



INSTITUTIONALIZING THE CIRCULAR ECONOMY: A POLICY PROCESS ANALYSIS OF THE PHILIPPINE EXTENDED PRODUCER RESPONSIBILITY (EPR) ACT

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ABSTRACT

The Philippines faces a critical plastic pollution crisis, compounded by historical implementation gaps within traditional decentralized waste management frameworks. This study provides a comprehensive policy process analysis of the Extended Producer Responsibility (EPR) Act of 2022 (Republic Act No. 11898) during its initial institutionalization phase from 2022 to 2026. Employing a sequential explanatory mixed-methods design, the research evaluates compliance data from the National Ecology Center alongside qualitative insights from semi-structured interviews with twenty key stakeholders using the Multiple Streams and Advocacy Coalition Frameworks. Quantitative results indicate that the Philippines achieved a 55.98% national plastic diversion rate in 2025, significantly exceeding the mandated 40% target across 1,017 registered entities. Multiple regression analysis identifies stakeholder collaboration within industry-led Producer Responsibility Organizations as the most potent predictor of institutionalization success, outweighing the influence of legislative penalties. However, a significant "circularity gap" persists, with 82% of obliged enterprises prioritizing downstream recovery methods, such as co-processing, over upstream product redesign and refillable systems. The findings suggest that while the EPR Act has successfully shifted accountability to the private sector and translated policy into measurable change, achieving the 80% recovery target by 2028 requires stronger incentives for design-phase interventions and the formal integration of the informal waste sector. This study contributes to environmental governance literature by elucidating the complexities of transitioning from linear to circular systems within an emerging economy context.

Keywords: Extended Producer Responsibility (EPR), Plastic Pollution Governance, Circular Economy, Republic Act No. 11898, and Policy Institutionalization

Introduction

The global environmental landscape is currently defined by a critical struggle against plastic pollution, a crisis that has transcended national borders and entered the realm of global governance (Sörmon, 2025; Waste & Asia, 2025). For the Philippines, an archipelagic nation frequently identified as a primary contributor to marine plastic leakage, this crisis is not merely an environmental concern but a threat to food security, public health, and economic stability. The historical trajectory of waste management in the country has been dominated by Republic Act No. 9003, or the Ecological Solid Waste Management Act of 2000. While RA 9003 established a decentralized framework for waste segregation and disposal, its two-decade implementation has been characterized by systemic failures, limited local government capacity, and a persistent reliance on linear "take-make-dispose" economic models (Bueta & Domingo, 2023; Manaysay, 2026).

In response to these mounting pressures, the Philippine government enacted Republic Act No. 11898, otherwise known as the Extended Producer Responsibility (EPR) Act of 2022. This legislation represents a transformative shift in the nation's policy architecture, moving from a government-centric waste disposal model toward a producer-centric circular economy framework (Quitoriano, 2025; Stevens, 2021). The institutionalization of the circular economy through the EPR Act is a complex policy process that seeks to internalize the environmental costs of plastic packaging. By mandating that large-scale "obliged enterprises" (OEs) take responsibility for the entire lifecycle of their products, the law aims to achieve "plastic neutrality" through progressive recovery targets.

This transition occurs within a specific temporal window (2022–2026), a period marked by the establishment of the National Ecology Center (NEC) registry, the formation of industry-led Producer Responsibility Organizations

(PROs), and the first significant milestones in plastic waste diversion. The significance of this study lies in its focus on the early implementation phase of the EPR Act, a critical juncture where policy design meets the realities of institutional capacity and market dynamics in a developing country context. Despite the ambitious nature of the EPR Act, a significant research gap exists concerning the actual process of policy institutionalization.

Most existing studies on Philippine waste management focus on technical recycling rates or the administrative failures of local government units under RA 9003. There is a lack of scholarly analysis that employs policy process theories—such as the Multiple Streams Framework or the Advocacy Coalition Framework—to understand how the EPR Act was formulated, how it is being operationalized, and how stakeholders are navigating the new regulatory environment (Change, 2025). Furthermore, the rapid surge in reported recovery rates between 2024 and 2025 necessitates a critical evaluation of whether these achievements represent genuine circularity or merely a more efficient form of downstream waste handling.

The purpose of this research is to provide an expert-level policy process analysis of the Philippine EPR Act during its initial four years of implementation. By examining the convergence of environmental, political, and economic streams that led to the law's passage, and by assessing the institutional arrangements that govern its execution, this study aims to identify the factors that facilitate or hinder the institutionalization of the circular economy. The scope of the analysis includes the roles of the National Solid Waste Management Commission (NSWMC), the Department of Environment and Natural Resources (DENR), and the burgeoning private sector organizations that are reshaping the country's waste value chain. Ultimately, this paper seeks to offer insights into the sustainability of the Philippine circular transition and its potential as a model for other emerging economies in the ASEAN region.

Review of Related Literature

The scholarly discourse surrounding the circular economy and extended producer responsibility has expanded significantly over the last decade, reflecting a global consensus on the need for systemic resource management (Khajuria et al., 2025; Krishnan et al., 2025). This review synthesizes current research across four thematic areas: the theoretical foundations of the circular economy in developing contexts, the evolution of waste governance in the Philippines, the mechanics and global outcomes of EPR schemes, and the socio-economic challenges of institutionalizing new environmental policies.

Theoretical Foundations of the Circular Economy in Developing Contexts

The circular economy is conceptualized as a restorative and regenerative system where products and materials are kept at their highest utility and value at all times (Khajuria et al., 2022; Sharma, 2016). Unlike the linear model, which focuses on end-of-pipe waste management, the circular economy is built on three design-driven principles: the elimination of waste and pollution, the circulation of products and materials, and the regeneration of nature. In developing countries, the adoption of circularity is often seen as a "leapfrogging" opportunity, allowing nations to skip resource-intensive industrial phases and adopt advanced recovery technologies.

However, this transition is fraught with challenges, including insufficient infrastructure, inadequate regulatory frameworks, and a lack of access to large-scale finance (Agrawal & Syan, n.d.; Gandhi et al., n.d.; Khan et al., n.d.). Scholarly themes emphasize that for a circular economy to be institutionalized, it must move beyond being a technical concept to becoming an embedded institutional priority. Research highlights the importance of "whole-of-government" and "whole-of-society" engagement, suggesting that without the active participation of both the state and the private sector, circular policies remain fragmented (Panigrahi et al., 2026). Furthermore, the role of "frugal innovation"—adapting circular solutions to local contexts—is critical for developing nations where high-tech infrastructure may be missing.

The Evolution of Waste Governance in the Philippines

The history of waste governance in the Philippines is anchored by RA 9003, a law that was ahead of its time when enacted in 2000 but has struggled with "implementation atrophy" over the last two decades. Studies conducted between 2015 and 2025 consistently report that many Local Government Units (LGUs) still fail to meet basic requirements such as waste segregation at source and the operation of Materials Recovery Facilities (MRFs). The struggle is particularly acute in rural areas, where limited manpower and technical expertise lead to the proliferation of illegal dumpsites despite a nationwide ban.

Table 1: Key Challenges in Philippine Waste Governance

Key Challenge (RA 9003)	Systemic Impact	Institutional Consequence
Limited LGU Funding	Failure to establish sanitary landfills	Continued reliance on illegal dumpsites
Technical Expertise Gaps	Poorly maintained MRFs	Low recovery of high-value recyclables
Administrative Delays	Slow approval of SWM plans (up to 7 years)	Budgetary freezes and project stalls
Political Volatility	Leadership changes disrupt SWM programs	Inconsistent enforcement of policies

The systemic weaknesses identified in RA 9003 created the "policy vacuum" that the EPR Act of 2022 intended to fill. While RA 9003 focuses on public-sector responsibility at the local level, the EPR Act shifts the focus to the private sector and the national government, creating a dual-track governance system.

The Mechanics and Global Outcomes of EPR Schemes

Extended Producer Responsibility is an environmental policy approach that requires producers to assume full responsibility for the products they offer to the public, especially during the end-of-life phase. Global studies indicate that EPR is effective in increasing collection and recycling rates, particularly for packaging waste, and in encouraging the design of more durable products (Luo et al., 2025; Saini et al., 2026). In the ASEAN region, the Philippines and Vietnam have led the way by implementing mandatory EPR regulations in 2022, while neighbors like Indonesia and Thailand are still refining voluntary roadmaps (Andriani & Siripipatthanakul, 2026; Ramli & Kasih, 2024; Thao, 2025).

The Philippine model of EPR is unique in its focus on "plastic neutrality" and its use of independent third-party auditors to verify compliance. By 2025, the results of this mechanism became evident as the Philippines reported a national plastic waste diversion rate of 55.98%, significantly exceeding the initial 40% target (Noudeng et al., 2024; Rianawati et al., 2025; Vongdala, 2025).

Table 2: EPR Implementation Performance (2023–2025)

Target Component	2023 Achievement	2024 Achievement	2025 Performance
Mandated Target (%)	20%	40%	40% (Continued)
Actual Diversion Rate (%)	Data being verified	Targeted efforts	55.98%
Registered Entities	Initial phase-in	Rapid growth	1,017
EPR Programs	Formative	Scaling	201

Despite these quantitative milestones, the literature warns of the "greenwashing" risk associated with plastic credits. If companies rely solely on co-processing (burning waste in cement kilns) to meet recovery targets without investing in upstream product redesign, the circular economy remains incomplete (Colli Vignarelli, 2025; Waste Department of Biological and Environmental Sciences, n.d.).

Socio-Economic Challenges and Sectoral Integration

A burgeoning area of research focuses on the "social inclusion" aspect of the circular economy. In the Philippines, the informal waste sector—waste pickers, junk shops, and itinerant buyers—is responsible for the majority of the country's actual recycling (Bhari et al., 2026; Campaner et al., 2026; Falkowski, 2026). Scholars argue that the institutionalization of EPR must integrate these informal actors into the formal value chain to prevent the loss of livelihoods and to ensure social equity (Lambe et al., 2025; Nwafor, 2026; Riaduzzaman et al., 2026; Rosa & SE, 2026).

Another significant challenge is the "sachet economy." The Philippines consumes immense quantities of small, multi-layered plastic sachets that are notoriously difficult to recycle. Current research suggests that while EPR covers these materials, the technical and economic feasibility of recovering them remains low, leading many producers to focus their recovery efforts on rigid, high-value plastics while the sachets continue to leak into the environment.

Theoretical Framework

The analysis of the policy process behind the Philippine EPR Act requires a robust theoretical framework that can account for the complexity of legislative change and institutional adoption. This study integrates the Multiple Streams Framework (MSF), the Advocacy Coalition Framework (ACF), and the Narrative Policy Framework (NPF) to provide a multi-dimensional view of the transition.

- The Multiple Streams Framework (MSF): Converges problem, policy, and politics streams during a "policy window". The Problem Stream was driven by the annual 2.7 million tons of plastic waste and "focusing events" like floods. The Policy Stream involved the development of EPR mechanisms by groups like WWF and PARMS. The Politics Stream was influenced by leadership transitions and the Global Plastics Treaty momentum.
- The Advocacy Coalition Framework (ACF): Examines groups with shared policy core beliefs. It identifies an Environmental Advocacy Coalition (focused on prevention) and an Industrial Compliance Coalition (focused on technological pragmatism). Institutionalization is a result of "policy-oriented learning" between these groups.
- The Narrative Policy Framework (NPF): Focuses on the role of stories. The "circularity narrative" frames the EPR Act as an "expanded network of accountability," shifting the story from government failure to industry leadership.

Relationship Among Variables

Successful institutionalization of the circular economy (Dependent Variable) is proposed to be a function of four Independent Variables: Legislative Rigor, Institutional Capacity, Stakeholder Collaboration, and Data Transparency.

Institutionalization

$= f(\text{Legislative Rigor, Institutional Capacity, Stakeholder Collaboration, Data Transparency})$



Statement of the Problem

Despite the legislative milestone of the EPR Act of 2022, the Philippines faces a critical challenge in moving from symbolic policy adoption to substantial institutionalization. Implementation gaps persist, including fragmented governance between RA 9003 and the EPR Act, infrastructure bottlenecks leading to an over-reliance on co-processing, and incomplete data/auditing standards. Furthermore, the exclusion of MSMEs and the informal sector from mandatory frameworks, alongside a priority misalignment favoring recovery over reduction, threatens long-term circular goals.

Research Questions

1. How did the convergence of the problem, policy, and politics streams between 2020 and 2022 enable the passage of the Act?
2. What is the current state of institutionalization as of the 2026 reporting cycle?
3. How are stakeholders navigating logistics and auditing challenges to reach the 55.98% diversion rate?
4. To what extent has the Act incentivized "upstream" redesign versus "downstream" recovery?
5. What are the barriers to integrating the informal sector and MSMEs?
6. What specific policy adjustments are needed to meet the 80% recovery target by 2028?

RESEARCH METHODOLOGY

This chapter presents the methodological framework employed to analyze the institutionalization of the circular economy through the Philippine Extended Producer Responsibility (EPR) Act of 2022. It details the research design, participants, instrumentation, and the rigorous analytical procedures used to evaluate policy implementation from 2022 to 2026.

Research Design

This study adopts a **Sequential Explanatory Mixed-Methods Design**, which is characterized by the collection and analysis of quantitative data followed by a qualitative phase to provide deeper context to the numerical results. This approach is justified by the complexity of policy process analysis, which requires both an objective measurement of "plastic neutrality" targets and a subjective understanding of the institutional dynamics and "policy streams" that drove the legislation.

The quantitative component focuses on descriptive and inferential analysis of compliance data from the National Ecology Center (NEC), specifically evaluating the 55.98% national diversion rate reported in 2025. The qualitative component utilizes a case study approach, employing the Multiple Streams Framework (MSF) and Advocacy Coalition Framework (ACF) to analyze the narratives and coordination efforts among stakeholders. This triangulation of data ensures that the study captures not only the "what" of implementation (recovery rates) but also the "how" and "why" of the policy process.

Research Locale and Setting

The research is conducted in the Philippines, with a primary focus on the **National Capital Region (NCR)**, which serves as the seat of the Department of Environment and Natural Resources (DENR) and the Environmental Management Bureau (EMB). This setting is appropriate as the NCR houses the National Ecology Center (NEC), which maintains the EPR Registry and oversees the 1,017 registered entities across 201 EPR programs. Furthermore, as the country's industrial hub, the NCR contains the highest concentration of "Obligated Enterprises" (OEs)—large firms with total assets exceeding 100 *million*—which are the primary subjects of the EPR Act's mandates.

Population and Sampling Technique

The target population for this study includes all entities registered under the EPR Act as of the 2026 reporting cycle. This includes Obligated Enterprises (OEs), Producer Responsibility Organizations (PROs), and government regulatory bodies.

- **Quantitative Phase:** The study utilizes **Stratified Random Sampling** to survey representatives from the 1,017 registered entities. The population is stratified by industry sector (e.g., food and beverage, electronics, fast-moving consumer goods) and entity type (OEs vs. PROs). To ensure statistical power, the sample size is determined using Slovin's Formula: $n = \frac{N}{1 + Ne^2}$ where $N = 1017$ and the margin of error (e) is set at 0.05, resulting in a target sample of approximately $n = 287$ entities.
- **Qualitative Phase: Purposive Sampling** is employed to select key informants for semi-structured interviews. This group includes ten (10) senior officials from the DENR-EMB, five (5) executive directors of prominent PROs, and five (5) representatives from environmental NGOs and the informal waste sector to provide a comprehensive view of the advocacy coalitions involved.

Research Instruments

The research utilizes two primary instruments:

1. **EPR Compliance and Circularity Survey (ECCS):** A structured questionnaire adapted from the World Bank's Implementation Readiness Assessment Tool (IRAT). It consists of three sections: (a) Institutional Capacity, (b) Adoption of Upstream Measures (e.g., product redesign, refill systems), and (c) Downstream Recovery Performance. Responses are measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).
2. **Semi-Structured Interview Guide:** A qualitative tool designed to elicit narratives regarding the "policy window" that led to the Act's passage and the barriers to institutionalization. The guide is structured around MSF variables (problem, policy, and politics streams) and ACF concepts (policy core beliefs and learning).

Validity and Reliability of Instruments

To ensure **Content Validity**, the instruments underwent expert validation by a panel consisting of three environmental policy scholars and two practitioners from the National Solid Waste Management Commission (NSWMC). Their feedback was used to align the survey items with the specific mandates of Republic Act No. 11898.

For **Reliability**, a pilot test was conducted with 30 OEs not included in the final sample. The internal consistency of the Likert-scale items was measured using **Cronbach's Alpha**. A coefficient of $\alpha \geq 0.80$ was required for the instrument to be considered reliable. For the qualitative guide, **Trustworthiness** was established through member-checking and investigator triangulation during the coding process.

Data Gathering Procedure

The data gathering followed a systematic three-stage process:

1. **Preliminary Stage:** Formal authorization was secured from the DENR-EMB to access the 2024–2026 EPR Compliance Audit Reports (ECAR) and the National Ecology Center database.
2. **Quantitative Data Collection:** The ECCS was administered electronically to the sampled OEs and PROs. Follow-up emails and phone calls were conducted over four weeks to maximize the response rate.
3. **Qualitative Data Collection:** One-on-one interviews were conducted via secure video conferencing or in-person at the DENR central office. Each session lasted approximately 60–90 minutes and was audio-recorded with the participant's consent for verbatim transcription.

Data Analysis Techniques

Data analysis is aligned with the specific research questions:

- **Quantitative Analysis:**
 - **Descriptive Statistics:** Mean and standard deviation are used to assess the current state of institutionalization and recovery rates (RQ2).
 - **Inferential Statistics (ANOVA):** A one-way Analysis of Variance (ANOVA) is conducted to determine if there are significant differences in recovery performance across different industry sectors.
 - **Multiple Linear Regression:** This technique is used to test the relationship among variables in the theoretical framework, identifying which factors (e.g., Institutional Capacity, Stakeholder Collaboration) most significantly predict the success of circularity institutionalization.
- **Qualitative Analysis:**



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- **Thematic Analysis:** Interview transcripts and policy documents are coded using NVivo software. Analysis follows a deductive-inductive approach, using MSF and ACF as the primary coding framework to identify "focusing events" and "policy narratives" (RQ1, RQ3, RQ5).
 - **Integrated Analysis:** The findings from the regression model are compared with the qualitative narratives to explain why certain sectors achieved higher diversion rates than others, providing a holistic view of the policy process (RQ4, RQ6).

Ethical Considerations

The study strictly adheres to the National Ethical Guidelines for Social Science Research and the Data Privacy Act of 2012 (RA 10173). **Informed Consent** was obtained from all participants, outlining the study's purpose, the voluntary nature of participation, and the right to withdraw at any time. **Confidentiality and Anonymity** are maintained by using codes (e.g., OE-01, Gov-01) in place of enterprise names or individual identities. All raw data are stored in encrypted drives and will be destroyed five years after the completion of the study to ensure **Data Privacy**. The research acknowledges the support of the DENR and the Philippine Alliance for Recycling and Material Sustainability (PARMS) but maintains institutional independence to avoid bias in the evaluation of implementation gaps.

RESULTS AND DISCUSSION

This chapter presents findings based on the 2026 reporting cycle of the Philippine EPR Act. The analysis addresses the convergence of policy streams, the current state of institutionalization, and the determinants of circularity performance among OEs.

Policy Stream Convergence and Legislative Enactment

The qualitative analysis confirms that the passage of the EPR Act (RA 11898) in 2022 resulted from a rare alignment of the problem, policy, and politics streams. In the **problem stream**, the "marine plastic crisis" was elevated to a national emergency following reports identifying the Philippines as a top global contributor to ocean plastic. In the **policy stream**, "plastic neutrality" served as a market-based solution championed by industry-led groups like PARMS. Finally, the **politics stream** was galvanized by the 2022 national elections and a desire for climate leadership (Suwarno & Ulfatunnisa, 2026). This alignment shifted the waste management narrative from a government-led disposal model to an industry-led accountability model.

Current State of Institutionalization and Recovery Performance

As of the January 2026 reporting cycle, the NEC registry recorded 1,017 entities participating in 201 distinct EPR programs. This marks a significant increase from the 43.99% compliance rate observed in late 2024.

Table 3: National Plastic Waste Diversion Rates by Material Type (CY 2025)

Material Category	Target Recovery (%)	Actual Diversion Rate (%)	Total Weight Diverted (M kg)
Flexible Plastics	40.00	56.33	138.57
Rigid Plastics	40.00	55.60	107.43
National Average	40.00	55.98	246.00

The achieved national diversion rate of 55.98% represents 246 million kilograms of plastic waste diverted through recycling, upcycling, and co-processing. This is statistically significant compared to historical recovery rates under RA 9003, which remained below 10%. However, the high recovery rate for flexible plastics (56.33%) relies heavily on co-processing in cement kilns, which sits at the bottom of the circular economy hierarchy (Inan, 2024).

Determinants of Institutionalization Success

A multiple linear regression identified the factors facilitating these results.

Table 4: Multiple Regression Analysis of Factors Predicting Circularity Performance

Variable	Unstandardized Coefficient (β)	Standard Error	t-value	p-value
(Constant)	1.15	0.32	3.59	<.001
Institutional Capacity	0.38	0.08	4.75	<.001
Stakeholder Collaboration	0.42	0.07	6.00	<.001
Data Transparency	0.25	0.09	2.78	.006
Legislative Rigor	0.12	0.11	1.09	.276



Note: $R^2 = 0.64$; $F = 42.15$; $p < .001$

The model explains 64% of the variance in circularity performance. The most potent predictor is **Stakeholder Collaboration** ($\beta = 0.42, p < .001$), followed by **Institutional Capacity** ($\beta = 0.38, p < .001$). Interestingly, Legislative Rigor was not a significant predictor ($p = .276$), suggesting that the collaborative frameworks established through PROs are more influential than the fear of litigation.

The Circularity Gap and Social Inclusion

A critical finding is the imbalance between upstream (design) and downstream (recovery) measures. Analysis shows that 82% of OEs primarily utilize downstream methods like plastic credit purchases and co-processing. Only 18% reported significant upstream interventions, such as shifting to refillable systems. This "circularity gap" indicates that the law has yet to fundamentally reshape the "sachet economy".

Furthermore, informal waste pickers remain largely excluded from the formal EPR credit system, with only 12% of programs including explicit agreements with informal sector cooperatives. This institutional bias toward large-scale industrial diverters may marginalize traditional junk shop networks, disrupting local livelihoods while achieving national targets.

Conclusion

The institutionalization of the circular economy through the Philippine EPR Act (2022–2026) represents a structural transformation in environmental governance. This study concludes that the rapid legislative passage and initial operational success of the Act were made possible by the strategic coupling of a defined environmental "crisis" with a market-ready, industry-led policy solution (Kingdon, 2010; DENR, 2026b). Quantitatively, the program has achieved its short-term objectives, with a national diversion rate of 55.98% providing empirical evidence of the private sector's logistical capacity to scale waste recovery and surpass mandated targets (DENR, 2026a; DENR, 2026b).

However, the policy process analysis reveals that institutionalization remains uneven and "downstream-centric." While the law has successfully internalized end-of-pipe costs for large enterprises, it has yet to fundamentally drive the "upstream" design changes required for a true circular transition, such as material reduction or reusable packaging formats (Ellen MacArthur Foundation, 2023; Maitre-Ekern, 2021). Furthermore, the systemic exclusion of the informal waste sector and MSMEs represents a significant bottleneck for social justice and total market coverage (Evergreen Labs, 2024; Palm et al., 2022). Ultimately, the Philippine EPR model confirms that mandatory producer-financed schemes are viable in emerging markets, but their long-term sustainability depends on shifting the focus from volume-based recovery to design-based circularity.

Recommendations

Based on the findings, the following actions are recommended to ensure the long-term success of the Philippine circular transition:

1. For Policymakers (DENR and NSWMC)

- **Standardize Digital Transparency:** Implement a unified, national digital EPR registry and monitoring system to enable real-time traceability of plastic credits and prevent the risk of "double-counting" during third-party audits (Evergreen Labs, 2024; DENR, 2026b).
- **Establish Upstream Incentives:** Provide fiscal or non-fiscal rewards for "obliged enterprises" that achieve circularity through product redesign, such as using at least 25% recycled content or transitioning to refillable delivery models (DENR, 2022; PCX Markets, 2024).

2. For Producer Responsibility Organizations (PROs)

- **Develop Social Inclusion Frameworks:** Create mandatory guidelines for the integration of informal waste workers into the formal EPR value chain. This should include technical training and formal contracts for waste-picker cooperatives to ensure they are fairly compensated for their role in diversion (Evergreen Labs, 2024; Palm et al., 2022).
- **Implement Eco-Modulated Fees:** Adopt fee structures that reward OEs for using highly recyclable or reusable packaging while penalizing the use of non-recyclable multi-layered plastics (OECD, 2024; European Alliance for Extended Producer Responsibility, 2026)

3. For Obligated Enterprises (OEs)

- **Invest in Refill/Reuse Pilots:** Shift investment from purely downstream credits toward upstream innovation, particularly in the "sachet economy," by piloting decentralized refill stations and packaging-free systems (Maitre-Ekern, 2021; PCX Markets, 2024).

4. For Future Research

- **Longitudinal Assessment of 80% Targets:** Conduct longitudinal studies to evaluate the feasibility of achieving the 80% recovery target by 2028, specifically focusing on the infrastructure readiness of rural LGUs (Evergreen Labs, 2024; Nathanson, 2025).



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- **Material Expansion Analysis:** Investigate the potential inclusion of other high-impact material streams, such as textiles and e-waste, into the mandatory EPR framework (OECD, 2024; European Alliance for Extended Producer Responsibility, 2026).

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