

Legal and Economic Harmonization of Extended Producer Responsibility (EPR) as a Strategy for Sustainable Plastic Waste Management in Southeast Asia

Alfin Dwi Novemyanto

Faculty of Law, Universitas Gadjah Mada, Yogyakarta, Indonesia

ARTICLE INFO

Article history:

Received 10 October 2025

Revised 10 October 2025

Accepted 15 October 2025

Available online 20 October 2025

Kata Kunci:

Economic, Environmental, Extended Producer Responsibility (EPR), Legal

Keywords:

Economic, Environmental, Extended Producer Responsibility (EPR), Legal



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.
Copyright © 2023 by Author. Published by Yayasan Daarul Huda

ABSTRAK

Masalah sampah plastik di Asia Tenggara telah menjadi isu lingkungan global yang menimbulkan biaya ekonomi dan mengancam ekosistem laut. UNEP (2021) dan Bank Dunia (2021) mengidentifikasi Indonesia, Filipina, Vietnam, dan Thailand sebagai kontributor utama kebocoran plastik laut. Meskipun beberapa negara telah mengadopsi Tanggung Jawab Produsen yang Diperluas (EPR) dalam kebijakan nasional, implementasinya lemah dan kurangnya harmonisasi regional. Studi ini menggabungkan penelitian hukum normatif dengan analisis dampak ekonomi menggunakan kumpulan data internasional untuk mengidentifikasi kesenjangan regulasi dan mengevaluasi potensi manfaat EPR yang terharmonisasi di seluruh ASEAN. Hasil menunjukkan bahwa kerangka hukum yang terfragmentasi, kapasitas pemantauan yang terbatas, dan insentif ekonomi yang tidak memadai melemahkan efektivitas EPR. Pemodelan ekonomi memperkirakan kerugian tahunan melebihi USD 6 miliar akibat kebocoran plastik, dengan biaya yang ditanggung oleh masyarakat dan pemerintah. Analisis skenario menunjukkan bahwa standar hukum yang terharmonisasi dan internalisasi biaya melalui EPR dapat mengurangi kebocoran hingga 40% sekaligus menciptakan lapangan kerja di sektor ekonomi sirkular. Temuan ini menggarisbawahi bahwa

integrasi hukum-ekonomi sangat penting: aturan regional yang dapat ditegakkan, arus keuangan yang transparan, dan mekanisme yang didanai produsen yang didasarkan pada prinsip pencemar membayar sangat diperlukan. Studi ini merekomendasikan kerangka kerja ASEAN yang mengikat untuk EPR, pelaporan standar dan audit independen, serta instrumen keuangan campuran untuk menjembatani kesenjangan investasi dan mempercepat transisi menuju ekonomi plastik berkelanjutan.

ABSTRACT

The problem of plastic waste in Southeast Asia has become a global environmental issue that imposes economic costs and threatens marine ecosystems. UNEP (2021) and World Bank (2021) identify Indonesia, the Philippines, Vietnam, and Thailand as major contributors to marine plastic leakage. Although several countries have adopted Extended Producer Responsibility (EPR) in national policy, implementation is weak and lacks regional harmonization. This study combines normative legal research with economic impact analysis using international datasets to identify regulatory gaps and evaluate the potential benefits of harmonized EPR across ASEAN. Results indicate that fragmented legal frameworks, limited monitoring capacity, and insufficient economic incentives undermine EPR effectiveness. Economic modeling estimates annual losses exceeding USD 6 billion from plastic leakage, costs borne by communities and governments. Scenario analysis suggests that harmonized legal standards and cost-internalization via EPR could reduce leakage by up to 40% while generating employment in circular-economy sectors. The findings underscore that legal-economic integration is essential: enforceable regional rules, transparent financial flows, and producer-funded mechanisms grounded in the polluter-pays principle are needed. The study recommends an ASEAN binding framework for EPR, standardized reporting and independent audits, and blended-finance instruments to bridge investment gaps and accelerate the transition to sustainable plastic economy.

INTRODUCTION

Plastic waste management in Southeast Asia has reached a crisis point due to growth in consumption, rapid urbanization, and increased use of disposable products. According to the UN Environment Programme (UNEP), each year around 19-23 million tons of plastic leak into the global aquatic ecosystem, with the largest proportion of leaks coming from Southeast Asia's coastal areas and rivers, which are

*Corresponding author

E-mail addresses: alfindwinovemyanto@mail.ugm.ac.id

important habitats for biodiversity (1). This situation is exacerbated by limited end-of-life management infrastructure in developing countries, resulting in increasing volumes of waste without adequate treatment. The World Bank even projects a significant increase in global waste generation, adding to the fiscal and operational burden on governments. This problem creates an urgent need to find policy instruments that shift costs from the public to producers while promoting circular economy practices (2). Extended Producer Responsibility (EPR) then emerged as a policy mechanism that connects producers with the post-consumption phase of products. EPR has the potential to reduce the public burden, increase collection, and encourage more recycling-friendly product design (3). However, the success of its implementation is highly dependent on regulatory design and implementation capacity in each country.

The current situation shows fragmentation in EPR policies in Southeast Asia, where some countries have issued regulations on packaging, while others still rely on voluntary initiatives. ASEAN has adopted the Regional Action Plan on Marine Litter (2021-2025) as a coordinated measure, but national implementation still varies in scope and enforcement mechanisms. Differences in obligations, fee structures, and cross-border producer involvement create risks of regulatory arbitrage and market uncertainty (4). This creates a gap with the ideal situation, namely the need for a harmonized regional legal framework to prevent market distortions and ensure the sustainability of recycling financing. Without harmonization, multinational companies can exploit regulatory disparities to minimize compliance costs. As a result, countries with weak regulatory capacity bear greater environmental externalities costs. This study therefore places legal harmonization as a prerequisite for EPR economic instruments to function optimally. Harmonization is also expected to create a stable secondary materials market and reduce cross-border transaction costs.

OECD (Organization for Economic Co-operation and Development) data shows that EPR can generate significant funding flows for post-consumer management and increase recycling rates if designed with the right principles of accountability and economic incentives (5). However, recent reports from the OECD and World Bank confirm that infrastructure investment needs remain very high, particularly for shifting the system from end disposal to a circular economy. The main challenges in ASEAN lie not only in regulation, but also in initial financing, collection management, and integration of the informal sector, which has been the backbone of the management system. Legal and economic questions arise regarding fair EPR contribution mechanisms among producers and guarantees for the effective distribution of funds to infrastructure. EPR schemes must also be able to internalize negative externalities in the form of ecosystem damage and public health costs. Without proper design, moral hazard and free riding risks will undermine policy objectives. Therefore, the integration of legal and economic instruments is absolutely necessary to address the complexity of this issue.

A literature review shows that most studies on EPR in Southeast Asia are still descriptive and limited to the national context, so cross-country analysis with a legal-economic perspective is still rare. This research gap is mainly related to the evaluation of the effectiveness of regional harmonization on recycling indicators and the public fiscal burden. The novelty of this research is the development of an analytical framework that combines principal-agent, governance, and public policy economics theories to assess the impact of legal harmonization on EPR economic incentives. With data support from the OECD, World Bank, UNEP, and ASEAN RAPMALI, this study will model the costs and benefits of harmonization on investment, secondary material markets, and plastic leakage reduction. The goal is to formulate policy recommendations for harmonizing the legal aspects and economic mechanisms of EPR in Southeast Asia. The academic benefit of this research is to enrich the integrative law-economics literature, while the practical benefit is to provide a blueprint for ASEAN, national regulators, and industry. The final outcome is expected to be technical recommendations on fee structures, cross-border compliance mechanisms, and feasible financing options to close the funding gap.

RESEARCH METHODS

Research Design

This study uses a normative legal approach combined with public policy economic analysis. The normative legal approach is used to examine the national and regional legal frameworks related to EPR in plastic waste management in Southeast Asian countries. The analysis is conducted through a document study of national legislation, international agreements, and ASEAN regional policies. Meanwhile, the public policy economic approach is used to assess the effectiveness of EPR instruments in terms of costs, benefits, and burden distribution among actors (producers, consumers, and the government). The combination of these two approaches was chosen to provide a holistic picture of the relationship between the legal framework and economic incentives in the implementation of EPR.

Data Collection

Research data was collected from two main sources, namely secondary legal data and secondary economic data. Legal data was obtained from official government documents, national regulations in ASEAN member countries, and ASEAN policy documents such as the ASEAN Regional Action Plan for Combating Marine Debris (2021-2025). Economic data was taken from credible international institutions such as the World Bank, OECD, UNEP, and ASEAN Secretariat, which provide information on plastic waste volume, management costs, and the economic impact of plastic leakage on the fisheries, health, and tourism sectors. To ensure accuracy, only data from official sources with the most recent publication year (2018-2025) was used.

Legal Analysis Method

Legal analysis was conducted using the statutory approach and comparative approach. The statutory approach was carried out by examining the conformity of applicable legal norms at the national level with international principles on EPR, particularly those adopted in OECD and UNEP practices. Meanwhile, the comparative approach was conducted by comparing EPR regulations among ASEAN countries to identify substantive differences, weaknesses in harmonization, and the potential for regulatory arbitrage. The results of the analysis were used to identify the legal gap between *das sein* (the actual condition of the regulations) and *das sollen* (the ideal condition expected based on international standards).

Economic Assessment

The economic analysis was conducted using the Cost-Benefit Analysis (CBA) and Extended Cost-Effectiveness Analysis (ECEA) frameworks. CBA was used to assess the comparison between the costs of implementing the EPR scheme (producer fees, infrastructure investment, monitoring costs) and the economic benefits obtained (increased recycling, public cost savings, job creation, and the market value of secondary materials) (6). ECEA is used to analyze the distribution of benefits and burdens among actors, including the informal sector, which plays an important role in plastic waste collection in Southeast Asia. Using this method, research can evaluate the extent to which harmonization of EPR at the regional level can reduce negative externalities and improve fiscal sustainability.

Analytical Framework

The research analysis framework integrates principal-agent theory to explain the relationship between the government (principal) and producers (agents) in the implementation of EPR, as well as regulatory governance theory to assess institutional capacity in supporting cross-border policy harmonization. The analysis also uses the concept of circular economy as the basis for sustainability evaluation, with key indicators being the reduction of plastic leakage, increased recycling rates, and resource use efficiency. This framework allows for the integration of normative legal analysis with quantitative economic analysis, enabling the research results to provide more applicable policy recommendations.

Research Limitations

The limitations of this study lie in the uneven availability of quantitative data across ASEAN countries, particularly regarding the actual costs of EPR implementation and the contribution of the informal sector to plastic waste management. Furthermore, this study focuses on legal and economic aspects, and therefore does not discuss in depth the technical and managerial aspects of waste management. However, these limitations do not diminish the validity of the results, as the study emphasizes policy design, regulatory harmonization, and economic evaluation of EPR implementation.

RESULTS AND DISCUSSIONS

Current Status of Plastic Waste in Southeast Asia

Southeast Asia is now recognized as one of the epicenters of the global plastic waste problem, contributing significantly to global marine pollution. According to a UNEP report (2021), around 11 million tons of plastic enter the oceans every year, with ASEAN countries contributing nearly a quarter of that total. Indonesia, the Philippines, Vietnam, and Thailand are listed as four of the ten largest contributors to global plastic leakage into the sea (7). This situation is mainly caused by the high use of single-use plastics, an unintegrated waste management system, and limited recycling infrastructure capacity. As a result, most plastics end up in open landfills or leak into rivers and oceans. This challenge is exacerbated by weak enforcement of waste management laws, which renders regulations ineffective. Thus, the current situation shows that Southeast Asia faces a significant burden in reducing the environmental impact of single-use plastics.

More specifically, Indonesia produces more than 3.2 million tons of mismanaged plastic waste each year, with an estimated 1.3 million tons leaking into the ocean. (8). The Philippines is even more concerning, with an estimated 35% of its plastic waste not being properly managed, potentially polluting marine ecosystems directly (9). Meanwhile, Vietnam and Thailand also face similar problems with high volumes of

plastic leakage, especially in densely populated coastal areas. These high figures reveal a huge gap between massive plastic production and the available management systems. The absence of a clear producer responsibility mechanism means that the burden of waste management costs is borne more by the government and the community. This situation creates a heavy economic burden and worsens the quality of the environment.

In addition to plastic production and consumption factors, institutional structures in Southeast Asia are also contributing to the slow pace of waste management system improvements. Most ASEAN countries still rely on the informal sector for waste collection and sorting, which, although effective on a certain scale, lacks adequate regulatory support and social protection. According to the regulatory governance framework, weak cross-sectoral coordination makes it difficult to implement EPR policies consistently. Producers tend not to feel obligated to finance recycling because regulations are lax and oversight mechanisms are weak. As a result, the circular economy, which should be able to turn plastic waste into an economic resource, remains only a policy discussion. This situation creates a serious gap between *das sein* (the actual condition) and *das sollen* (the ideal condition).

The implications of this situation are far-reaching, both legally and economically. From a legal perspective, the weak implementation of EPR means that the country has failed to uphold the polluter pays principle, which is an international norm in environmental governance. From an economic perspective, plastic leakage causes negative externalities worth billions of dollars per year due to damage to the tourism, fisheries, and public health sectors. According to World Bank calculations, the economic cost of plastic waste in Southeast Asia reaches around USD 6 billion per year, a figure that reflects the urgency of systemic change (10). Thus, the current status of plastic waste management in Southeast Asia shows an emergency situation that requires harmonization of EPR policies at the regional level. This step will be an important starting point to strengthen the effectiveness of the law while promoting economic efficiency in overcoming the plastic crisis.

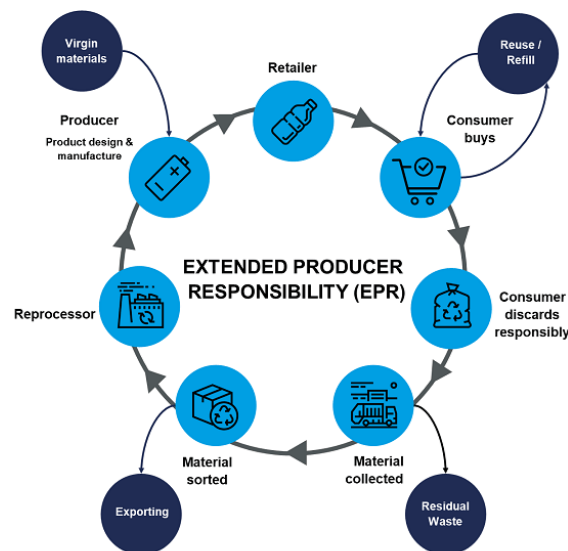


Fig. 1. Extended Producer Responsibility (EPR) cycle framework (11).

Legal Framework Analysis of EPR in ASEAN

EPR has become an effective legal instrument globally in reducing the burden on governments in waste management, especially in developed countries. The OECD, in its official 2016 guidelines, emphasizes that EPR places producers as the party fully responsible for recycling, collection, and final management of plastic products. However, in Southeast Asia, the implementation of EPR is still partial and limited to sectoral policies that are not yet binding across the board. For example, regulations in Indonesia and Thailand are still in the form of roadmaps without strong legal instruments in the form of producer fees. This is in contrast to Japan, South Korea, and Germany, which already have official management bodies or Producer Responsibility Organizations (PROs) to ensure effective implementation. This fundamental difference creates a regulatory gap between global standards and practices in ASEAN.

Indonesia began adopting EPR through Minister of Environment and Forestry Regulation No. 75 of 2019, which requires producers to prepare a waste reduction roadmap. However, this regulation places more emphasis on long-term targets and has not yet established a strict sanction mechanism for producers who do not comply. On the other hand, Vietnam's Law on Environmental Protection (2020) has included EPR with the obligation for producers to fund the recycling process through the Recycling Fund. Meanwhile,

Thailand has integrated EPR into its Plastic Waste Management Roadmap 2018-2030, but the mechanism is still voluntary. With these differences, it is clear that ASEAN does not yet have uniform laws that can serve as regional standards. This results in the effectiveness of EPR depending on each country, so there is no collective force to pressure multinational producers operating across borders.

One of the main obstacles to the implementation of EPR in ASEAN is the weak enforcement of laws and financial transparency. Most regulations only require producers to submit reports or roadmaps without any independent audit mechanisms. In addition, there is no official levy system in the form of producer fees allocated to a special fund to finance recycling infrastructure. According to regulatory governance theory, the success of a regulation is largely determined by oversight mechanisms, transparency, and the capacity of implementing agencies. Without these elements, regulations remain mere paper laws with no real impact in the field. This situation highlights a serious gap between the ideal (*das sollen*) as stipulated in legal documents and the reality (*das sein*) in practical implementation. Regional legal harmonization through the ASEAN framework is essential to address this issue.

Harmonization of EPR laws in ASEAN is also important to avoid regulatory arbitrage, where producers choose to operate in countries with the weakest regulations to avoid additional costs. In the context of the open ASEAN market, regulatory inconsistencies can create competitive unfairness between local and multinational producers. Therefore, the implementation of EPR should be harmonized through regional legal instruments, such as a special protocol in the ASEAN Agreement on Transboundary Haze Pollution or other collective policy models. If successful, this will not only strengthen the legal position of ASEAN countries in dealing with global producers, but also provide clarity for investors in the recycling sector. Thus, legal harmonization is not only an environmental necessity, but also a strategic instrument to strengthen the economic competitiveness of the region.

Table 1. Comparison of EPR Regulations in ASEAN and OECD.

Country / Organization	EPR Regulatory Status	Financial Mechanism	Enforcement Strength
Indonesia	Roadmap (2019)	Voluntary	Weak
Vietnam	Environmental Law (2020)	Recycling Fund	Moderate
Thailand	Roadmap (2018-2030)	Voluntary	Weak
OECD (Germany, Japan, Korea)	Mandatory EPR since the 1990s	PROs & Producer Fees	Strong

a. Economic Burden of Plastic Pollution

Plastic waste not only causes environmental problems, but also poses a significant economic burden on Southeast Asian countries. A World Bank report (2021) states that the economic losses due to plastic leakage in this region reach more than USD 6 billion annually. This figure includes losses in the tourism, fisheries, and public health sectors, as well as the loss of potential materials that could have been recycled. This fact shows that the economic burden of plastic waste is borne more by the community and the state than by producers. This situation contradicts the polluter pays principle, which should be the basis of EPR policy.

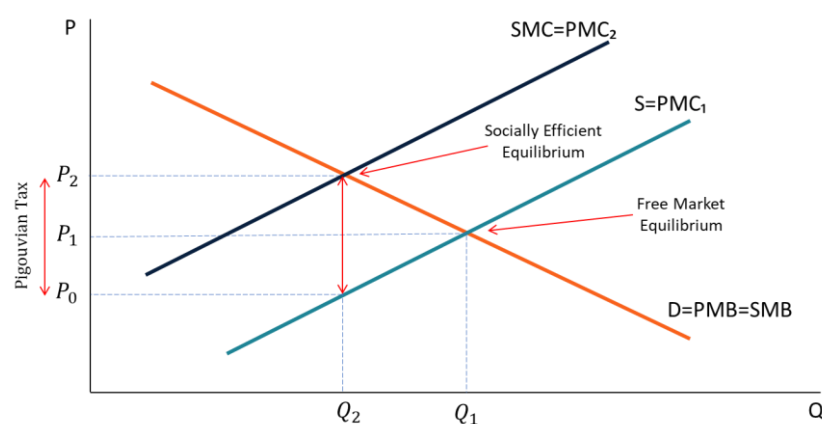


Fig. 2. The standard pigouvian tax (12).

From an environmental economics perspective, plastic waste is categorized as a negative externality, which is a social cost that is not reflected in the market price of plastic products. Producers and consumers benefit from the use of plastic, but the costs of pollution are borne by third parties, namely the community and the government. According to Pigouvian Tax theory (as shown in Figure 2), the burden of such externalities should be transferred back to producers through tax instruments or environmental fees. However, without an EPR mechanism, these costs remain outside the market system. As a result, plastic products remain cheap on the market, while the long-term losses are borne by the public. EPR serves to internalize these external costs so that the price of plastic products reflects the costs of post-consumption management. In other words, the implementation of EPR is not only a legal policy but also an economic instrument to correct market failures.

One of the most prominent issues is the low rate of plastic recycling in Southeast Asia. The average recycling rate in this region is only around 10-15%, far below the OECD standard of 40-50% (13). Low recycling rates are caused by a lack of economic incentives, weak EPR financing mechanisms, and the dominance of the informal sector, which operates without regulatory support. As a result, the economic opportunities offered by the secondary materials market cannot be fully exploited. In fact, the transition to a circular economy in Southeast Asia has the potential to create millions of new green jobs. In other words, the failure to develop an EPR system not only causes environmental damage, but also hinders the creation of new sustainable economic value. This confirms that the economic burden of plastic waste can actually be turned into an opportunity if managed properly.

The urgency of implementing EPR in Southeast Asia can also be seen from the fiscal burden borne by countries in waste management. Most of the waste management budget comes from public funds, while producers do not contribute significantly to the cost of processing their products after use. According to UNEP estimates (2021), without policy intervention, the global cost of plastic waste management will triple by 2040, with most of the burden falling on developing countries (14). If ASEAN is able to implement an effective EPR mechanism, part of this fiscal burden can be shifted to producers through fees and financial responsibility schemes. In addition, the implementation of EPR can also create economic incentives for the private sector to invest in recycling and environmentally friendly material innovation. Therefore, EPR harmonization will not only reduce economic losses due to plastic, but also strengthen the fiscal resilience of ASEAN countries in the long term.

b. Theoretical Implications and Policy Recommendations

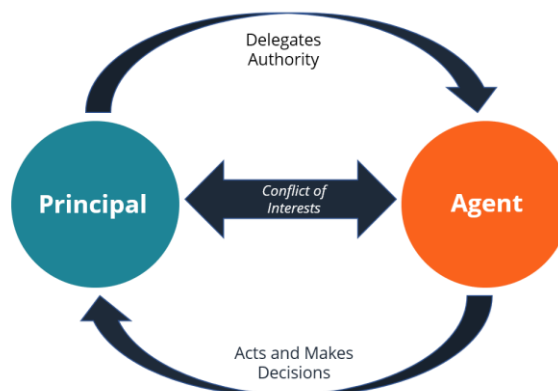


Fig. 3. The standard pigouvian tax (15).

The implementation of EPR in Southeast Asia has important theoretical implications for understanding the relationship between the state, producers, and society. Based on principal-agent theory (as shown in Figure 3), the government acts as the principal that sets the rules, while producers become agents that must comply with waste management obligations. However, in many ASEAN countries, this relationship is disrupted by weak supervision and incentives, causing producers to neglect their responsibilities. This situation reveals a serious agency problem, where the principal's interests are not fully carried out by the agent. In addition, regulatory governance theory emphasizes that the success of regulations depends on institutional capacity, transparency, and cross-sector coordination. Weak governance in ASEAN indicates the need for institutional reform to support the effectiveness of the law. These theoretical implications reinforce the view that the success of EPR cannot be understood solely from a legal perspective, but also from an institutional and regulatory governance perspective.

From an economic theory perspective, the implementation of EPR is a form of internalization of negative externalities as explained by the Pigouvian Tax concept. Plastic waste as an externality incurs

social costs that are not reflected in product prices, so it is necessary to impose additional burdens on producers so that prices reflect real costs. In practice, EPR can be implemented through producer fees, cross-subsidies, or mandatory investment in recycling facilities. This encourages producers to reduce the use of single-use plastics, innovate in environmentally friendly materials, and improve product design to make them easier to recycle. This theory emphasizes that economic instruments are key to encouraging producers to move towards a circular economy. Without coercive economic mechanisms, legal regulations often remain mere formalities. Therefore, a combination of legal and economic instruments is the most effective approach to implementing EPR.

The policy implication that can be drawn is the importance of harmonizing EPR laws at the ASEAN regional level to avoid regulatory fragmentation. This harmonization can be achieved through the development of an ASEAN Regional Framework on EPR, similar to the existing ASEAN Regional Action Plan for Combating Marine Debris (2021-2025). This regional framework needs to regulate minimum standards, including producer contribution obligations, financial transparency, and cross-border monitoring mechanisms. In addition, the establishment of Producer Responsibility Organizations (PROs) at the ASEAN level can be a solution to ensure that funds from producers are used effectively for recycling. Countries with stronger institutional capacity can serve as models for other countries, thereby creating policy convergence in the region. With this kind of harmonization, ASEAN will have a stronger bargaining position vis-à-vis multinational producers. This policy can also reduce the risk of regulatory arbitrage, which has been undermining the effectiveness of national laws.

In addition to legal harmonization, policy recommendations also include integrating EPR with circular economy strategies. Governments need to create fiscal incentives for producers who adopt environmentally friendly product designs, for example through tax reductions or research and development subsidies. On the other hand, there needs to be clear disincentives in the form of fines or high financial burdens for producers who fail to meet their EPR obligations. The integration of the informal sector into the formal system is also important, as informal workers make a significant contribution to plastic collection in Southeast Asia. The informal sector can become an important partner in creating green jobs if it is given social protection and access to EPR mechanisms. Thus, the ideal policy recommendation is a combination of strong legal regulations, fair economic mechanisms, and social empowerment. This approach will ensure that EPR truly functions as a sustainable strategy to overcome the plastic waste crisis in Southeast Asia.

CONCLUSIONS

Legal and economic harmonization of EPR is an urgent strategy for Southeast Asia in facing the increasingly complex plastic waste crisis. Analysis of the current status shows a heavy environmental and economic burden due to weak regulations and fragmentation of policies between countries, while analysis of the legal framework confirms the need for convergence of norms to avoid regulatory arbitrage and ensure producer compliance. From an economic perspective, research confirms that plastic leakage creates negative externalities worth billions of dollars per year, so that the implementation of EPR serves as an instrument to internalize these social costs into the price of plastic products. Theoretical implications confirm that EPR can only be successful if legal and economic instruments work synergistically within a strong governance framework. Therefore, this research offers novelty by filling the gap in cross-country legal and economic analysis and provides practical contributions in the form of policy recommendations for EPR harmonization in ASEAN. This harmonization is expected to strengthen legal effectiveness, reduce the fiscal burden on countries, increase recycling rates, and create new economic opportunities within the circular economy framework.

REFERENCES

1. Muhammad S, Muhammad A, Muhammad A, Muhammad S. International perspective on aquatic plastic pollution. *The Journal of Research Review*. 2025;2(2):252–64.
2. Awino FB, Apitz SE. Solid waste management in the context of the waste hierarchy and circular economy frameworks: An international critical review. *Integrated Environmental Assessment and Management*. 2024 Jan 1;20(1):9–35.
3. Pramianti SK. Post-consumer plastic waste management strategy: A study of producer responsibility implementation. *Waste, Society and Sustainability*. 2025;2(1):1–19.
4. Tran Thang Long, Chung LHA. Tackling Marine Litter: Mediterranean Regional Cooperation Platform and Experience for ASEAN. *LPSS Journal*. 2022 Jun 9;1(1):3–18.
5. Brown A, Laubinger F, Börkey P. New Aspects of EPR: Extending producer responsibility to additional product groups and challenges throughout the product lifecycle [Internet]. 2023 Nov [cited 2025 Sep 19]. (OECD Environment Working Papers; vol. 225). Report No.: 225. Available from:

- https://www.oecd.org/en/publications/new-aspects-of-epr-extending-producer-responsibility-to-additional-product-groups-and-challenges-throughout-the-product-lifecycle_cfdc1bdc-en.html
6. Steijger D, Chatterjee C, Groot W, Pavlova M. Challenges and Limitations in Distributional Cost-Effectiveness Analysis: A Systematic Literature Review. *IJERPH*. 2022 Dec 28;20(1):1–14.
 7. Ng CH, Mistoh MA, Teo SH, Galassi A, Ibrahim A, Sipaut CS, et al. Plastic waste and microplastic issues in Southeast Asia. *Front Environ Sci*. 2023 Apr 7;11:1–15.
 8. World Bank. Plastic Waste Discharges from Rivers and Coastlines in Indonesia [Internet]. Washington DC: World Bank; 2021 [cited 2025 Sep 19]. Available from: <https://hdl.handle.net/10986/35607>
 9. Borongan G, NaRanong A. Practical Challenges and Opportunities for Marine Plastic Litter Reduction in Manila: A Structural Equation Modeling. *Sustainability*. 2022 May 18;14(10):1–30.
 10. Finnegan AMD, Gouramanis C. Projected plastic waste loss scenarios between 2000 and 2030 into the largest freshwater-lake system in Southeast Asia. *Sci Rep*. 2021 Feb 16;11(1):1–12.
 11. ePS Packaging. Extended Producer Responsibility (EPR) in the packaging industry [Internet]. ePS Packaging. 2025 [cited 2025 Sep 19]. Available from: <https://epackagingsw.com/blog/extended-producer-responsibility-in-packaging>
 12. Corporate Finance Institute. Pigouvian tax [Internet]. Corporate Finance Institute. 2025 [cited 2025 Sep 19]. Available from: <https://corporatefinanceinstitute.com/resources/economics/pigouvian-tax/>
 13. Goh SL, Yap KS, Neo ERK, Koo CW, Madhavan U, Suwandi NA, et al. Life cycle assessment of plastic waste end-of-life scenarios in South and South East Asia. *Waste Management*. 2025 Jun;200:1–11.
 14. Sheriff SS, Yusuf AA, Akiyode OO, Hallie EF, Odoma S, Yambasu RA, et al. A comprehensive review on exposure to toxins and health risks from plastic waste: Challenges, mitigation measures, and policy interventions. *Waste Management Bulletin*. 2025 Sep;3(3):1–19.
 15. Corporate Finance Institute. Principal-Agent Problem [Internet]. Corporate Finance Institute. 2025 [cited 2025 Sep 19]. Available from: <https://corporatefinanceinstitute.com/resources/economics/principal-agent-problem/>