

Policy Brief

Enhancing Plastic Reuse and Recycling with a Full Life-Cycle Approach

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Key Messages:

- ASEAN countries continue to face significant challenges in scaling plastic reuse and recycling initiatives, despite these being prioritised in their National Action Plans to tackle marine debris.
- To effectively scale up reuse and recycling, ASEAN countries should assess and implement strategies at each stage of the plastic life cycle, embracing a full life-cycle approach.
- Achieving practical results in reuse and recycling requires dedicated technical, logistical, and financial support to build a robust circular plastics economy.

Plastic pollution poses both environmental and economic challenges for Southeast Asia, underscoring the urgent need for a transition to a circular plastics economy driven by reuse and recycling strategies. Although AMS have incorporated these strategies within their National Action Plans, they are struggling to achieve the scale necessary to counteract rising plastic waste. This policy brief identifies key barriers hindering the growth of plastic reuse and recycling initiatives in the region and provides targeted recommendations based on a full life-cycle approach. By adopting this approach, AMS can maximise the economic potential associated with effective plastic waste management and pollution mitigation.

Plastic Pollution and ASEAN's Strategic Response

Plastic pollution has become a critical environmental threat, severely impacting ecosystems and causing substantial economic losses worldwide. In the Asia-Pacific Economic Cooperation region alone, declines in marine ecosystem services due to plastic pollution are estimated to cost US\$10.8 billion annually (McIlgorm et al., 2022). The problem largely stems from an accelerating increase in plastic production and consumption, coupled with inadequate waste management practices (Kumar et al., 2021). This has entrenched a linear economic model, where resources are extracted, processed, consumed, and ultimately discarded, often ending up in landfills or the environment. To address this, transitioning to a circular economy that reintroduces plastic products back into the economy – preventing them from becoming waste – presents a sustainable solution to plastic pollution (Burke et al., 2021).

In a circular economy, resource recovery and regeneration focus on reuse and recycling. Reuse involves reusing items with minimal modification, while recycling involves breaking down materials to repurpose them (ERIA, 2024). For plastics, two primary recycling approaches exist: mechanical recycling, where plastic waste is reprocessed into raw materials, and chemical recycling, which breaks plastics down into basic monomers for further use (Ragaert et al., 2017). These strategies not only offer environmental benefits but also present profitable business opportunities; a 2021 World Bank study estimates that missed opportunities in plastic recycling in Malaysia, the Philippines, and Thailand amount to about US\$6 billion annually.

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To address plastic pollution, nearly all ASEAN Member States (AMS) have incorporated reuse and recycling strategies into their National Action Plans (NAPs). For instance, Viet Nam's 2020 NAP for Marine Plastic Litter Management encourages vigorous recycling and reuse initiatives by organisations and individuals. At the regional level, AMS have committed to advancing 3R approaches (reduce, reuse, recycle) to improve resource efficiency through the 2019 Bangkok Declaration on Combating Marine Debris.

However, achieving the necessary scale to significantly reduce plastic pollution in ASEAN remains challenging. This is reflected in the limited waste collection coverage and relatively low plastic recycling rates in several Southeast Asian nations, as shown in Table 1. Overcoming these barriers will require enhanced regional efforts, investments, and innovations to support and expand effective reuse and recycling systems across ASEAN.

Table 1: National Waste Collection Coverage and Plastic Recycling Rates in Several ASEAN Member States

Member State	Waste Collection Coverage		Plastic Recycling Rate	
	(%)	Year	(%)	Year
Indonesia	69	2020	10	2020
Malaysia	80	2020	24*	2019
Philippines	55	2021	28*	2019
Singapore	100	2023	6	2023
Thailand	70	2021	18*	2018
Viet Nam	75	2018	33*	2019

* Key plastic resin.

Source: ERIA (2024); Global Recycling (n.d.); JICA (2018); National Environment Agency (n.d.); Siahaan (2023); Siddharta (2022); The Incubation Network (2021); UN-Habitat (2022).

To tackle these challenges, this policy brief aims to identify the key barriers hindering progress in strengthening reuse and recycling within the region. It examines the current approaches outlined in AMS' National Action Plans (NAPs) and assesses their progress in advancing these strategies. Based on this analysis, the brief provides recommendations for AMS to capitalise on economic opportunities linked to addressing plastic pollution while enhancing reuse and recycling systems across the region.

Adopting a Full Life-cycle Approach to Plastics

The United Nations Environment Programme (UNEP, 2022) proposed a framework to address plastic pollution, categorising the plastic life cycle into three main stages:

- 1. Upstream:** Production of plastic polymers
- 2. Midstream:** Plastic product design, manufacture, distribution, use, and reuse

3. Downstream:

Plastic waste management, disposal, and treatment

To effectively strengthen reuse and recycling systems, it is crucial to focus on midstream and downstream interventions where these processes are most relevant. However, successful implementation across the full life cycle requires supportive measures at each stage, as these stages form an interconnected system. For example, reuse systems are ineffective if products are not designed to be reusable, and recycling efforts are limited without accessible waste management services.

A full life-cycle approach provides a comprehensive framework to evaluate the impact of an action at each stage of a product's journey (UNEP, 2021). This method offers several benefits, especially for industrial activities related to plastic products:

- 1. Targeted Intervention:** By examining each life cycle stage, stakeholders can identify necessary modifications, ensuring responsibility – and environmental accountability – is shared across the product's entire life span.
- 2. Resource Optimisation:** This approach maximises the capacity of each stage to lower resource consumption and boost overall product performance.
- 3. Balanced Policy:** The life-cycle perspective allows policymakers to balance trade-offs, helping to avoid shifting environmental impacts from one stage to another.

A practical example of this approach in ASEAN is the adoption of colorless PET bottles by beverage

companies like Coca-Cola Europacific Partners Indonesia (Nugroho, 2023). This shift simplifies recycling and increases the value of recyclable materials, incentivising waste collection and enhancing recycling, especially amongst informal waste sectors.

Beyond circular product design, additional policy interventions throughout the life cycle are critical for advancing reuse and recycling. Insights from the ASEAN Conference on Combating Plastic Pollution 2023 led to six recommended interventions, addressing each life-cycle stage, and are detailed in Table 2. These recommendations include regulatory and technical measures to strengthen ASEAN's reuse and recycling systems.

Table 2: Policy Recommendations to Boost Reuse and Recycling across the Plastic Life Cycle

Life Cycle Stage	Policy Recommendations	
Upstream	1	Promote the use of recycled plastic pellets
	2	Establish product and packaging standards for plastics reuse and recycling
Midstream	3	Build systems and infrastructure to phase out single-use plastics
	4	Enhance waste collection for recycling
Downstream	5	Strengthen support for the informal waste sector
	6	Harmonise regional and international trade in plastics

Source: Summarised from ERIA (2024).

Several AMS have already adopted aspects of these interventions in their NAPs. By the third quarter of 2024, six AMS had launched and implemented NAPs aimed at combating plastic pollution. Evaluating these NAPs shows varying levels of integration for the recommended initiatives. As Table 3 indicates, Malaysia, the Philippines, and Thailand have fully integrated all six recommended policies, customising them to fit their national contexts. Meanwhile, Indonesia, Singapore, and Viet Nam have incorporated three, two, and two of these policies, respectively.

Incomplete initiatives at any stage of the plastic life cycle can impede effective plastic reuse and recycling. For instance, without increased demand for recycled plastic pellets through upstream interventions, the recycling industry may lack incentives to grow and scale up. This could, in turn, reduce plastic waste collection due to limited demand for recyclables. Thus, a comprehensive approach to the plastic value chain is essential, enabling AMS to devise strategies that support scaling reuse and recycling markets.

Table 3: Circular Economy Interventions in the National Action Plans of ASEAN Countries

Country	Upstream	Midstream		Downstream		
	1: Recycled plastic	2: Product standards	3: Phase out SUP	4: Waste collection	5: Informal waste	6: Trade in plastics
Indonesia	Increase the use of plastic waste as additives for construction	Develop Indonesian National Standard for degradable and recyclable plastic products	-	Provide waste management facilities including for 3R and recycling centres	-	-
Malaysia	Develop and promote product criteria to stimulate the market for secondary raw materials	Develop and promote product sustainability and circularity criteria	Phase out bioplastics, reduce unnecessary SUP, and transition into reuse and circular economy	Engage value chain stakeholders to establish enabling mechanisms or infrastructure to increase waste recovery	Establish informal sector networks where they become regular partners in pilot projects	Develop and implement strategies to combat marine litter, including minimising the importation of plastic waste
Philippines	Develop mandatory minimum requirements for use of materials with recycled content	Promote research and enhance product or packaging redesign for improved reusability and recyclability	Study, develop, and promote the use of sustainable packaging and other business models, including refill systems	Support Local Government Units' efforts on segregated collection, materials recovery and processing	Integrate the informal waste sector as stakeholders in recycling system	Collect information on Philippine import and export data on waste or recyclables
Singapore	-	-	Implement campaigns to encourage the public to bring reusable food containers; Publish 3R guidebooks	Control waste collection and disposal; Establish an integrated solid waste management system	-	-
Thailand	Promote the use of packaging with Post-Consumer Recycled contents amongst brand owners	Set up criteria and standards for plastic products, and scale up to mandatory standards	Expand refill stations; Amend rules to support the operations of refill stations	Improve the efficiency of plastic waste collection systems	Conduct capacity building for informal sectors and waste buyers	Control the import of plastic scraps from abroad

Country	Upstream	Midstream		Downstream		
	1: Recycled plastic	2: Product standards	3: Phase out SUP	4: Waste collection	5: Informal waste	6: Trade in plastics
Viet Nam	-	-	Encourage organisations and individuals to recycle, reuse, and develop circular economy and green growth	Develop and complete systems for the collection, classification, transfer, and processing of plastic waste in urban and coastal areas	-	-

SUP = single-use plastic, 3R = reduce, reuse, recycle.

Source: Summarised from National Action Plans.

Reducing Technical, Logistical, and Financial Challenges

Despite efforts to incorporate reuse and recycling actions in NAPs, scaling these systems poses multiple challenges. First, contamination of recyclable plastic with non-recyclable materials or harmful chemicals during waste collection complicates and increases the cost of recycling, requiring additional sorting or decontamination. This contamination also reduces the quality of recycled material, making it challenging for recyclers to meet market standards. These issues often stem from low public awareness of proper waste management, inadequate segregation practices, and unsustainable plastic product designs.

Second, limited waste collection coverage restricts the supply of plastics for recycling. Among the six AMS listed in Table 1, all have achieved over 50% waste collection coverage nationwide, but significant disparities exist between rural and urban areas. In Viet Nam, for instance, waste collection coverage ranges from 40% in remote regions to 95% in metropolitan areas like Hanoi (Global Recycling, n.d.). This challenge is exacerbated by the region's varied geography – from mountainous terrains to archipelagos – creating logistical and transport challenges for waste collection, reuse, and recycling systems.

Finally, addressing these technical and logistical challenges is costly. An estimated US\$1 trillion investment is needed annually to reduce global mismanaged plastic volumes by 90% by 2040 relative to 2019 levels (The Circulate Initiative, 2024). While economies of scale may eventually reduce

costs for waste collection and management, the systems for plastic circularity in the region have not yet reached the necessary scale or efficiency. Thus, AMS face high financial demands to establish and operate these systems, which is particularly difficult in an already capital-intensive and underfunded waste sector.

Establishing an enabling ecosystem for reuse and recycling is essential to overcome these technical, logistical, and financial barriers. This could include non-policy interventions, such as technical assistance for the recycling industry, logistical support for product transport, or legislative and financial instruments to support circular business growth. A more detailed overview of the instruments needed to strengthen the reuse and recycling industry in Southeast Asia is provided in the report from the ASEAN Conference on Combating Plastic Pollution 2023.

Policy Recommendations

The following recommendations can be integrated into future action plans or relevant legislative frameworks as governments work to advance reuse, recycling, and strengthen efforts against plastic pollution:

1. Adopt a Full Life Cycle Approach in Policy Instruments

With the upcoming international legally binding instrument on plastic pollution and the impending conclusion of current NAPs, governments should consider embedding a full life cycle approach into

their policymaking. This can be achieved by explicitly incorporating the term 'full life cycle approach' in national policy documents and conducting Material Flow Analyses (MFAs) and Life Cycle Assessments (LCAs) of the national plastic value chain. MFAs, LCAs, and other evidence-based tools can help identify critical intervention points where policies can be developed to effectively tackle plastic pollution.

2. Enhance Technical, Logistical, and Financial Support for a Circular Plastics Economy

While policy interventions lay the foundation for advancing reuse and recycling, their implementation often encounters technical, logistical, and financial barriers. To address these, governments should consider strengthening non-policy interventions, such as offering technical assistance, logistical support, and financial mechanisms to key stakeholders across the plastic value chain. This support would help create an enabling environment for a circular plastics economy, ensuring that policy objectives translate into tangible outcomes on the ground.

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