026/ND-CP.

the market. This obligation is subject to specific exemptions, which are determined based on annual sales revenue and the purpose of production or importation. Exempted cases include products and packaging manufactured for export or re-export; those imported exclusively for research, training, or testing purposes; and producers or importers with annual sales revenues below ₫30 billion. Additional exemptions apply to producers who place packaging on the market but subsequently collect, repackage, and reintroduce such packaging, provided that the recovery and reuse rate is equal to or exceeds the mandatory recycling rate prescribed by law.

Producers and importers in Viet Nam comply with their recycling obligations through one or a combination of the following mechanisms: (i) self-recycling, (ii) contracting recycling companies, or (iii) delegating responsibilities to an intermediary organisation (PROs) (Government of Viet Nam, 2025). In parallel, Viet Nam's EPR framework allows producers and importers of packaging to discharge their recycling obligations by making financial contributions to the Viet Nam Environmental Protection Fund (VEPF) to support recycling-related activities. For packaging containing hazardous substances, exhibiting low recyclability, or posing challenges in collection and treatment, financial contribution to the VEPF is the sole compliance option. The fund allocates financial support for local waste treatment activities such as the collection, transportation, and treatment of municipal solid waste generated from households and individuals; research and development of waste management technologies and innovations; and the collection, transportation, and treatment of pesticide packaging waste (Government of Viet Nam, 2026).

Also, under the Law on Environmental Protection 2020 and its implementing ng decrees and circulars, Viet Nam's EPR regime covers four categories of packaging materials – paper, metal, plastic, and glass – and six groups of products: (i) batteries and accumulators, including rechargeable batteries; (ii) lubricating oils; (iii) inner tubes and tyres; (iv) electrical and electronic equipment, office electronic devices, light bulbs, and photovoltaic panels; and (v) road vehicles. Under the implementation road map, producers and importers are required to fulfil recycling obligations starting from 1 January 2024 for packaging, batteries and accumulators, lubricating oils, and tyres; from 1 January 2025 for electrical and electronic products; and from 1 January 2027 for road vehicles.

For products and packaging containing hazardous or non-recyclable substances, or those that are difficult to collect and treat as specified in Article 55 of Law on Environmental Protection 2020, including pesticides and their packaging, single-use batteries, chewing gum, cigarettes, and products containing synthetic plastics such as balloons, children's toys, single-use plastic items, household goods, construction materials, and small plastic bags, the recycling responsibility has been in effect since 1 January 2022.

2.2. Financial Contribution to Support Recycling of Products and Packaging

The financial contribution to the VEPF for each category of products and packaging (F) is determined using the formula:

$$F = R * V * F_s.$$

Where:

- F is the total contribution payable by the producers or importers to the VEPF for each type of product or packaging (unit: ₫);

- R is the mandatory recycling rate for the specific type of product or packaging (unit: %).

- V is the weight of products or packaging manufactured or imported and placed on the market in the year of obligation (unit: kg);

- Fs is the unit recycling cost per kilogram of products and packaging (unit: ₫/kg), comprising: (i) costs of sorting, collection, transportation, and recycling of products and packaging (hereinafter referred to as 'recycling costs'); and (ii) costs associated with the administration, monitoring, and support for the implementation of recycling responsibilities by producers and importers. Specific Fs values for each product and packaging have issued[4] and revised on a 3-year cycle by MAE; each adjustment shall not exceed an increase of 10%, with the first adjustment taking place in 2029 (Government of Viet Nam, 2026) (See Annex 2 for List of Products, Packaging, and Financial Contribution Levels for Supporting Waste Treatment Activities).

In case of products and packaging[5] containing hazardous substances, those with low recyclability, or those posing difficulties for collection and treatment, the contribution levels are calculated based on product quantity, packaging type, or net revenue.[6]

According to VEPF's report on the financial contributions for waste treatment support from producers and importers in 2024, total number of contributing producers and importers was 76 entities. with total amount of contributions for waste treatment support of ₫432,051,561,317. Cumulative total from 1 January 2022 to 31 December 2024 was ₫1,259,765,420,922. The funds received from financial contributions for waste treatment and recycling support that have not yet been disbursed are deposited in commercial banks (Viet Nam Environmental Protection Fund, 2025).

[4] Annex I of Decree No.110/2026/ND-CP

[5] Including pesticides and their packaging, single-use batteries, chewing gum, cigarettes, and products containing synthetic plastics such as balloons, children's toys, single-use plastic items, household goods, construction materials, and small plastic bags

[6] Annex 2 of Decree No.110/2026/ND-Cp

2.3 . National Mandatory Recycling Rates and Recycling Specifications

Producers or importers of recyclable products and packaging have to recycle them according to the mandatory recycling rates and specifications, except for products and packaging exported, temporarily imported and re-exported, or produced or imported for research, study, or testing purposes (National Assembly of Viet Nam, 2020).

The mandatory recycling rate refers to the minimum proportion, by weight, of products and packaging that must be collected and recycled in accordance with the prescribed recycling specifications within the year of compliance, relative to the total volume of products and packaging manufactured or imported and placed on the market in the same year.

The mandatory recycling rate for each category of products and packaging is determined based on life-cycle considerations, disposal rates, and collection rates, as well as national recycling targets, environmental protection requirements, and prevailing socio-economic conditions in each period (Government of Viet Nam, 2026) (See Annex1 for the mandatory rate for each category).

Besides, the mandatory recycling rates applicable to each category of products and packaging for the initial 3-year period are specified in Decree No. 110/2026/ND-CP . .[7] These rates are required to review and adjust every 3 years as prescribed by MAE, with a gradual increase, to align with national recycling targets and environmental protection requirements; but each adjustment shall not exceed an increase of 10%, with the first revision in 2029 Accordingly, packaging carries the most stringent mandatory recycling targets, with rates of up to 22% for aluminium packaging and rigid PET (polyethylene terephthalate) botst the prescribed product/packaging category.

The mandatory recycling specifications refers to the designated recycling solutions selected for each type of product and packaging, as prescribed by regulation,[8] for example, grinding and milling glass into powder or granules for use as input materials in other production processes; dismantling, sorting, and recovering components by material categories, including metals, plastics, and other materials (Government of Viet Nam, 2026).

2.4. Implementation Timeline and Compliance Procedures

Regarding the implementation timeline and compliance procedures, producers and importers are required to fulfil their EPR obligations on an annual basis by registering recycling plans, reporting recycling results, and submitting the required declaration by 1 April each year. They bear full legal responsibility for the accuracy and completeness of submitted recycling plans and reports on recycling performance and all submissions must be made through the National EPR Information System This annual reporting

[7] Column 3 of Appendix I of the Decree No. 110/2026/ND-CP .
[8] Column 4 of Appendix I of the Decree No. 110/2026/ND-CP

mechanism strengthens accountability, improves transparency, and provides a consistent basis for monitoring EPR implementation and compliance.

Table 6.1. Implementation Timeline of Viet Nam's EPR System

Date	Stakeholder	Main Obligations
By 1 April	Producers/Importers	Register annual recycling plan and report recycling results from the preceding year **or** declare financial contributions
	Viet Nam Environmental Protection Fund (VEPF)	Report annually to the MAE and the National EPR Council, and publicly disclose the receipt and use of financial contributions
20 April	Producers/Importers	Fully pay the declared financial contributions for supporting waste treatment activities to VEPF

Source: Government of Viet Nam (2026).

In 2024, the former MONRE officially launched the National EPR Portal at https://epr.monre.gov.vn/vi/. This portal was subsequently upgraded into the National EPR Information System, with its access domain adjusted to align with the organisational structure of the Ministry of Agriculture and Environment.[9] As prescribed by law, the National EPR Information System of Viet Nam has to be interconnected with relevant national and specialized databases in accordance with applicable legal provisions, ensuring that registration, reporting, and declarations by producers and importers comply with regulatory requirements (Government of Viet Nam, 2026).

The National EPR Information System enables producers and importers subject to EPR obligations – including product and packaging recycling, as well as waste treatment responsibilities – to complete registration, declaration, and reporting procedures online, rather than submitting hard-copy dossiers to the MAE as required. The system facilitates greater convenience and accessibility for producers and importers, while also reducing compliance costs associated with fulfilling their legal obligations on recycling and waste treatment.

In addition to online registration, declaration, and reporting, producers and importers can use the system to access updated information on relevant legal regulations and obtain guidance on compliance with requirements related to product and packaging recycling and waste treatment responsibilities.

[9] Notification No.173/TB-BTNMT dated 28 April 2025, issued by the Ministry of Agriculture and Environment regarding the change of the name and access address of the National EPR Information System.

3. Stakeholder Landscape and Public Perceptions

3.1. Main Roles of Management Agencies in EPR System

MAE has key responsibilities include: (i) revising and promulgating mandatory recycling rates for each category of products and packaging for subsequent 3-year cycles; (ii) revising and promulgating financial contribution levels for each category of products and packaging, as well as allocation rates for the management, monitoring, and support costs associated with waste collection and treatment, for subsequent 5-year cycles; (iii) annually conducting review and selection process to designate entities eligible for support for recycling activities, categorized by specific product and packaging groups. At the same time, MAE oversees the registration of recycling plans and reporting of recycling results, as well as the declaration and management of financial contributions related to products and packaging manufactured or imported and placed on the market by producers and importers. The ministry also facilitates the publication of information on recycling entities for products and packaging; develop, manage, and operate the National EPR Information System. Furthermore, the minister of MAE is responsible for deciding on the establishment and promulgation of organisational and operational regulations of the National EPR Council, and defining the functions, tasks, powers, and organisational structure of the EPR Office (Government of Viet Nam, 2026).

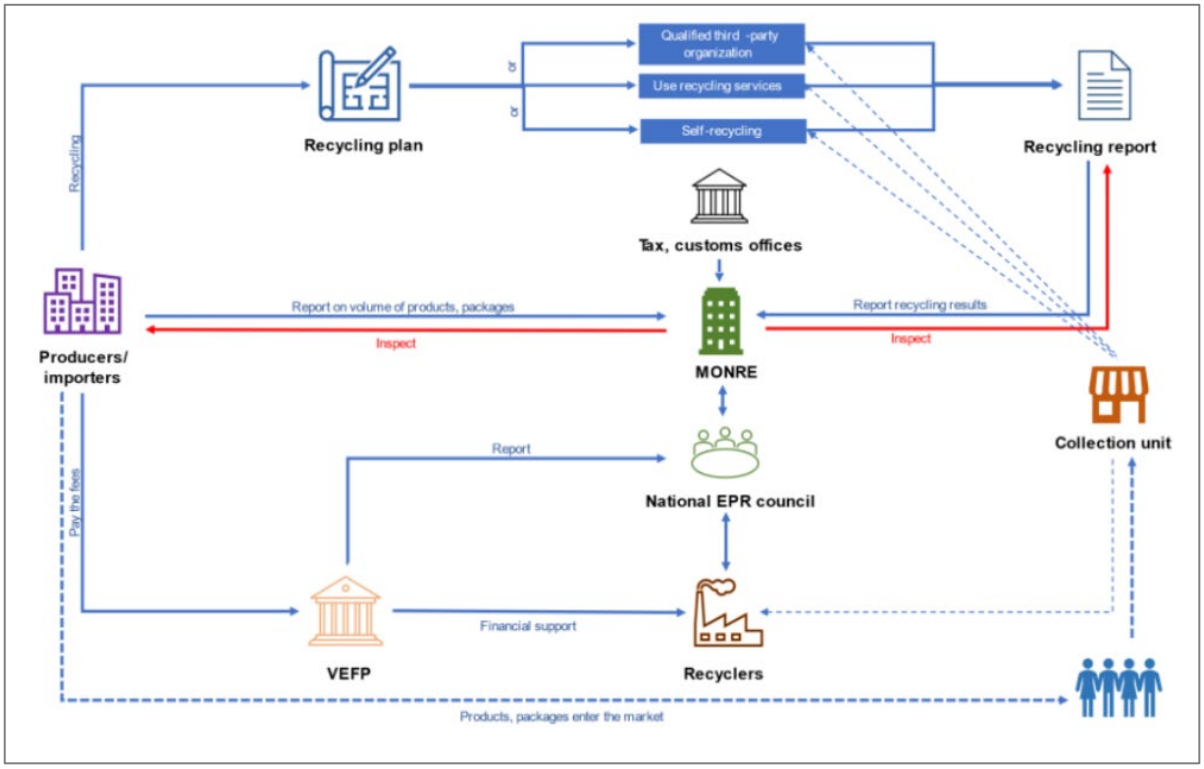
One distinctive feature of Viet Nam's approach is the establishment of designated institutions and the assignment of specific responsibilities to them for the direct management of key components of the EPR system. These include the National EPR Council, the EPR Office, and the VEPF that are prescribed as follows:

- The National EPR Council[10] is mandated to provide advisory support to the Minister of MONRE in overseeing, monitoring, and facilitating the implementation of EPR obligations by producers and importers. The council is composed of representatives from MONRE, the Ministry of Finance, and the Ministry of Industry and Trade, as well as representatives of producers and importers, recycling and waste treatment entities, and relevant social and environmental organisations (Government of Viet Nam, 2025).
- The EPR Office serves as the supporting body to the Council in organising, administering, monitoring, and facilitating the implementation of EPR. This includes overseeing producers' and importers' obligations related to the recycling of products and packaging, as well as the collection and treatment of waste, in accordance with applicable legal regulations (MONRE, 2023).
- VEPF, a unit under MONRE, is tasked with collecting and overseeing financial contributions from producers and importers to ensure compliance with recycling and

[10] Decision No. 252/QĐ-BTNMT, dated 14 February 2023 of the Minister of Natural Resources and Environment, on the Establishment of the National EPR Council; and Decision No. 2235/QĐ-BTNMT dated 08 August 2023 of the Minister of Natural Resources and Environment Promulgating the Regulation on the Organisation and Operation of the National EPR Council. The Minister of Agriculture and Environment restructured the National EPR Council in Decision No. 3721/QD-BNNMT, dated 11 September 2025.

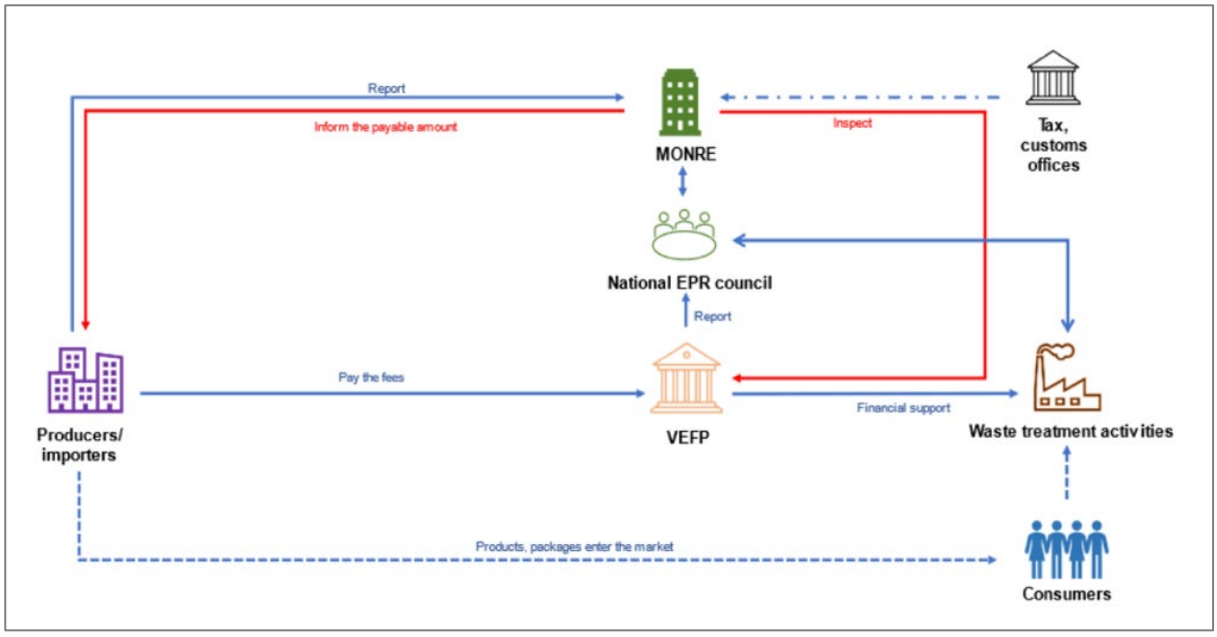
waste treatment obligations.

Figure 7.1. EPR Operational Schemes for Recycling Responsibility in Viet Nam



Source: Anh, Sunil, and Prasad (2023).

Figure 7.2. EPR Operational Scheme for Treatment Responsibility in Viet Nam



Source: Anh, Sunil, and Prasad (2023).

3.2. Businesses Engagement in EPR System

Producers and importers constitute the central actors in the EPR system, bearing responsibility for organising recycling activities or making financial contributions. In practice, however, many enterprises demonstrate limited readiness and uneven levels of participation. Large enterprises and foreign-invested firms tend to be more proactive, driven by compliance pressures from international markets, whereas SMEs face significant constraints related to financial capacity, technical knowledge, and access to recycling infrastructure. In addition, the tendency to hire recycling services or opt for financial contributions indicates that EPR is often perceived as a compliance obligation rather than a strategic approach to sustainable development (UNDP, 2026).

Nevertheless, EPR is not merely a legal requirement; it also creates opportunities for enterprises to reshape their development strategies. When implemented in a rigorous and innovative manner, EPR enables firms to improve product design for recyclability, adopt environmentally friendly materials, optimise product life cycles, and build responsible brand identities. These efforts can generate clear competitive advantages, particularly as major export markets increasingly tighten environmental standards. Moreover, EPR allows enterprises to take a more proactive role in controlling product quality and production processes, while also capturing value from waste streams. A circular production/consumption or recycling model not only reduces environmental impacts but also creates new revenue streams through material recovery and the development of recycled products. According to recent statistics, approximately 150–200 enterprises are operating in the recycling sector in Viet Nam; however, only about 54 of these enterprises[11] meet the eligibility requirements to participate in the EPR system (Tran, 2025).

Research on SMEs in the plastics sector to assess their readiness to implement EPR was conducted in 2021 (ISPONRE and WWF, 2021). The findings indicate that most enterprises were committed to fulfilling their environmental protection responsibilities and recognised that compliance with regulations could enhance their corporate image and competitiveness. The EPR mechanism was widely perceived as a tool for fulfilling corporate social responsibility. Approximately 94% of surveyed enterprises reported having basic awareness and understanding of their obligations related to the collection, recycling, and treatment of products and packaging under the Law on Environmental Protection 2020, thereby creating favourable conditions for implementation. Enterprises might choose amongst several compliance options, including self-recycling, hiring recycling services, authorising third parties, or making financial contributions. Amongst these, recycling services hiring, third-party authorisation, and financial contributions (accounting for 61–68%) were considered more feasible, given the limited self-recycling

[11] Ministry of Natural Resources and Environment (2024), Announcement No. 86/TB-BTNMT, Dated 20 February 2024, on the Publication of the List of Product and Packaging Recycling Units (Phase 1); Ministry of Natural Resources and Environment (2024), Announcement No. 460/TB-BTNMT, dated 14 August 2024, on the Publication of the List of Product and Packaging Recycling Units (Phase 2).

capacity of SMEs.

On the other hand, around 58% of enterprises reported encountering difficulties in implementing EPR. The main challenges include the lack of clear guidance on stakeholder responsibilities across the value chain; an underdeveloped waste classification and collection system; low quality of domestic recyclable materials due to insufficient source separation; high recycling costs caused by contamination; limited capacity to utilise recycled plastics or substitute packaging materials; substantial investment requirements for self-recycling; complex administrative procedures; and relatively rigid technical standards. The primary entities affected could be small enterprises with constrained financial capacity and highly competitive pressure. As a result, the additional costs associated with EPR implementation might pose significant challenges. Furthermore, threshold-based regulations linked to revenue and production output mean that some enterprises below the threshold remain less incentivised to engage in EPR implementation (ISPONRE and WWF, 2021).

Ho Chi Minh City, where approximately 1,800 tonnes of plastic waste are generated daily, faces significant pressure on waste management, given that the recycling rate remains at only about 27%. The implementation of EPR has encountered multiple barriers, including limited corporate awareness, high investment costs, and inadequate recycling infrastructure. Survey results from 86 enterprises in Ho Chi Minh City indicate that 61.6% are familiar with the basic concept of EPR; however, only 38.4% have received formal training. Larger enterprises have begun implementing recycling activities, whereas SMEs continue to face considerable challenges because of limited resources and the lack of detailed technical guidance. In addition, 66.3% of surveyed enterprises recognise the importance of EPR for both environmental and economic outcomes, and 65.1% express a demand for training, particularly in areas such as cost calculation, collection system organisation, financial support policies, and recycling technology solutions. EPR policies have initially contributed to raising awareness and shifting corporate management towards more sustainable practices, promoting product design improvements, and increasing waste recovery. Nevertheless, implementation effectiveness remains constrained by four major groups of barriers: (i) compliance with minimum regulatory targets increases financial and administrative burdens; (ii) collection, sorting, and recycling infrastructure remains fragmented, with outdated technologies and insufficient collection points; (iii) the legal framework is incomplete and lacks consistency and detailed technical guidelines; and (iv) responsibilities amongst stakeholders have not been clearly defined (Chau, 2026).

Based on these findings, a set of integrated solutions is recommended to enhance EPR effectiveness in Ho Chi Minh City. These include improving the legal framework and strengthening management and monitoring mechanisms; developing an interconnected EPR database system; and adjusting contribution fees to the Environmental Protection Fund based on the environmental friendliness of packaging. In parallel, it is necessary to enhance financial transparency of the fund, design targeted support policies for SMEs,

develop infrastructure for waste collection and source separation, and formalise the informal sector. Furthermore, efforts should be made to promote behavioural change amongst consumers through communication strategies, apply co-regulation mechanisms, and strengthen the roles and responsibilities of stakeholders across the EPR value chain (Chau, 2026).

When it comes to the draft decree detailing the implementation of selected provisions of the Law on Environmental Protection concerning the recycling responsibilities and waste treatment obligations of producers and importers,[12] , the Viet Nam Beer–Alcohol–Beverage Association presented its member enterprises' perspectives on the proposed revisions to Viet Nam's EPR system. Particularly, it was necessary to clearly stipulate that recycling costs – including both financial contributions and the costs of organising collection and treatment activities – were recognised as reasonable and deductible expenses for corporate income tax purposes. Secondly, policy mechanisms should be introduced to incentivise the use of recycled plastic packaging, particularly rPET, to promote the recycling industry and advance the circular economy in line with international practices. This was especially important given that enterprises have proactively adopted such materials but have yet to receive adequate policy support. Thirdly, support policies for improving recycling infrastructure and encouraging pioneering enterprises should be expanded. Accordingly, the VEPF should broaden its eligibility criteria to include manufacturing and importing enterprises implementing recycling models. Fourthly, enabling conditions should be established to pilot glass recycling initiatives, particularly deposit–return schemes, which have proven highly effect, in the current context where no suitable implementing entity exists. Fifthly, the efficiency of the VEPF/EPR Fund should be enhanced by supporting closed-loop recycling initiatives, the development of recycled products, and packaging containing recycled content. At the same time, support should be provided to facilitate the transition of the informal collection sector into the formal economy, alongside strengthened communication efforts to raise public awareness on waste segregation, reuse, and recycling. Finally, additional investment incentives should be introduced for recycling infrastructure and collection activities, particularly for hard-to-recycle materials, such as multi-layer packaging. At the same time, eligibility for incentives from the VEPF/EPR Fund should be expanded to include pioneering enterprises engaged in recycling models (Viet Nam Beer–Alcohol–Beverage Association, 2025).

Furthermore, in Viet Nam, the Packaging Recycling Alliance of Viet Nam functions as the officially acknowledged producer responsibility organisation (PRO) within the national EPR framework. Established in 2019 as a non-profit initiative by nine major enterprises operating in the consumer goods, packaging, retail, and import sectors, the alliance has subsequently grown to include 30 member companies. In 2023, it was formally appointed by the former MONRE as an authorised body responsible for co-ordinating packaging

[12] The draft decree was released on 13 June 2025 by the MAE for public consultation.

recycling activities under the EPR scheme.

PRO Viet Nam has been formally recognised by the former MONRE (now MAE) as the first intermediary organisation authorised to undertake EPR obligations on behalf of enterprises. This designation reflects Viet Nam's strategic alignment with international practices, in which PROs serve as central actors in organising and co-ordinating EPR systems. The role of PRO Viet Nam extends beyond merely fulfilling recycling obligations on behalf of producers. It encompasses comprehensive system co-ordination, including the development of collection and recycling plans, the selection of partners that meet legal and technological requirements, the monitoring of implementation processes, and the assurance of transparency and traceability. In this capacity, PRO Viet Nam functions as a critical interface, bridging the gap between policy objectives and the existing limitations of domestic recycling infrastructure.

During the pilot phase prior to the official enforcement of EPR (2022–2023), approximately 17,000 tonnes of packaging waste were recycled. This figure rose significantly to over 64,000 tonnes in 2024. By the end of 2025, following policy adjustments that granted enterprises an additional 12 months to comply with EPR requirements, the volume of delegated obligations declined. Nevertheless, PRO Viet Nam, in collaboration with its members, successfully ensured the collection and recycling of approximately 33,000 tonnes of packaging waste. This achievement has maintained the continuity of established collection and recycling systems and strengthened their readiness for full-scale implementation in 2026 (PRO Viet Nam, 2026).

3.3. The Roles of the Informal Sector in Waste Management Chain

The rapid urbanisation and population growth in Viet Nam have led to a significant increase in solid waste generation, thereby fostering the development of an extensive informal recycling network across both urban and rural areas. This network comprises various stakeholder groups that are actively engaged in waste collection, sorting, and recycling, as follows:

- Scrap collectors: Individuals who collect recyclable materials from households, offices, and production facilities for resale to collection points. This group mainly consists of migrant workers operating in an informal and independent manner.
- Waste pickers: Individuals who recover recyclable materials from streets, dumpsites, and waste treatment areas for reuse or resale.
- Scrap collection facilities: Entities that aggregate materials from multiple sources, conduct preliminary sorting, and store recyclables prior to transferring them to recycling facilities.
- Scrap transporters: Actors responsible for transporting recyclable materials across different stages of the value chain, ranging from small-scale operators to more organised service providers handling large volumes over longer distances.

- Recycling facilities/workshops: Units that process scrap materials into secondary raw materials, typically operating at small to medium scales with semi-manual technologies.
- Recycling craft villages: Traditional production clusters that have transitioned into recycling activities (e.g., paper, metals, plastics), predominantly located in the northern region.
- Recycling clusters: Groups of households in peri-urban areas, particularly in the southern region, that collectively engage in small-scale recycling activities based on spatial proximity and community linkages.

In Viet Nam, the informal waste collection workforce serves as a crucial link in the waste value chain. Accordingly, the informal sector, comprising up to approximately 90% women, plays a critical role in collecting over 30% of recyclable plastic waste. These activities not only have reduced financial pressure on formal waste collection entities but also have the potential to reduce public expenditure on waste collection and treatment (A Chau Company, 2024b; VnEconomy, 2024). Scrap collectors (known in Vietnamese as *ve chai*) and their networks handle the majority of material recovery activities for valuable recyclables, such as plastics, metals, and paper. They operate primarily through market-based mechanisms and demonstrate the highest efficiency in urban areas.

However, most informal actors remain excluded from the formal EPR system because EPR funds are allocated solely to legally recognised enterprises and organisations, whereas freelance workers do not belong to any specific company or organization (Linh, 2024). This limitation affects the inclusiveness of the system and constrains the potential to scale up recycling activities (A Chau Company, 2024b; Global Plastic Action Partnership, 2025). Therefore, the informal sector should be considered an integral part of any solution and can support producers in achieving recycling targets under the EPR framework.

Beyond informal waste collectors, the sector also includes other actors along the plastic value chain, such as purchasing depots, scrap shops, waste sorters, and, in some provinces, officially registered scrap co-operatives; accordingly, the voices and rights of these groups need to be recognized (A Chau Company, 2024b; UNDP, 2024). EPR is not only a producer responsibility for achieving recycling rates but also a social responsibility towards workers across the entire value chain, particularly informal workers whose livelihoods depend on waste collection.

A notable limitation is that informal workers primarily collect high-value scrap, whereas EPR regulations require the management of all post-consumer products, including packaging and low-value waste. Without mechanisms to connect these activities, EPR regulations are unlikely to be fully implemented, resulting in a portion of waste remaining unrecycled (Linh, 2024).

Formalising the informal workforce faces multiple barriers, including low education levels, limited awareness of formal employment opportunities, and vulnerability to social

stigmas. Women in this group often face challenges in accessing training programmes, financial resources, and social support systems, further complicating the transition to formal employment. In a study involving interviews with 38 informal female waste collectors in Ha Noi, 71% expressed hesitation or reluctance to participate, highlighting the need for flexible working hours; 24% were willing to engage if supported by government or enterprises; and 5% remained uncertain. On the other hand, women who had participated in training programmes related to waste management and environmental issues demonstrated greater openness to change, with 88% expressing a desire to continue engaging in future training sessions and pilot initiatives (Ly et al., 2024).

Recycling facilities and enterprises in Viet Nam are predominantly part of the informal sector, with most activities carried out by clustered operations in traditional craft villages (commonly referred to as recycling villages). In addition, a smaller share of recycling activities takes place in independent facilities and informal recycling clusters outside these villages. Viet Nam has approximately 4,000 recycling villages, accounting for a substantial proportion of the more than 5,400 traditional craft villages nationwide. Due to limited investment in science and technology, this segment of the recycling sector primarily produces basic secondary materials such as plastics, iron, and copper. Some facilities also manufacture recycled products, such as recycled paper; however, the quality of these products is generally low. The majority of recycling operations in craft villages are small-scale, household-based units, with only a limited number of enterprises operating at an industrial scale with modern machinery and equipment for production (Herrador et al., 2023).

Viet Nam's recycling craft villages could be classified into three main categories: paper, metal, and plastic recycling, particularly:

- Paper recycling craft villages: These are strongly developed in the northern region, particularly in Bac Ninh Province. Production is predominantly small-scale and dispersed, relying on outdated technologies and ageing equipment, which pose challenges for environmental management and waste collection. The product range is diverse, including traditional *do* paper, votive paper, sanitary paper, and cardboard.
- Metal recycling craft villages: These are widely distributed across the country, with concentrations in provinces, such as former Nam Dinh, Ha Noi, and Bac Ninh. Their activities mainly involve processing scrap steel and used metals, supplying a substantial volume of construction materials and mechanical products to the domestic market.
- Plastic recycling craft villages: These are primarily concentrated in the northern region (Hung Yen, Hai Phong, Ha Noi, and former Vinh Phuc). Production activities are closely linked to networks for the collection, sorting, and transportation of plastic waste from multiple localities. Raw materials are classified into common polymer categories such as HDPE (high-density polyethylene), PP (polypropylene), PS (polystyrene), PVC (polyvinyl chloride), and PET (polythylene terephthalate) prior to

recycling (University of Civil Engineering, 2011).

Particularly, the informal plastic recycling activities are predominantly carried out in small-scale facilities, which are largely concentrated in traditional craft villages. These facilities employ outdated technologies and equipment, consume high amounts of energy, and pose significant environmental pollution risks. The limited area of such establishments constrains their capacity to expand production and adopt advanced technologies. Recycled plastic products from informal operations are generally of low quality, serving primarily the lower-end market segments. However, due to their flexible organisational structure and rapid adaptability, informal recycling facilities could access a diverse range of post-consumer plastic waste, enabling them to compete with formal enterprises in the collection and recycling of used plastic packaging. The workforce in the plastic recycling sector is currently characterised by limited educational attainment and low technical skills, which adversely affect the efficiency of recycling processes. Management capacity at informal facilities is also relatively low compared with other manufacturing sectors, representing a major barrier to technological innovation and production scaling. In addition, there is currently no comprehensive, publicly accessible database on recycled materials and products, limiting access to information for enterprises and stakeholders in the industry (ISPONRE, 2022).

3.4. General Public and Socio-economic and Cultural Perceptions Related to EPR

Public awareness and consumer behavior constitute another critical determinant in the effective implementation of EPR. In Viet Nam, waste management has traditionally been perceived as a primary responsibility of the authorities. Although environmental awareness has gradually improved, corresponding behavioural changes remain modest. Empirical evidence indicates that, despite a general recognition amongst stakeholders of the need to enhance waste management systems and advance circular economy approaches, practical implementation continues to face significant challenges. These constraints are largely attributed to inadequate infrastructure, the absence of detailed operational guidelines, and low levels of trust in the system (WWF, 2021a).

Households and individual consumers play a decisive role in the success of EPR through their participation in source separation, the proper return of waste (e.g., packaging and electronic waste) to designated collection points for recycling, and the monitoring of producers' compliance. Active public engagement contributes to pollution reduction, facilitates the transition towards a circular economy, and supports the integration of informal waste collectors.

Public awareness of legal requirements relating to solid waste management and environmental protection remains generally limited. A survey found that up to 24% of surveyed households were not aware of any regulations related to solid waste management or environmental protection, while 48% were familiar with only one specific regulation. The most commonly recognised provisions include proper waste disposal

practices (identified by 56% of households) and waste segregation requirements (19%) (Tran, 2021).

In Can Tho, access to information on policies and campaigns aimed at reducing plastic waste also shows noticeable variation. Specifically, 22.5% of households reported having no information about ongoing policies or programmes, whereas the remaining 77.5% indicated that they had accessed relevant information (Nguyen et al., 2022).

Despite limited levels of awareness, public support for plastic waste reduction policies is relatively high. Research findings indicate that 63% of households, 57% of business households, and 63% of waste collectors surveyed support the implementation of bans and penalties for improper waste disposal. Furthermore, as many as 77.5% of respondents expressed agreement with policies restricting or banning the use of plastic bags (Tran, 2021).

These findings suggest that, although the community's legal awareness remains incomplete, public attitudes towards plastic waste management policies are generally positive, thereby providing a favourable foundation for promoting the effective implementation of policy measures, including those related to EPR, in the coming period.

In addition, community awareness of the impacts of plastic waste on human health, ecosystems, and the environment is assessed to be relatively high. Survey results from multiple localities indicate that 37.41% of respondents consider waste pollution in their residential areas to be severe. The perceived negative impacts of plastic waste are concentrated on several key aspects, including pollution of surface water bodies such as rivers, canals, and ponds (75.9%); degradation of urban aesthetics (75.9%); obstruction of water flows (54.3%); air pollution (51.8%); impacts on agricultural soil quality (48.6%); and marine and coastal pollution (37.8%).

The proportion of individuals aware of the adverse impacts of plastic waste on health and the environment varies across localities. In Da Nang, this figure ranges from 63–65% (Tran, 2021), while in Can Tho, it is approximately 55% (Nguyen et al., 2022). In rural areas, survey results from Long Tri A Commune, Chau Thanh District, Hau Giang Province show relatively high awareness levels: around 80% of respondents understand that burning plastic waste can negatively affect human health and the environment; nearly 70% believe that plastic waste is difficult or non-biodegradable; and 90% and 77.5% of respondents recognise the risks of cancer and environmental pollution associated with plastic waste management, respectively (Nguyen and Nguyen al., 2020).

Community awareness of source separation of plastic waste has improved in recent years. However, practical implementation continues to face multiple systemic barriers, including limitations in infrastructure and a lack of synchronisation across waste collection, transportation, and treatment systems. As a result, although a proportion of households are aware of and attempt to practice separation of municipal solid waste, they are often unable to sustain such behaviour because of inadequate supporting conditions. Furthermore, the fact that waste is frequently mixed again after separation has

undermined public trust, leading to the perception that source separation does not yield tangible benefits.

Survey results from several localities indicate that the majority of residents recognise the necessity of household-level solid waste separation. Nevertheless, the proportion of households actually practicing separation remains at approximately 50%. Despite this, the figure represents a significant improvement compared to findings from 2019, when only about 31% of households participated in source separation, including 26.1% separating into two categories, 5.33% into three categories, and 1.02% into four categories (Tran, 2021).

In Ha Noi, survey findings reveal that 81.6% of respondents consider waste separation, management, and environmental protection to be the responsibility of individuals and communities, while 10% attribute this responsibility to government authorities, and a small remaining proportion to production and business establishments. Amongst households that practice separation, 52.8% choose to sell recyclable materials to the informal collection sector. Notably, up to 96.4% of respondents expressed willingness to participate in communication activities aimed at reducing the use of single-use plastics (Pham et al., 2021).

At the same time, activities related to reducing, reusing, and recycling plastic waste are increasingly receiving public attention and support. The main motivations driving household participation in waste separation include facilitating waste treatment and reducing environmental pollution (accounting for 64.4%), as well as recovering economic value through recycling (36.3%). In practice, high-value plastic items, such as bottles, containers, and plastic household goods, are often separated and sold to informal recyclers. In contrast, low-value or hard-to-recycle plastics, such as thin plastic bags, foam boxes, and plastic straws, are typically disposed of together with general household waste.

A study by Pham et al. (2021) in Ha Noi showed that 89.4% of households clearly recognise the role of reuse and recycling in reducing plastic waste. In terms of specific behaviours, 34.3% of respondents separate waste for sale to recyclers, while 59.3% reuse plastic products for other purposes in daily life. In Can Tho, approximately 50% of surveyed households reported participating in plastic waste recycling activities, including 10% separating waste for sale, 57.5% reusing plastic bags or containers, and 37.5% not engaging in reuse practices (Nguyen et al., 2022).

Differences in consumption behaviour and plastic use between urban and rural areas are relatively pronounced. In Ha Noi, 70.3% of residents bring their own bags or baskets when shopping, while 37.5% do not, and 1.2% use alternative options. At the same time, 85.8% prioritise products that are reusable or recyclable (Pham et al., 2021). In contrast, in rural areas, only 12% of residents bring their own bags when shopping, 10% use food containers, and 5% use other means (Nguyen and Nguyen, 2020). In Phu Quoc, 50.3% of households are willing to replace plastic bags with environmentally friendly alternatives,

18.2% are unwilling, and 31.5% remain hesitant due to concerns over convenience and cost (WWF and USAID, 2018).

In addition, the study by Dung and Cuc (2021) conducted in Da Lat identified five key factors influencing the intention to reduce the use of plastic bags, including attitudes, subjective norms, perceived behavioural control, awareness of environmental impacts, and awareness of health impacts. The regression analysis results indicated that all these factors directly affect behavioural intention, with awareness of environmental impacts playing the most significant role. However, the study also revealed that public attitudes towards limiting plastic bag use remain insufficiently positive, while the general level of understanding regarding plastic waste issues is still somewhat limited.

In practice, financial resources from the public sector for municipal solid waste management in urban areas remain inadequate to meet development requirements. This necessitates stronger participation and contributions from society as a whole, particularly from local communities. A study by Nguyen et al. (2017) analysed and compared households' willingness to pay (WTP) for municipal solid waste collection services in the former cities of Bien Hoa and My Tho. The findings showed that in Bien Hoa, WTP increased by ₫14,450 per month in 2016–2020, and is projected to increase by an additional ₫18,350 per month in 2021–2025, compared to the current fee of ₫28,000 per month. Similarly, in My Tho, WTP increased by ₫13,000 per month during 2016–2020 and by ₫16,950 per month during 2021–2025 relative to the existing fee. The analysis further indicated that WTP is influenced by multiple factors, including income, waste generation volume, occupation, and educational attainment of households. For example, households with monthly incomes below ₫10 million tend to choose a payment level of around ₫5,000, while WTP increases with income; households earning above ₫15 million per month are generally willing to pay ₫20,000 or more. In My Tho, where the average household income is approximately ₫7 million per month, households earning below ₫1 million typically opt for a payment level of ₫5,000; those in the ₫10–15 million income group select around ₫25,000, while a fee of ₫30,000 per month is largely not accepted.

In another study, Dung, Xuan, and Khai (2021) estimated households' WTP for municipal solid waste management services in three major urban areas in the Mekong Delta. The results indicated that each household is willing to pay between ₫86,000 and ₫110,000 per month; however, the acceptance rate declines as the fee increases. In addition, household characteristics such as income, waste sorting behaviour at source, and support for waste classification programmes significantly influence the decision to participate in payment.

Similarly, the study by Quy et al. (2022) applied the contingent valuation method to estimate WTP while also examining the role of cognitive factors in shaping household payment behaviour. The survey covered 525 households across 25 provinces and cities representing northern Viet Nam. The findings indicated that the majority of respondents are well aware of the negative impacts of plastic waste pollution, with 76.8% of households willing to make financial contributions to a fund for plastic waste reduction.

The estimated WTP ranges from ₫680,775 to ₫944,461 per household per month. Factors such as age, gender, awareness of plastic pollution impacts, associated health risks, and healthcare costs related to pollution were identified as key determinants influencing voluntary financial contribution decisions.

4. Performance and Challenges of the EPR System

Since its incorporation into the Law on Environmental Protection (2020), EPR in Viet Nam has made significant progress in establishing a legal and institutional framework. By the end of 2023, the legal foundation for EPR implementation had been largely completed (A Chau Company, 2024a). Key components, such as mandatory recycling targets, financial contribution mechanisms, and reporting systems, have been developed. However, the actual effectiveness of the system remains limited, reflecting a gap between policy design and implementation outcomes (VnEconomy, 2026).

In terms of performance, no clear evidence currently demonstrates that EPR has significantly improved recycling rates in Viet Nam. The system is still in its early stages, and recycling activities are predominantly driven by the informal sector rather than formal EPR mechanisms. Moreover, the tendency of firms to prioritise financial contributions over direct recycling has weakened the substantive impact of EPR on waste management. Monitoring capacity and data transparency related to EPR are still being developed, the level of readiness amongst enterprises remains uneven, and implementation mechanisms require further strengthening to fully realise their intended role (VnEconomy, 2026).

Although EPR principles have been introduced since 2005, awareness and engagement amongst Vietnamese enterprises remain limited, with participation largely concentrated amongst large firms and foreign-invested enterprises (B&Company, 2026). In addition, the capacity of public administration in Viet Nam remains insufficient for effective EPR enforcement, while waste collection systems are fragmented and largely dependent on informal networks such as scrap collectors and craft villages (Ministry of Industry and Trade of Viet Nam, 2024). The recent study assesses the awareness and preparedness of scientists, authorities, and companies regarding EPR implementation, including challenges, causes of non-compliance, monitoring perspectives, and policy recommendations for packaging waste management. Academics demonstrate relatively higher knowledge; however, overall awareness and readiness across groups remain limited. The most common compliance approach (23.8%) is outsourcing to recycling service providers, while large firms – with an annual revenue of more than ₫300 billion – show the highest level of preparedness, with 71.4% having established implementation plans. Key barriers to effective EPR implementation include, for authorities, difficulties in data collection, legal adjustments, capacity constraints, and monitoring effectiveness; and for companies, challenges related to recycling operations, waste management systems, financial costs, and client requirements. Major drivers of non-compliance include limited

awareness, complex administrative procedures, financial burdens, weak enforcement, and regulatory complexity. Monitoring effectiveness depends on clear regulations and transparent information disclosure to reduce free-rider behavior. While firms moderately support information transparency, notable concerns remain regarding disclosure of financial contributions and producer identification (Tran, Herat, and Kaparaju, 2025).

One of the most critical challenges is the lack of an effective financial allocation mechanism. Although producers have begun contributing to the Environmental Protection Fund, the absence of a clear disbursement process has resulted in inefficient use of financial resources. This creates a 'system bottleneck', where funds exist but are not effectively translated into actual recycling activities. To address these challenges, the draft decree detailing the implementation of selected provisions of the Law on Environmental Protection concerning the recycling responsibilities and waste treatment obligations of producers and importers introduces additional regulations on financial support mechanisms. These mechanisms are financed through contributions from producers and importers, with the aim of promoting recycling and waste treatment activities.

The draft decree clearly specifies provisions related to eligible beneficiaries and forms of support; principles governing the management, allocation, and disbursement of funds; and implementation procedures. Recycling support packages are designed for specific groups of products and packaging, taking into account the actual capacity and operational scale of recycling facilities. This approach is intended to encourage broad participation from the business sector, particularly SMEs and capable private firms. It thereby contributes to the development of a diversified, competitive, and transparent domestic recycling network. Regarding waste treatment activities, financial resources are allocated to local authorities based on quantitative criteria, including population size and the characteristics of disadvantaged areas. Provincial people's committees are granted autonomy in determining the use of these funds, while bearing full legal responsibility for their management and implementation.

Economic challenges also play a crucial role. High recycling costs, combined with the lower competitiveness of recycled materials compared to virgin materials, reduce incentives for both producers and recyclers; Ministry of Industry and Trade of Viet Nam, 2024). In addition, EPR-related costs may increase product prices, thereby negatively affecting the international competitiveness of Vietnamese firms (A Chau Company, 2024a), particularly in export-oriented sectors such as textiles and packaging.

Policy design limitations further constrain system effectiveness. The current EPR framework provides only two compliance options: full recycling or full financial contribution. This binary structure fails to reflect differences in marginal costs across firms and does not allow for more flexible compliance strategies, such as combining partial recycling with partial financial contributions. As a result, the system does not provide sufficient incentives for technological innovation or improvements in recycling

capacity.

Besides, the Prime Minister's Directive No. 20/CT-TTg on strengthening environmental protection, particularly plastic waste management, promotes the use of recycled plastic packaging. This measure not only helps reduce the volume of plastic waste released into the environment but also contributes to the development of a circular economy. The incorporation of incentive and support mechanisms for enterprises to use recycled packaging into the Law on Environmental Protection and the EPR regulatory framework is necessary to create direct momentum for the development of collection and recycling systems, attract investment in the recycling industry, and promote the effective implementation of circular economy models in production and business activities, in line with the orientation set out in Decision No. 222/QĐ-TTg on the National Action Plan for Circular Economy Implementation towards 2035 (Business Forum Magazine, 2025).

Institutional and governance challenges have also been considered. The roles and responsibilities of key units, such as the National EPR Council and the EPR Office, remain insufficiently defined, while monitoring and enforcement mechanisms are still evolving. A lack of transparency in fund management and utilisation further undermines stakeholder trust.

Effective EPR implementation requires waste collection and recycling systems to operate at an industrial scale. Therefore, the development of an efficient and modern collection system is a key challenge that must be addressed to improve EPR performance in Viet Nam. The success of EPR largely depends on whether collection systems can be organised at an industrial scale. The introduction of mandatory waste sorting at source, scheduled to begin in January 2025, is expected to serve as a foundation for modernising the collection system (Ministry of Industry and Trade of Viet Nam, 2024). However, existing assessments indicate that waste separation at source in Viet Nam has not yet been effectively implemented (A Chau Company, 2023; WWF, 2021b).

Viet Nam's EPR system is considered to have significant potential to promote the integration of the informal workforce into formalised waste management mechanisms. However, the current policy framework has not yet adequately recognised the role and contributions of this group within the environmental and waste management sectors. Most existing regulations are designed based on assumptions aligned with the formal sector, and therefore do not fully reflect the operational realities or the value contributions of informal workers. In addition, this workforce, of which women constitute a considerable proportion, typically has limited awareness of labour rights, restricted access to social protection, and insufficient understanding of the broader social implications of their work. Furthermore, persistent social stigmas associated with waste collection and recycling activities continue to undermine proper recognition and appreciation of their contributions within society (Ly et al., 2024).

Despite these challenges, several innovations and reform directions are emerging. The development of the national EPR information portal represents an important step towards

digitalisation and enhanced monitoring. At the same time, the role of PROs is being emphasised to improve collective compliance efficiency. In addition, ongoing policy discussions are increasingly focusing on introducing more flexible compliance mechanisms, improving financial allocation systems, and strengthening the integration of recycling enterprises as well as informal sector actors.

In conclusion, Viet Nam's EPR system has established a relatively comprehensive policy foundation, but its practical effectiveness remains limited. The system remains largely compliance-based and financially oriented, failing to create strong incentives for behavioural change amongst producers. Addressing key challenges, particularly those related to financial allocation mechanisms, infrastructure development, and more flexible policy design, will be essential to transforming EPR into an effective tool for sustainable waste management and advancing the transition to a circular economy in Viet Nam.

5. Conclusion

The responsibility for recycling and waste treatment should not be narrowly interpreted as landfill disposal or incineration. The fundamental focus of EPR policy lies in promoting circular economy models, emphasising recycling as a means of transforming waste into valuable resources. It is essential to emphasise, as a guiding principle, that the EPR policy in Viet Nam should be implemented immediately and operated in a substantive and effective manner, rather than approached through a purely administrative mindset. EPR should be understood as a set of policy instruments designed to provide additional contributions and support, rather than to replace existing waste management obligations stipulated under current legislation. The scope of products and waste streams subject to EPR should prioritise those that are difficult to collect and treat, pose significant environmental risks, and be progressively expanded in accordance with a defined road map.

In the long term, EPR aims to incentivise both producers and consumers to shift towards environmentally friendly products, gradually phasing out unsustainable alternatives and fostering lasting changes in consumption behaviour. Financial resources mobilised through EPR should be managed based on the principles of voluntariness, transparency, and accountability, without being administratively rigid or treated as part of the state budget system. The Government of Viet Nam should avoid imposing inflexible expenditure rules or creating additional bureaucratic structures. Instead, it should ensure that contributors are represented to participate in decision-making and oversight of fund utilisation through a governing council comprising representatives of businesses and other relevant stakeholders. Only when the target groups, responsibilities, and operational mechanisms are clearly defined can EPR function as an effective policy tool for linking the responsibilities of producers and consumers across the entire product life cycle, thereby delivering tangible environmental protection outcomes.

To ensure the effective refinement and implementation of EPR regulations in Viet Nam, it

is essential to first clearly define the entities subject to EPR obligations (Thi, 2024). Accordingly, producers and importers are required to assume responsibility for product quality, goods standards, and labelling in compliance with national regulations on product and goods. In addition, enterprises that place packaging on the market but subsequently collect and repackage it for reintroduction to the market are exempt from fulfilling EPR obligations, provided that the rate of collection and repackaging exceeds the mandatory recycling threshold.

Further research is required to bridge the gap between the design of EPR policies and the realities of the domestic recycling market in Viet Nam. Policy design should emphasise accountability and employ financial instruments to incentivise behavioural change. Treatment and recycling costs should be internalised from the beginning and reasonably allocated across the entire value chain, particularly at the collection stage, thereby encouraging consumers to proactively return end-of-life products to designated collection points for recycling and treatment. The financial mechanisms/policies should ensure that contributed funds are effectively used for collection, recycling, and treatment activities, especially for technically difficult and labour-intensive stages, while clearly distinguishing the responsibilities of formally operating producers and importers from issues such as surplus goods and smuggled or illegally imported products. Existing collection forces should be fully leveraged, with responsibilities clearly delineated by product type.

Besides, the effective implementation of EPR policies in Viet Nam requires the establishment of a comprehensive data collection and tracking system, notably the development of a national EPR portal to ensure accurate reporting and robust monitoring (Tran, Herat, and Kaparaju, 2025). An accurate data management system should be enhanced to ensure fairness amongst all participating stakeholders. Enterprises subject to EPR obligations are required to duly register and comprehensively report the quantities of packaging and products placed on the market, as well as their recycling outcomes, thus contributing to the development of a transparent and reliable system. In addition, the regular disclosure of performance reports, together with the establishment of independent auditing mechanisms, will further enhance transparency and accountability within the system. Accordingly, capacities for monitoring and data transparency related to EPR need to be strengthened.

Besides, the level of preparedness amongst enterprises remains uneven, while implementation mechanisms require further consolidation to fully realise their intended role. Capacity building and professional training should be strengthened through the organisation of targeted training programmes on EPR mechanisms, including practical guidance on recycling implementation and the application of waste management tools. In parallel, communication activities on EPR should be strengthened to raise awareness of its importance, disseminate relevant policies, and recognise business models that demonstrate effective compliance. Technical and technological support should also be provided to assist enterprises in adopting innovative solutions, reduce emissions, and

develop efficient collection and recycling systems.

At the same time, formulating a strategic road map that clearly defines the roles of PROs, strengthens co-ordination with municipal waste management systems, and integrates the participation of the informal collection sector will support more effective and sustainable EPR implementation in the long term.

In conclusion, to transition from the policy establishment phase to comprehensive and effective implementation, it is necessary to refine several core design elements. These include (i) clarifying the obligations of producers and importers, as well as the scope of regulated products; (ii) strengthening governance mechanisms for the EPR registration and reporting system; (iii) enhancing monitoring, verification, and enforcement frameworks to prevent non-compliance; (iv) improving transparency and accountability in the management and allocation of financial contributions for waste treatment; and (v) aligning national practices with regional and global best practices in EPR governance and circular economy implementation.

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Annex 1. List of Products, Packaging, and Mandatory Recycling Rates and Specifications

No.	Product/Packaging Category	Mandatory Recycling Rate	Recycling Specification
(1)	(2)	(3)	(4)
A. Packaging			
1	A.1.1. Paper and paperboard packaging (including coated paper or paperboard, defined as paper or paperboard that has been coated on one or both sides without losing its identity as paper or paperboard	20%	• Production of commercial pulp • Production of packaging or specific products
2	A.1.2. Multi-layer composite paper packaging (packaging consisting of two or more layers, including at least one paper layer)	15%	• Production of commercial pulp • Production of packaging or specific products
3	A.2.1. Aluminium packaging	22%	• Production of commercial aluminium ingots • Production of packaging or specific products
4	A.2.2. Iron and other metal packaging	20%	• Production of commercial metal ingots • Production of packaging or specific products
5	A.3.1. Rigid PET packaging	22%	• Production of commercial plastic resins • Production of packaging or specific products (excluding plastic flakes and waste-to-energy fuels)
6	A.3.2. Rigid HDPE, LDPE, PP, PS packaging	15%	• Production of commercial plastic resins • Production of packaging or specific products (excluding plastic flakes and waste-to-energy fuels)
7	A.3.3. Rigid EPS, PVC, and other rigid plastics	10%	• Production of commercial plastic resins • Production of packaging or specific products (excluding plastic flakes and waste-to-energy fuels)

No.	Product/Packaging Category	Mandatory Recycling Rate	Recycling Specification
(1)	(2)	(3)	(4)
8	A.3.4. Flexible plastic packaging (packaging with high flexibility, easily bendable, stretchable, and shape-changing without losing structural integrity, e.g., woven bags, shrink films, flexible plastic bags) Mono-material flexible packaging Multi-material flexible packaging	10%	• Production of commercial plastic resins • Production of packaging or specific products (excluding plastic flakes)
9	A.4.1. Glass packaging	15%	• Crushing/grinding into glass powder or cullet for use as input materials in other production processes • Production of other products (including non-fired bricks, concrete, artificial sand)
B. Batteries and Accumulators			
10	B.1.1. Lead-acid batteries	12%	Dismantling, sorting, recovery of plastic materials, and production of lead ingots
11	B.1.2. Batteries other than lead acid	08%	Dismantling, sorting, recovery of plastic materials and lithium or other metals
12	B.2.1. Rechargeable batteries		• Dismantling, sorting, recovery of plastic materials and lithium or other metals • Export (with or without pre-treatment) to overseas recycling/refurbishment facilities
	Rechargeable batteries (excluding lithium batteries and nickel-metal hydride batteries used for transportation vehicles)	08%	
	Lithium batteries, nickel-metal hydride batteries used for transportation vehicles	0%	
C. Lubricating Oil			
13	C.1.1. Engine oil, gear oil, and lubricants		• Production of base oil • Production of engine oil, gear oil, and lubricants
	Engine oil (excluding two-stroke engine oil)	15%	

No.	Product/Packaging Category	Mandatory Recycling Rate	Recycling Specification
(1)	(2)	(3)	(4)
	Gear oil and other lubricants	0%	• Production of other oil-based products
D. Tyres and Inner Tubes			
14	D.1.1. Rubber tyres and inner tubes	05%	• Retreading and patch repair of tired in accordance with manufacturer standards • Production of commercial rubber powder/granules • Production of oil products
E. Electrical and Electronic Equipment (excluding components and sub-components)			
15	E.1.1. Refrigerators, freezers, air conditioners, electric stoves, induction cookers, infrared cookers, ovens, microwave ovens	05%	Dismantling, sorting, and recovery by material type including metals, plastics, and other materials
16	E.1.2. Washing machines, dryers, speakers, amplifiers	09%	
17	E.2.1. Display devices (televisions, desktop monitors)	07%	• Dismantling, sorting, and recovery by material type including metals, plastics, and other materials • Crushing/grinding glass (if any) into cullet for use in other production processes (including non-fired bricks, concrete, artificial sand)
18	E.3.1. Tablets, laptops, cameras (including flash), video camera	09%	• Dismantling, sorting, and recovery by material type including metals, plastics, and other materials • Crushing/grinding glass (if any) into cullet for use in other production processes (including non-fired bricks, concrete, artificial sand)
19	E.3.2. Mobile phones	15%	
20	Desktop computers (excluding monitors), printers, photocopiers	09%	Dismantling, sorting, and recovery by material type including metals, plastics, and other materials

No.	Product/Packaging Category	Mandatory Recycling Rate	Recycling Specification
(1)	(2)	(3)	(4)
21	Compact fluorescent lamps (CFLs), fluorescent tubes	08%	Dismantling, sorting, and recovery of metal scrap, and crushing and grinding of glass into powder and granules for use as input materials in other production processes (including the manufacturing of non-fired bricks, concrete, and artificial sand).
22	Solar panels (photovoltaic panels)	03%	Dismantling, sorting, and recovery of metal scrap, as well as crushing and grinding of glass into powder and granules for use as input materials in other production processes (including the manufacturing of non-fired bricks, concrete, and artificial sand).
F. Vehicles			
23	Cargo vehicles and specialised trucks; Passenger vehicles with capacity of 9 persons or more (excluding the driver), school buses and kindergarten transport vehicles, four-wheeled motorised cargo vehicles, four-wheeled motorised passenger vehicles (Vehicles subject to regulated service life in accordance with legislation on road traffic order and safety)	0.5%	Dismantling, sorting, and recovery by material type, including metals, plastics, and other materials, for recycling purposes. (Recycled vehicles of other categories may be utilised to fulfil recycling responsibility obligations for this product group)

Source: Government of Viet Nam (2026).

Annex 2. List of Products, Packaging, and Financial Contribution Levels for Waste Treatment Support

No. (1)	Product/Packaging Type (2)	Format (3)	Capacity/Size (4)	Contribution Level for Waste Treatment Support (5)
1	Packaging of finished plant protection products	Plastic bottles, containers	Less than 500 ml	₫50/unit
			From 500 ml and above	₫100/unit
		Plastic bags, packages, pouches	Less than 100 g	₫20/unit
			From 100 g to under 500 g	₫50/unit
			From 500 g and above:	₫100/unit
		Glass bottles, containers	Less than 500 ml	₫150/unit
			From 500 ml and above	₫250/unit
		Metal bottles, jars, containers, boxes	Less than 500 ml	₫150/unit
			From 500 ml and above	₫250/unit
2	Single-use batteries	All	All	01% of the net revenue from the product
3	Disposable diapers, baby diapers, sanitary napkins, and single-use wet wipes	All	All	01% of the net revenue from the product
4	Chewing gum	All	All	01% of the net revenue from the product
5	Cigarettes	All	All	₫60 per 20 cigarettes
6	Products containing plastic components:			

No. (1)	Product/Packaging Type (2)	Format (3)	Capacity/Size (4)	Contribution Level for Waste Treatment Support (5)
6.1	Single-use plastic products: Food containers such as trays, boxes; bowls, chopsticks, cups, mugs, knives, spoons, forks, straws, other eating utensils; food wrapping films	All	All	₫1,500 per 1 kg of plastic used
6.2	Balloons, adhesive tape, cotton swabs, dental floss picks, toothbrushes, combs, disposable razors	All	All	
6.3	Pants, shirts, hats, socks, gloves	All	All	
6.4	Bags, briefcases, wallets, belts, shoes, sandals	All	All	
6.5	Children's toys	All	All	
6.6	Beds, mattresses, carpets	All	All	
6.7	Construction materials containing synthetic resin components (including: Epoxy resin – AB; polyurethane resin – PU; polyester resin; acrylic resin), such as paints; cladding, bonding, and flooring materials; thermal and acoustic insulation materials	All	All	
6.8	Non-biodegradable plastic bags (excluding plastic	All	Dimensions smaller than 50 cm × 50 cm and single-layer film	

No. (1)	Product/Packaging Type (2)	Format (3)	Capacity/Size (4)	Contribution Level for Waste Treatment Support (5)
	bags used for household waste as prescribed by local authorities)		thickness less than 50 µm	

Source: Government of Viet Nam (2026).

Chapter 7

Consumers' Attitudes Towards Extended Producer Responsibility Policies: Evidence from Survey Experiments in Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam

Azusa Uji, Jaehyun Song, and Fusanori Iwasaki

1. Introduction

As Southeast Asian nations face the escalating crisis of single-use plastic pollution, extended producer responsibility (EPR) has emerged as a cornerstone policy instrument. In principle, EPR shifts the burden of product waste from the public sector to the producers, holding companies financially and operationally responsible for the entire life cycle of their products, particularly the post-consumer stage. However, the practical implementation of these schemes often leads to a pass-through effect, where the financial costs incurred by companies are reflected in higher retail prices for consumers. This raises significant questions regarding public acceptance and the feasibility of various EPR designs. Understanding how consumers value different EPR policy attributes are thus essential for designing schemes that are socially and politically viable.

Against this backdrop, we conducted a multi-country online survey across five key ASEAN member states (AMSs): Indonesia, the Philippines, Viet Nam, Malaysia, and Thailand (N=2100 for each country). By examining consumer preferences in these diverse economic and cultural contexts, the study aims to provide evidence-driven insights into how EPR policies should be designed to maximise environmental benefits while maintaining robust public support in each country. This study employs a survey-embedded conjoint experiment, which captures how respondents make trade-offs between different policy components. In this experiment, participants are presented with six pairs of hypothetical EPR policy proposals and asked to choose their preferred option in each pair. Each proposal varies across five key components of EPR policy: key EPR policy instrument, additional household costs, policy enforcement measures, EPR fund allocation, and the entity for managing the fund.

In the remainder of this chapter, Section 2 details the research design, including the survey experimental design and the sample collection. Then, Section 3 presents the results of the conjoint experiment and a series of public perceptions. The last section summarises findings and provides policy implications.

2. Research Design

2.1. Survey Design

In recent years, conjoint experiments have gained popularity as a method to measure public preferences for complex, multidimensional policy proposals and estimate the causal impact of specific policy features on collective support (Bechtel and Scheve, 2013; Hainmueller, Hopkins, and Yamamoto, 2014). Simply put, a conjoint experiment mimics how people make decisions in the real world. Think about how consumers buy a smartphone. A smartphone has multiple dimensions, such as brand, price, and performance. Consumers make trade-offs, weighing multiple factors like price, brand, and battery life. Conjoint analysis focuses on how people trade off these factors in their decision-making. In this study, participants are asked to compare two concrete policy packages presented side by side, rather than simply indicating whether they support an environmental policy. This arrangement can reduce implicit social desirability bias by allowing respondents to evaluate multiple dimensions simultaneously, thereby making implicit trade-offs. Each package has identical dimensions, but each dimension can take multiple values that vary randomly across paired comparisons. By analysing thousands of these forced trade-offs, in which respondents indicate their preferred option in each paired comparison, researchers can pinpoint exactly which specific feature (e.g., high household cost or mandatory enforcement method) shapes public support. We used the forced-choice approach, in which respondents indicate their preferred option in the paired comparison. Respondents repeated this paired comparison six times.

In terms of survey mechanics, respondents first read the introductory text, which highlights the basic information on EPR policies and the explanations of potential EPR policy dimensions. The text introduces EPR as a policy, in which companies producing plastic packaging are held financially responsible for their products' entire life cycle, including the post-consumer stage. It explains that while this funding is used to reduce plastic pollution through various government-led programmes, it may also lead to an increase in the prices of single-use plastic items like bottles and food containers, some of which are passed on to the household. To ensure clarity before the experiment, the introduction explains five specific policy features to be presented in the conjoint experiment. Following this text, we included two attention check questions to see if they had read the contents of the introduction text. For those who failed to pass the attention check, we presented the introduction text again, with an emphasis to read it carefully.

The survey then transitioned to the experimental section. Respondents were first instructed that their government was considering advancing EPR legislation. They were then presented with six sequential pairs of hypothetical EPR policy proposals and asked to indicate which profile they supported in each pair. Hypothetical EPR policy packages were characterised by five dimensions: key EPR policy instrument, additional household costs, policy enforcement measures, EPR fund allocation, and the entity managing the fund, as presented in Table 7.1. These dimensions are categorised into two groups: (i) how revenue is generated and (ii) how those funds are subsequently utilised. The first group

of dimensions defines the mechanisms for holding producers financially accountable and the resulting economic impact on the public. The key policy instrument serves as the primary tool for financial responsibility, utilising fees on unrecyclable materials, penalties for insufficient recycled content, or revenue from unreturned deposits. These corporate costs may result in an additional cost to the household, representing the estimated monthly price increase passed through to consumers.[1] Policy enforcement concerns the level of regulatory strictness, ranging from voluntary participation, with or without government incentives, to mandatory compliance backed by fines.

The second group outlines the management and application of the EPR fund. Fund allocation (EPR fund supports) specifies the environmental interventions funded by the revenue, targeting various stages of the plastic life cycle, such as research and development (R&D), product redesign, waste collection infrastructure, or environmental cleanup. Finally, the dimension of fund management identifies the governing authority responsible for these activities, which may be an industry-led producer responsibility organisation (PRO), a national government agency, or a local municipal government. Table 7.2 provides a sample of these policy packages. This forced-choice conjoint experiment task, repeated across six tasks, yields a robust dataset of 25,200 observations per country (2,100 respondents × 6 choice tasks × 2 policy profiles).

Table 7.1. Five Dimensions of EPR Policy Packages

Attribute	Levels
Key policy instrument	Unrecyclable plastic fees Mandatory recycled content Deposit-refund system
Additional household cost	0/3x baseline /5x baseline /10x baseline /15x baseline /20x baseline * Baseline reflects the price per plastic bottle in local currencies.
Policy enforcement	Voluntary without incentives Voluntary with incentives Mandatory
Fund allocation	R&D for recycling or substitute technologies Recyclable product design Use less plastic and promote recycled plastic Improve waste collection services Build modern sorting and recycling facilities Clean up oceanic and terrestrial plastic pollution
Fund management	Industry-led body (PRO) National government agency Local government

Source: Created by the authors.

[1] The baseline cost reflects the price of a standard 500ml plastic bottle in each respective country: IDR 3,500 (Indonesia), RM2 (Malaysia), ₱15 (Philippines), ฿7 (Thailand), and ₫5,000 (Viet Nam). Across the choice of tasks, these costs are randomised across six levels, ranging from zero (no increase) to three times the baseline, up to a maximum of 20 times the baseline.

Table 7.2. Sample Choice Task

	Policy 1	Policy 2
Key policy instrument	Mandatory recycled content	Deposit-refund system
Additional cost to your household	Rp35,000/month	Rp70,000/month
Policy enforcement	Voluntary with incentives	Mandatory
Fund supports	Recyclable product design	Build modern sorting and recycling facilities
Fund is managed by	Local government	National government agency

Which policy do you support more?

◯ Policy 1 ○ Policy 2

Source: Created by the authors.

Beyond the conjoint tasks, the survey included a series of questions asking about perception and personal behaviours related to plastic pollution. These questions allow us to examine how individual perceptions of responsibility and personal experience with pollution could shape support for specific EPR attributes. These include the perceived significance of various actors (such as the national government or domestic companies) in combating plastic pollution, what respondents believe are the primary causes of the crisis, their perceived level of exposure to plastic pollution in their local communities, and their recent personal habits regarding the disposal of plastic bottles. Alongside them, we also asked the standard questions about their socio-demographic background, including age, gender, place of living, education, income, ethnicity/race, and religion.

2.2. Sample

We administered an online survey-embedded conjoint experiment to a sample of adult respondents (n=2,100) aged 18 or above in each country, using the services of a professional survey company PureSpectrum, between 17 and 26 December 2025.[2] Our sample closely approximates the demographic distribution of the population of each country by age and gender (See the Appendix Figures A1–A6 and Table A1 for the distribution of demographic profiles). At the start of our survey, we obtained written informed consent from survey participants. We did not collect personally identifiable information, and all responses were anonymised and converted into numerical data used exclusively for this research and securely stored in a folder accessible only to research team members.

[2] We obtained permission from our institution's review board and pre-registered our survey study plan with the Open Science Framework (https://osf.io/7ubts/overview?view_only=ded81452397243eba0cfe0511a5d1742) before administering the survey.

Importantly, the demographic composition of the survey sample exhibits a clear imbalance in terms of geographical distribution, household income, and educational attainment. As presented in Table A1 in the Appendix, the data are significantly skewed towards residents of major metropolitan hubs, such as Greater Jakarta (45.8%) and Metro Manila (42.4%). This regional concentration is mirrored by a pronounced skew in socio-economic status. For instance, over 30% of Filipino respondents fall into the upper-middle income bracket of ₱240,000–₱719,999, while nearly 40% of Thai respondents are concentrated in the THB205,000–609,999 range. Educational attainment also appears to contribute to this urban elite bias, with approximately 60% of respondents in the Philippines and 55% in Indonesia holding a university degree. In Malaysia, postgraduate representation is particularly high, with master's degree holders accounting for approximately 40% of respondents.

Consequently, these findings may not fully reflect the preferences or financial sensitivities of rural populations and lower-income households, which generally have lower levels of educational attainment and may be more adversely affected by policy-induced price increases. Nevertheless, the preferences of urban populations are strategically important for the design and implementation of EPR policies. Urban centres are the primary hubs of plastic consumption and waste generation in Southeast Asia, and they are in these densely populated areas where formal waste management infrastructure and EPR-funded collection services are most likely to be piloted and scaled first. Furthermore, because urban consumers often possess higher purchasing power and educational awareness, their initial acceptance and willingness to pay are critical for politically feasible policy design.

3. Results

This section first presents the results of the conjoint experiment and the responses to the perception questions. Due to space limits, the distributions of demographic variables are all presented in Figures A1-6 and Table A1 in the Appendix.

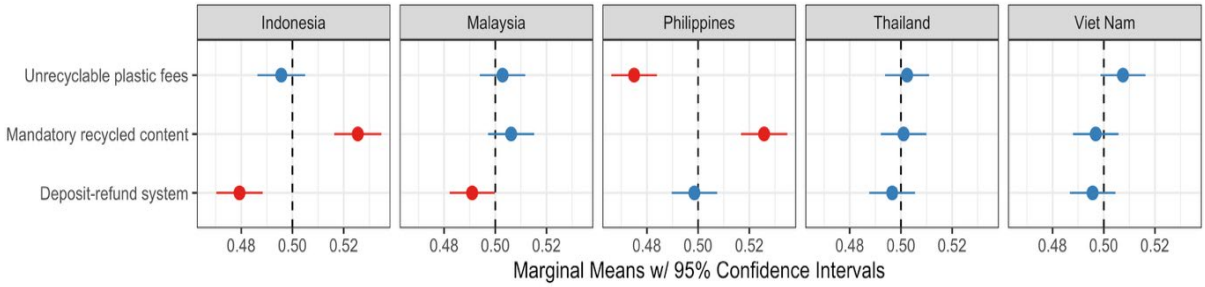
3.1. Conjoint Experiment

Figures 7.1–7.5 show the overall public preference for EPR policy in five countries, by each policy dimension. Dots represent the marginal means (MMs), which reflect how the specific value of each policy dimension influences public support for the policy package, while the bars around these dots represent the 95% confidence intervals. Dots with red bars indicate that the specific value of a dimension statistically significantly shapes support for the policy package, while dots with blue bars show that such an effect is not statistically significant. That is, for the specific value of a dimension to statistically significantly shape support, its confidence interval bars have to be entirely to the left or the right of the vertical line that reflects an MM of 0.5.

3.1.1. Key policy instrument

The experimental result for the first policy dimension, 'Key policy instrument,' is presented in Figure 7.1. It reveals significant regional variation in preferences across the five surveyed countries. Mandatory recycled content received strong positive support compared to other options in Indonesia and the Philippines. This preference likely reflects the public perception that direct regulatory mandates are more effective than alternative options. Whereas fees and deposit–refund systems may indirectly encourage recycling through price signals, they are not designed to directly boost the recycling market in the same way that a mandatory content requirement does. In fact, Indonesia opposes the deposit system, and the Philippines opposes fees. This preference may also be driven by the high levels of plastic pollution exposure experienced in these AMSs, as reflected in the response results of personal exposure to plastic waste (presented in Figure 7.8 in section 3.2). In contrast, respondents in Thailand and Viet Nam do not express a statistically significant preference for any specific instrument, with marginal means for all three options overlapping the 0.5 MM baseline. Furthermore, the results indicate a clear opposition to the deposit-refund system in both Indonesia and Malaysia. This resistance likely stems from public concern that such systems represent an unfair transfer of costs directly onto consumers.

Figure 7.1. Conjoint Result for the Key Policy Instrument



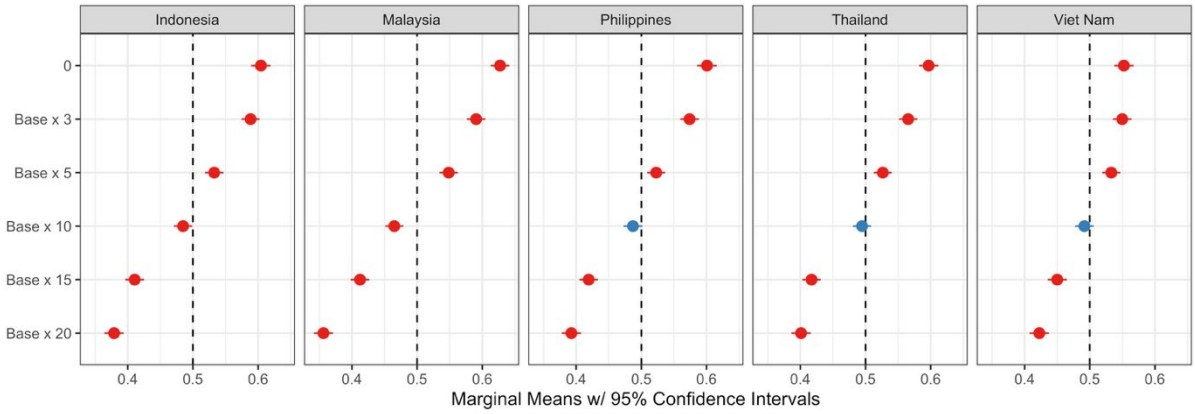
Source: Created by the authors.

3.1.2. Additional household costs

Figure 7.2 presents the experimental results for the second policy dimension, 'Additional household costs'. It demonstrates a consistent trend across all five surveyed countries: support for EPR policy decreases linearly as the associated household costs increase. However, notable variations exist in the degree of price sensitivity across AMSs. Notably, Malaysia displays the highest level of sensitivity to price increases. Compared to other countries, it is the most supportive (above 0.6) of the zero-cost scenario and expresses the strongest opposition to the high household costs of Base x 20 (around 0.35). This suggests that for the Malaysian public, the personal financial burden is a primary determinant of policy acceptability. In contrast, Viet Nam appears to be the least price-sensitive amongst the countries. It is notably less supportive of the zero-cost option and

shows significantly less resistance to high household costs (above 0.4) than their counterparts in Malaysia or Indonesia.

Figure 7.2. Conjoint Result for the Additional Household Costs



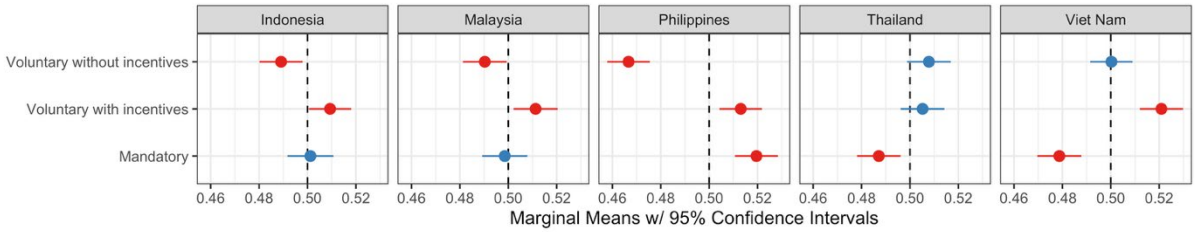
Source: Created by the authors.

3.1.3. Policy enforcement

Figure 7.3 presents the results of the 'Policy enforcement' dimension. It suggests a clear tension between voluntary co-operation and government mandates across the five countries. In Indonesia, Malaysia, and the Philippines, there is a shared scepticism towards purely voluntary measures. Respondents in these three countries consistently oppose voluntary approaches without incentives but show strong support for voluntary approaches with incentives. This pattern suggests that although these publics are open to non-mandatory approaches, they believe that participation must be supported by tangible incentives to be effective.

The most notable divergence occurs regarding mandatory enforcement. The Philippines stands out as the only country to show strong, statistically significant support for mandatory enforcement, suggesting a public desire for firm state-led regulation. Conversely, Thailand and Viet Nam both significantly oppose mandatory measures. The resistance to mandates in these countries may be explained by the public's emphasis on the greater role of domestic companies, nearly as significant as the national government, compared to other countries (presented in Figure 7.6 in section 3.2). This may suggest that they have a greater preference for collaborative or corporate-led solutions rather than top-down government requirements.

Figure 7.3. Conjoint Result for the Policy Enforcement



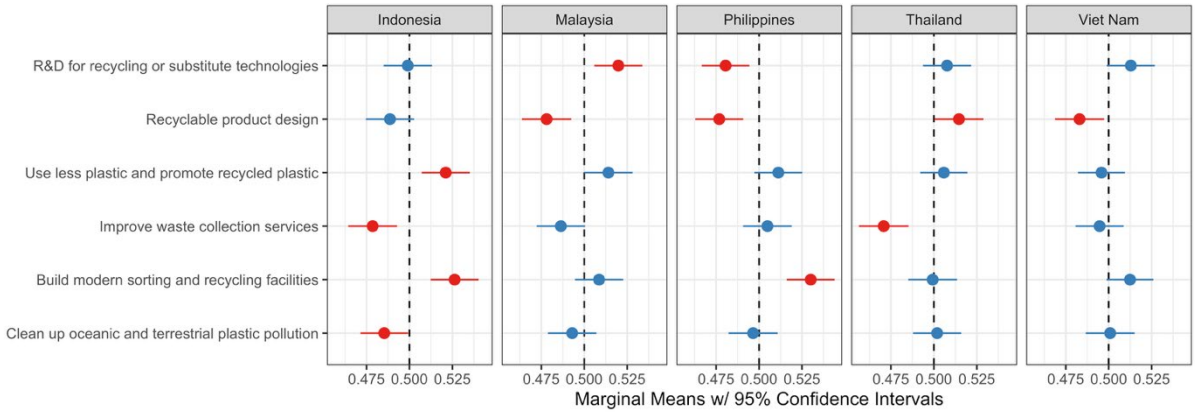
Source: Created by the authors.

3.1.4. EPR fund support

The results for 'EPR fund support' in Figure 7.4 show a strong public preference for recycle-oriented, upstream or upstream policies over downstream management strategies. Particularly in Indonesia, Malaysia, and the Philippines, respondents show stronger support for initiatives such as reducing plastic use and promoting the use of recycled plastics, building modern sorting and recycling facilities, and investing in R&D on recycling and alternative technologies than for policies focused on improving waste collection services or cleaning up marine and terrestrial plastic pollution. Within this category, Malaysia stands out for its specific prioritising of innovation, supporting R&D more than any other fund allocation option. The high level of support in these nations may be tied to a heightened awareness of exposure to plastic pollution (presented in Figure 7.8 in section 3.2).

In contrast, downstream policies, such as improving waste collection services or cleaning up marine and terrestrial plastic pollution, receive limited support. Notably, some countries, including Thailand and Indonesia, express explicit opposition to these downstream measures. This resistance likely stems from a public belief that post-hoc waste management is an insufficient approach to a crisis that requires fundamental changes to the plastic lifecycle. Surprisingly, recyclable product design, often regarded as the main corporate activity taken under EPR, is unfavourable in most countries. Many respondents view it as a lower priority for EPR funding. Thailand, however, is an exception, showing positive support for this category.

Figure 7.4. Conjoint Result for the EPR Fund Supports

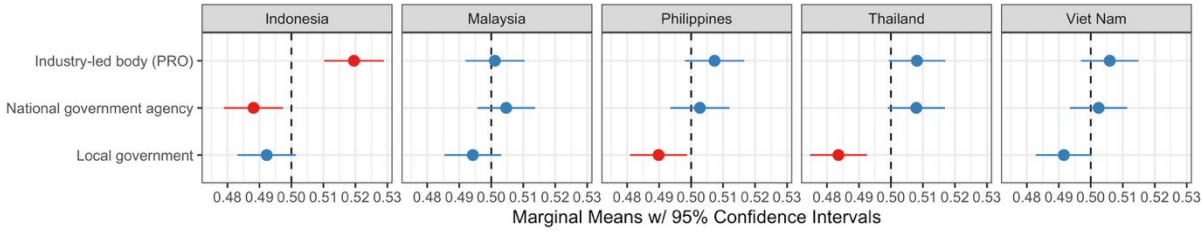


Source: Created by the authors.

3.1.5. EPR fund management

Figure 7.5 presents the experimental results for the final policy dimension, 'EPR fund management'. It reveals a reluctance to delegate fund management responsibilities to local governments in the Philippines and Thailand. This pattern suggests a significant lack of public trust in the capacity or suitability of local authorities to administer these funds. A similar negative trend, though statistically insignificant, is observed in Indonesia, Malaysia, and Viet Nam. In most countries, Malaysia, the Philippines, Thailand, and Viet Nam, respondents are generally indifferent to whether the fund is managed by the national government agency or PRO, perhaps as long as it is centralised. However, Indonesia expresses a strong preference for PRO while opposing national government agencies managing the fund.

Figure 7.5. Conjoint Result for the EPR Fund Management



Source: Created by the authors.

3.2. Public Perceptions about Plastic Pollution and Policy

3.2.1 Perceived role of actors in combating plastic pollution

First, we assessed the perceived role of various actors in combating plastic pollution. Respondents rated eight different actors – including national and local governments, domestic and foreign companies, industry-led organisations (PROs), non-governmental organisations, international organisations, and consumers – on a scale from 1 (most significant role) to 8 (least significant role). [3] To assess the perceived level of responsibility in combating plastic pollution, we calculated the mean significance role score assigned to each actor and ranked them accordingly. The resulting rankings across the five nations are presented in Figure 7.6, which reveals distinct regional patterns regarding who they believe should lead plastic policy in general.

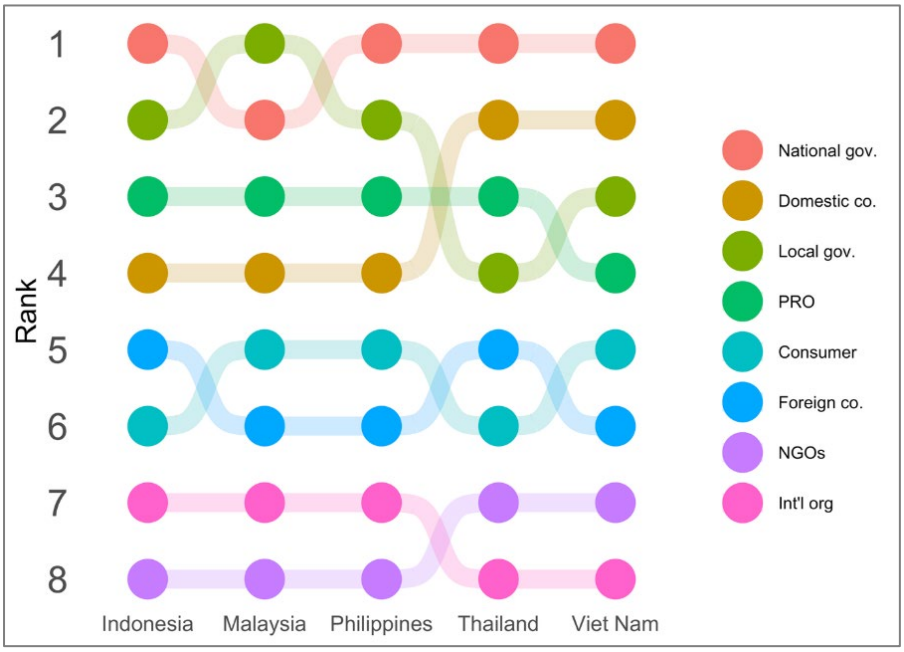
It shows a strong preference for state-led solutions across countries. Indonesia, the Philippines, Thailand, and Viet Nam consistently assign the highest significance to national governments. Specifically, Malaysia stands out as the only country where the local government is viewed as the most critical actor, surpassing the national government in perceived responsibility. Notably, as briefly mentioned in 3.1, Thailand and Viet Nam view domestic companies as playing key roles, nearly equal in significance to the national government. In countries other than Thailand and Viet Nam, domestic companies and PROs generally are located at a middle-tier ranking (third or fourth), suggesting they are not viewed as primary leaders. Consumers, along with foreign companies, are consistently ranked in the lower half of the significance scale, typically fifth or sixth. International organisations and non-governmental organisations are consistently viewed as having the least significant role across countries.

These findings suggest that while there is a regional consensus on the importance of the public sector (national and local governments), the specific emphasis on domestic corporate responsibility in Thailand and Viet Nam may reflect different levels of trust or expectations regarding private sector involvement in plastic policy.

[3] What level of role should each of the following actors have to combat plastic pollution? Please rate the level of the role for each actor. Please move the slider bar to express your answer. Note: 1 = Least significant role, 7 = Most significant role.

1. The national government of your country
2. Your local/municipal government
3. Domestic companies in your country
4. Foreign/multinational companies operating in your country
5. Industry-led organisations like producer responsibility organisation (PRO)
6. Non-governmental environmental organizations
7. Consumers (individuals)
8. International organisations

Figure 7.6. Roles of Actors in Combating Plastic Pollution



NGO = non-governmental organisation.
Source: Created by the authors.

3.2.2. Perceived causes of plastic pollution

To identify what respondents view as the primary cause of plastic pollution, they were asked to rank five factors from most to least significant. These factors included upstream and midstream issues like plastic production and product and packaging design, as well as downstream issues such as consumer consumption, public disposal habits (littering), and inadequate waste management infrastructure.[4] We calculated the mean rank score for each identified cause across the five countries. A rank of 1 (5) indicates that respondents perceive the factor as the most (least) significant driver of pollution. Across the five countries, public perception of the causes of plastic pollution is largely dominated by two factors, ranked first and second: plastic production and public disposal behaviour.

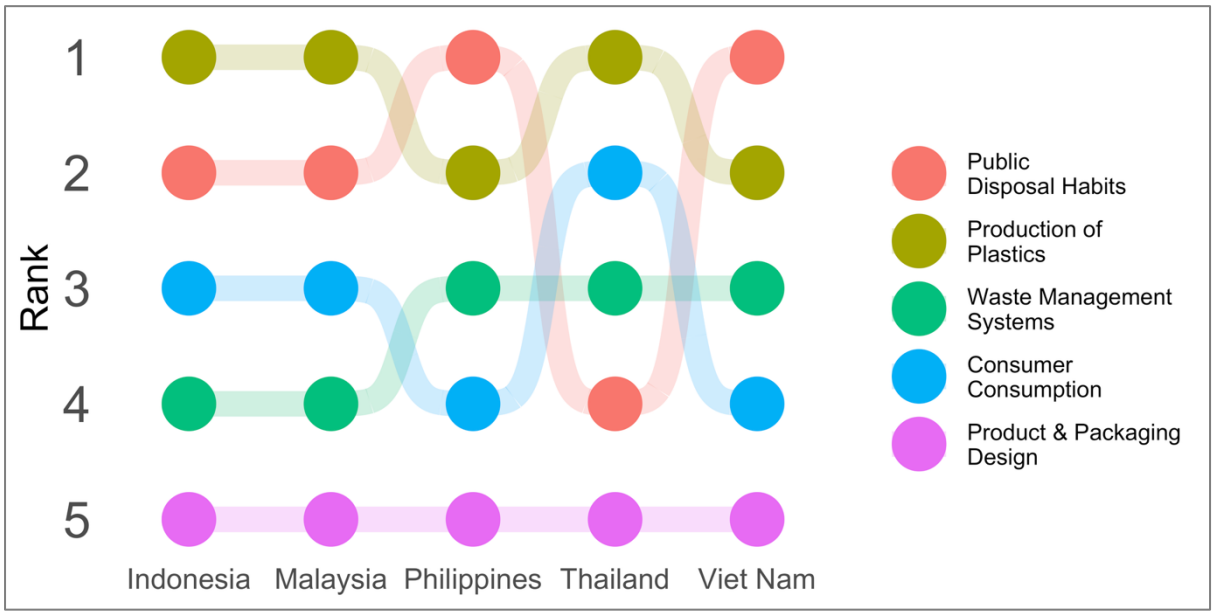
Respondents in Indonesia, Malaysia, and Thailand identify plastic production – particularly the manufacture of excessive amounts of virgin plastic and non-recyclable materials – as the leading cause of the plastic pollution crisis. In contrast, respondents

[4] More specifically, each item is described as:
1. Production of plastics: Manufacturers producing too many new (virgin) plastic, particularly for single-use items and non-recyclable materials.
2. Product and packaging design: Companies using excessive plastic packaging or designing products that are difficult to reuse or recycle.
3. Consumer consumption: High societal demand for and overconsumption of plastic goods, especially single-use plastic items.
4. Public disposal habits: Individuals and households incorrectly disposing of plastic, such as littering or not sorting waste properly for recycling.
5. Waste management systems: Inadequate systems and infrastructure to properly collect, sort, and process plastic waste after it has been discarded.

in the Philippines and Viet Nam rank public disposal behaviour, such as littering and improper waste sorting, as the primary cause. A notable outlier is Thailand, where public disposal habits are ranked significantly lower (fourth), compared to other nations.

The remaining causes – waste management systems (inadequate collection and sorting infrastructure), consumer consumption (high societal demand for single-use items), and product design (excessive or difficult-to-recycle packaging) – generally occupy the lower tiers of the ranking. Notably, product and packaging design (excessive or difficult-to-recycle packaging) is universally ranked as the least significant cause (fifth) in every country.

Figure 7.7. Cause of Plastic Pollution



Source: Created by the authors.

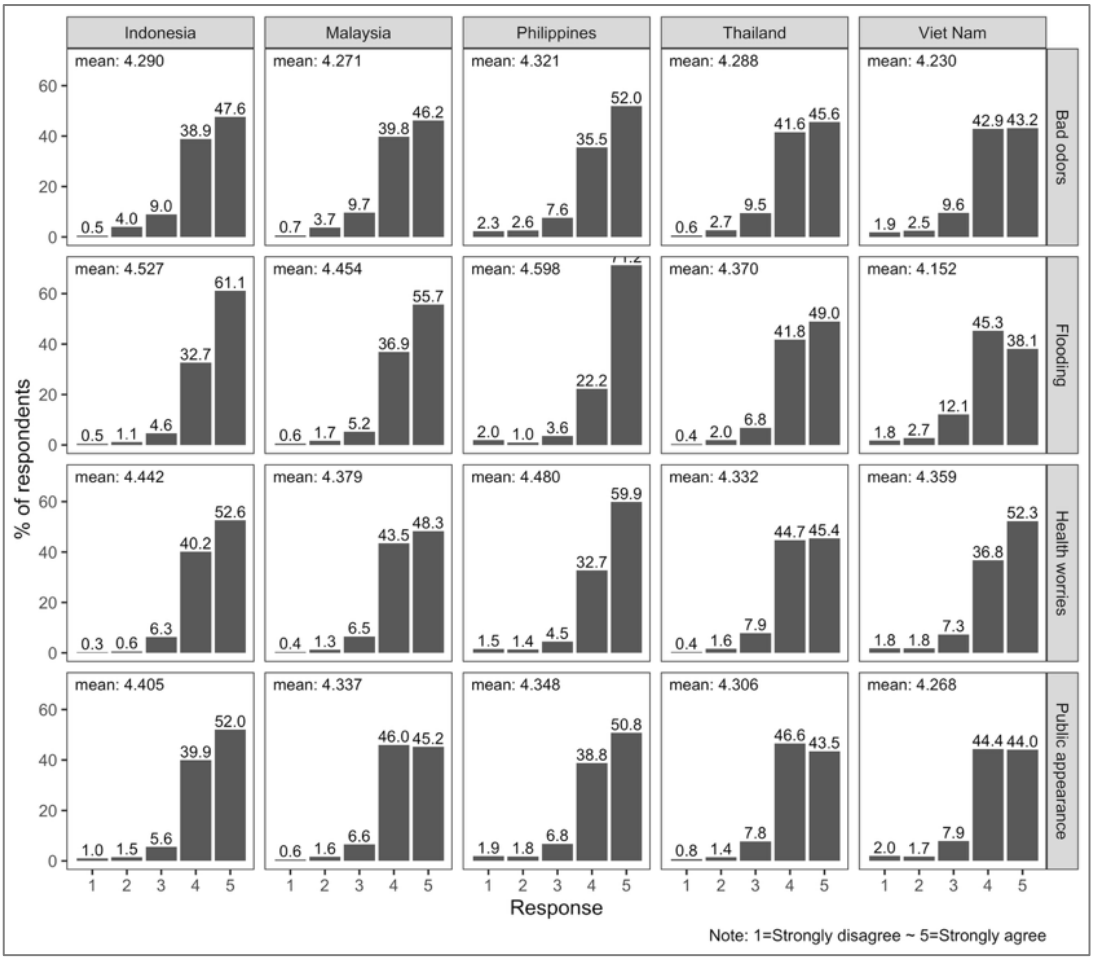
3.2.3. Perceived levels of exposure to plastic pollution

We also asked respondents' perceived level of exposure to plastic pollution within their local communities over the past year. Using a five-point Likert scale, from 1 (Strongly Disagree) to 5 (Strongly Agree), respondents indicated the extent to which plastic pollution affects their daily lives in their local communities across four dimensions: flooding, public appearance, bad odours, and health.[5] Figure 7.8 shows the comparison of the mean agreement scores across the four dimensions of pollution exposure. It

[5] More specifically, each item is described as:
1. Flooding: Plastic waste clogging drains, canals, or rivers has made flooding worse in my area.
2. Public appearance: Plastic litter spoils the appearance of my neighbourhood and public spaces (like parks or streets).
3. Bad odours: Dumped or uncollected plastic waste creates bad odours in my local community.
4. Health worries: I am worried about the potential health risks from plastics in my community (e.g., from burning waste or the presence of microplastics).

shows that a vast majority of respondents across all five countries perceive plastic pollution as a severe issue affecting their local communities, given that mean values for all items across countries are above 4.1. The Philippines and Indonesia consistently report the highest levels of exposure to all dimensions, compared to other countries. Amongst the four, flooding and health worries are regarded as the most intense in all five countries. Exposure to flooding is the most acute in the Philippines, followed by Indonesia and Malaysia. Health worries also show high mean values, particularly in the Philippines and Indonesia, followed by Malaysia.

Figure 7.8. Perceived Levels of Exposure to Plastic Pollution



Source: Created by the authors.

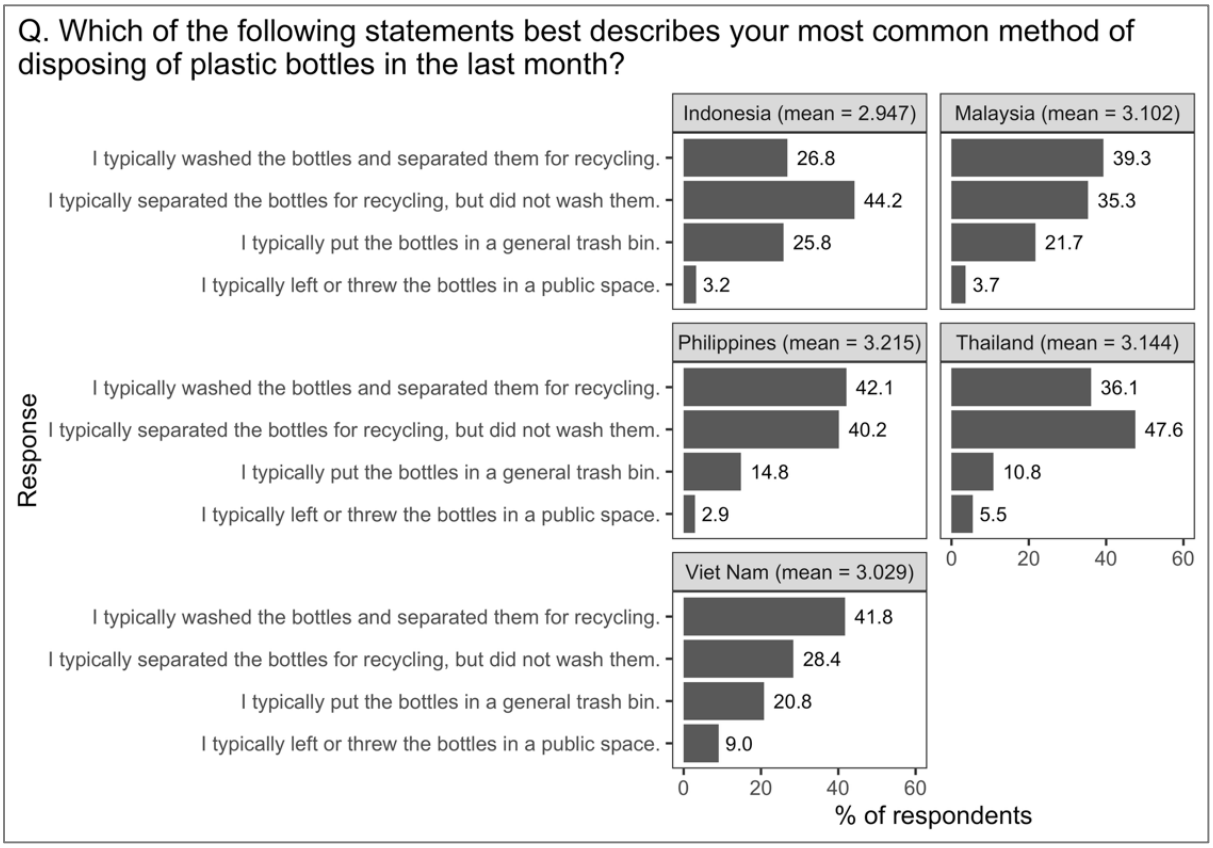
3.2.4. Plastic bottle disposal habits

Finally, the survey captured respondents' plastic bottle disposal behavior. We asked respondents to identify their most common method for disposing of plastic bottles, ranging from washing and separating for recycling to disposal in general trash or public spaces. A majority of respondents in all five countries reported some form of separation for recycling, although the level of effort varied. Amongst the five countries, the Philippines (42.1%), Viet Nam (41.8%), and Malaysia (39.3%) recorded the highest proportions of respondents reporting 'best practice' recycling behaviour, defined as

washing and separating plastic bottles before disposal. Separation without washing is the most common behaviour in Thailand (47.6%) and Indonesia (44.2%).

Meanwhile, a minority of the respondents still dispose of plastic bottles in ways that may contribute to littering. Disposal in general trash bins is most common in Indonesia (25.8%), followed by Malaysia (21.7%) and Viet Nam (20.8%). Fortunately, the reported rate of throwing plastic bottles in public spaces is consistently low across all five countries. Nevertheless, Viet Nam records the highest proportion of respondents reporting this behaviour (9.0%), followed by Thailand (5.5%).

Figure 7.9. Plastic Bottles Disposal Habits



Source: Created by the authors.

4. Discussion and Conclusion

Overall, this study provides a comprehensive overview of how consumers in Southeast Asia perceive and value different dimensions of EPR policy. We found that there are significant regional variations in public preferences for EPR policy design, specifically regarding how companies should be held financially responsible, how the policy should be enforced, and who should manage the collected funds. For instance, Indonesia and the Philippines show strong support for mandatory recycled content, while the deposit-refund system is a relatively unpreferred option. Meanwhile, Thailand and Viet Nam did

not express a clear preference for any particular policy approach. With respect to policy enforcement, respondents in both countries expressed reluctance towards top-down government mandates. In contrast, respondents in Indonesia, Malaysia, and the Philippines supported voluntary approaches only when these were accompanied by incentives. For the EPR fund management, Indonesia stands as an exception in its strong preference for PROs, whereas other nations show general indifference as long as the administration is centralised.

Despite these regional differences, we observe some general trends. One is the linear decrease in public support for EPR policies as the associated household costs increase. With this trend, Malaysia displays the highest sensitivity to these price signals, while Viet Nam appears the most resilient to higher costs, a sentiment potentially rooted in a localised sense of consumer responsibility. A positive finding for policymakers is the strong public preference for recycling-oriented, upstream and midstream activities over downstream waste management measures. Respondents expressed greater support for initiatives such as 'Use less plastic and promote recycled plastic, Build modern sorting and recycling facilities, and R&D for recycling or substitute technologies, over policies focused on Improve waste collection services or Clean up marine and terrestrial plastic pollution. This aligns with the public perception in most surveyed countries that the primary cause of plastic pollution is the excessive production of virgin and non-recyclable plastics, rather than waste management systems. These findings are notable given the shared view that constrained waste management infrastructure makes ASEAN a global hotspot for plastic pollution (OECD, 2025; World Bank, 2025). However, recyclable product design, an upstream approach, often considered the core part of EPR to boost the recycling rate, is universally ranked as the least significant cause of pollution and remains a low priority for fund allocation. This suggests a critical gap in public knowledge regarding how design improvements facilitate recycling, highlighting a need for government strategies to promote public awareness.

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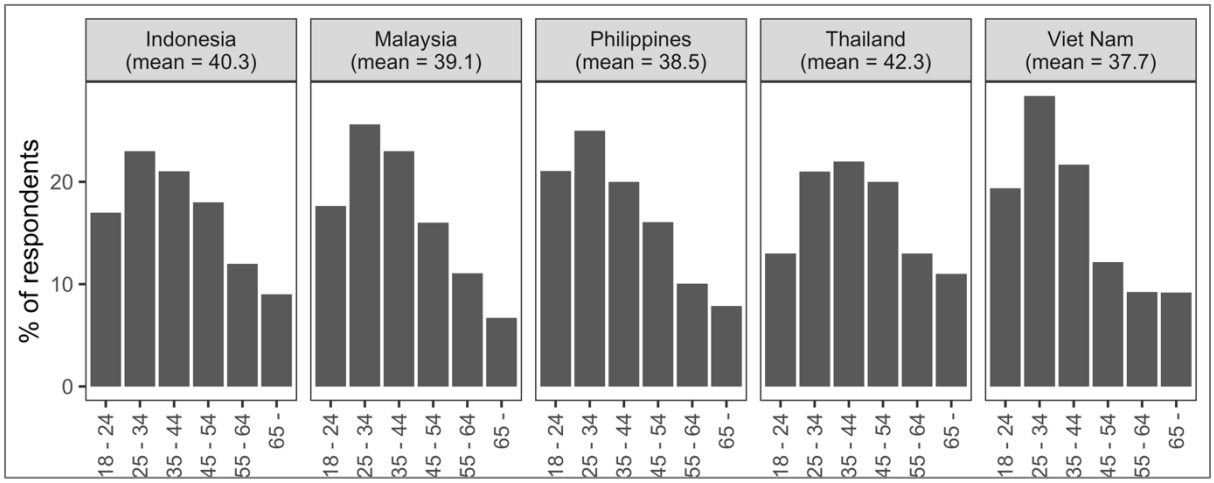
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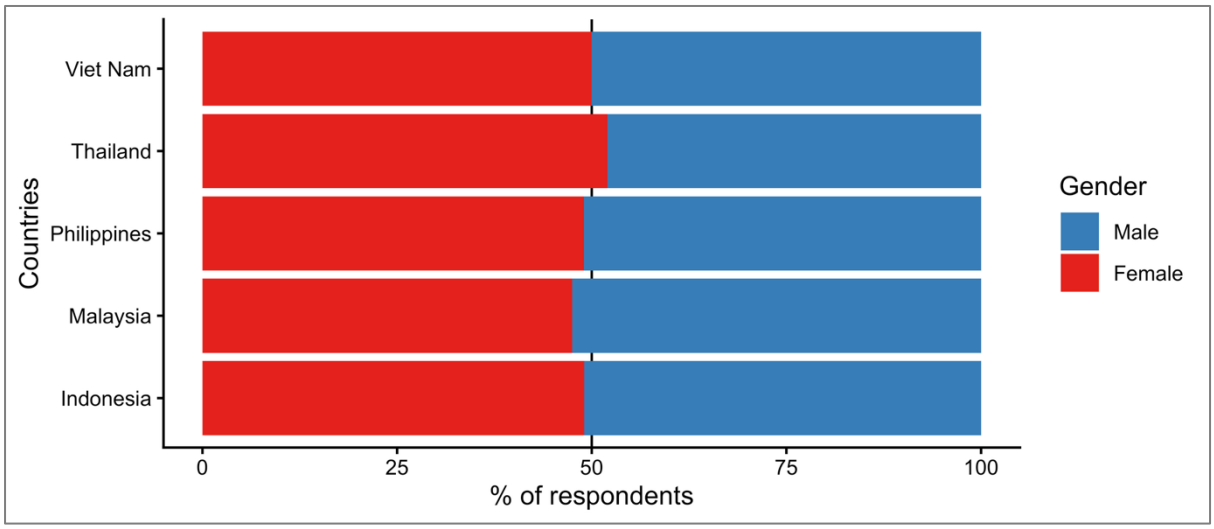
Appendix

Figure A1. Age



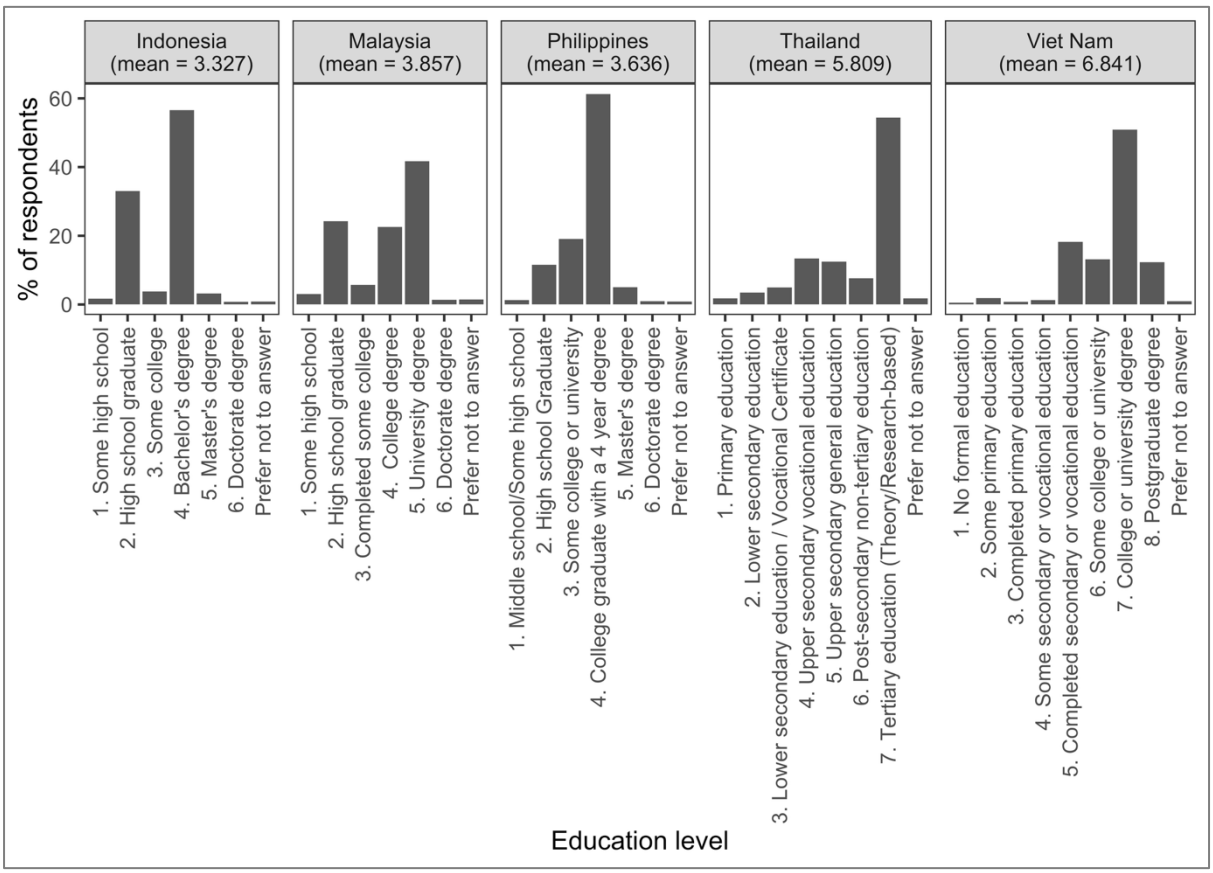
Source: Authors.

Figure A2. Gender



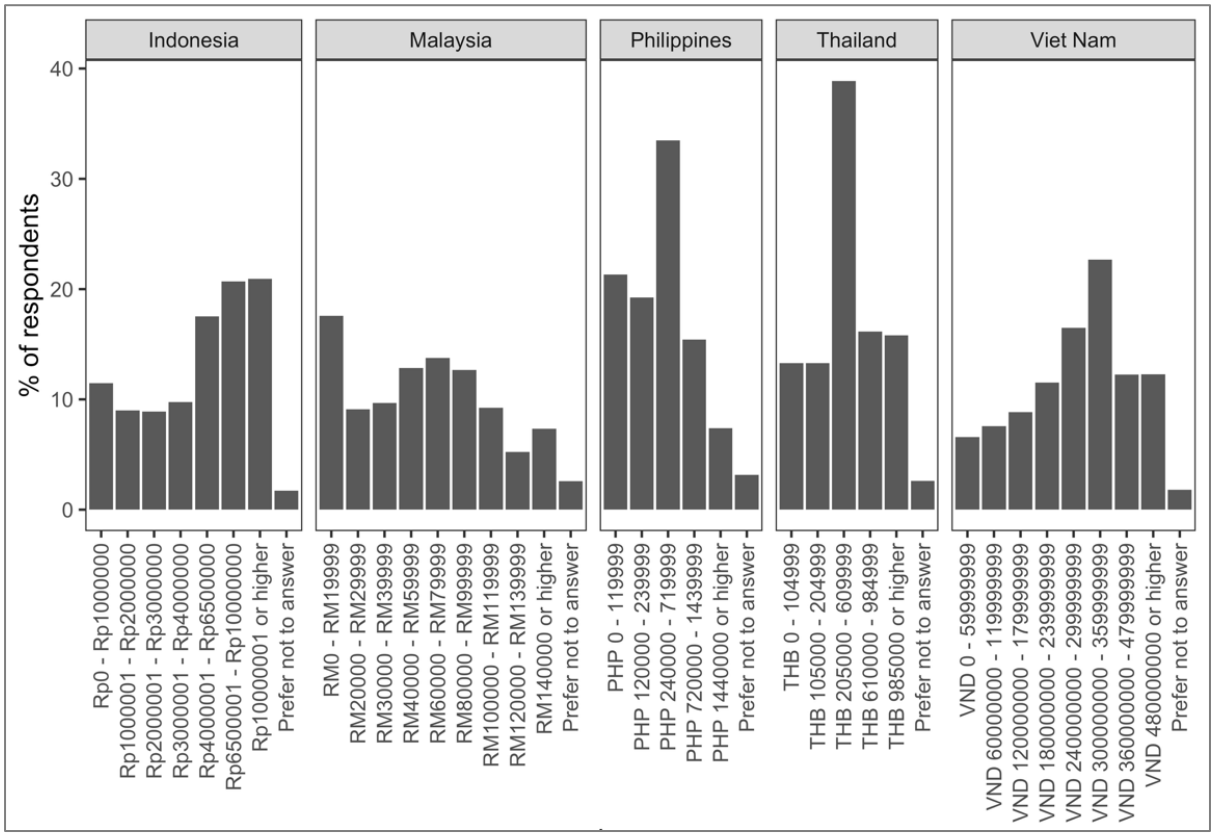
Source: Authors.

Figure A3. Education



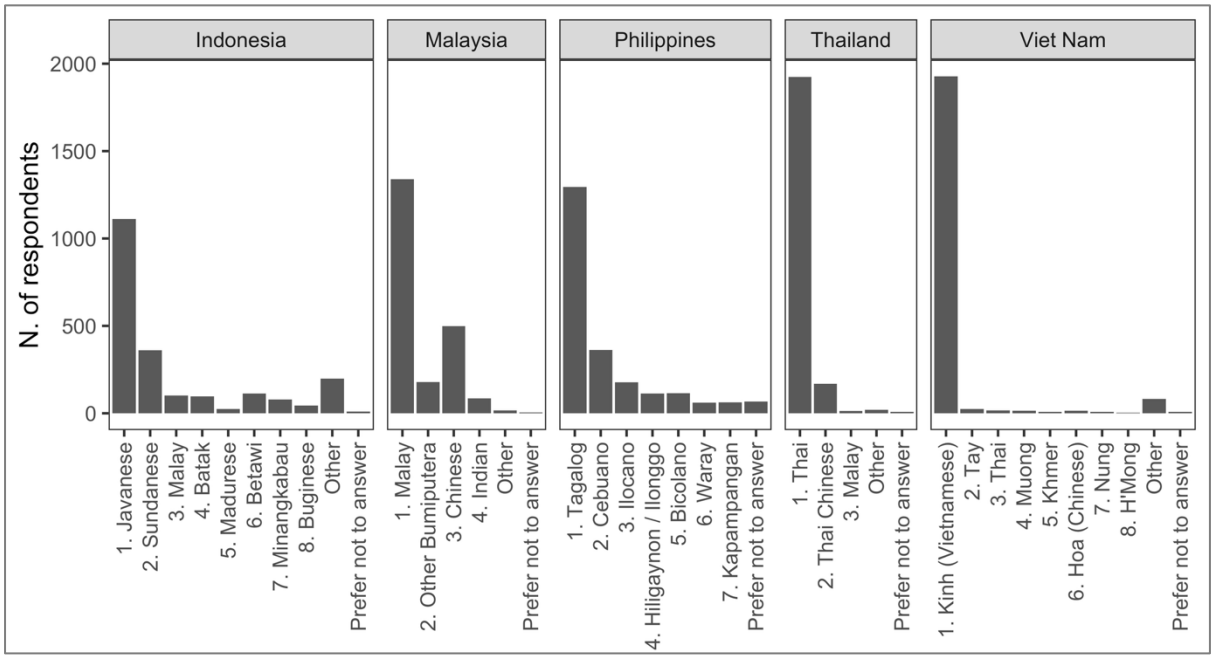
Note: The Malay rendering of category 4 college degree ("Ijazah kolej") denotes a college-level diploma rather than a university degree. Category 5 university degree ("Ijazah Sarjana") includes bachelor's as well as master's holders.
Source: Authors.

Figure A4. Income



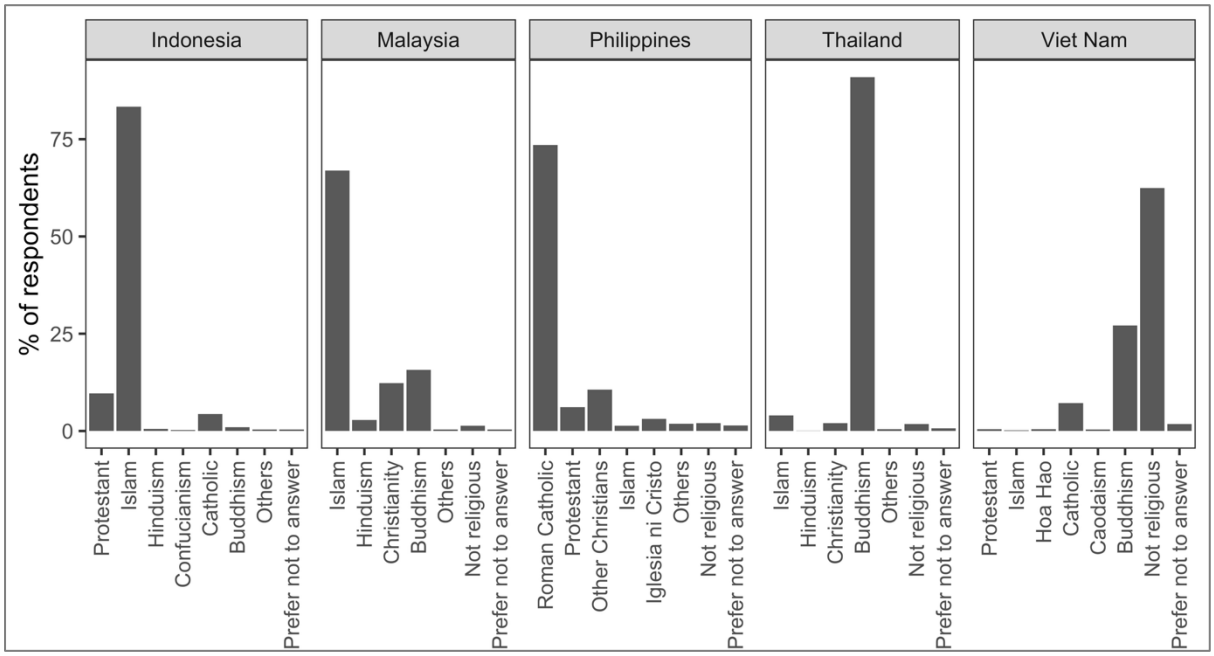
Note: Income brackets refer to monthly household income for Indonesia and to annual household income for Malaysia, the Philippines, Thailand, and Viet Nam.
Source: Authors.

Figure A5. Ethnicity/Race



Source: Authors.

Figure A6. Religion



Source: Authors.

Table A1. Region of Residence

Nation/Region	Number of Respondents	Percentage (%)
Indonesia		
Greater Jakarta	962	45.8%
Other Java	666	31.7%
Sumatra	270	12.9%
Kalimantan	77	3.7%
Sulawesi	67	3.2%
Nusa Tenggara	46	2.2%
Papua	9	0.4%
Maluku	4	0.2%
Malaysia		
Central	1,053	50.1%
East	408	19.4%
North	357	17.0%
South	282	13.4%
Philippines		
Metro Manila	891	42.4%
Central Luzon	491	23.4%

Nation/Region	Number of Respondents	Percentage (%)
Visayas	270	12.9%
Mindanao	264	12.6%
Northern Luzon	184	8.8%
Thailand		
Central	1,087	51.8%
Northeast	385	18.3%
North	303	14.4%
South	180	8.6%
East	145	6.9%
Viet Nam		
Southeast	840	40.0%
Red River Delta	664	31.6%
South Central Coast	206	9.8%
Mekong River Delta	157	7.5%
North Central Coast	84	4.0%
Northeast	63	3.0%
Central Highlands	50	2.4%
Northwest	36	1.7%

Source: Authors.