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*Review Research Paper*

# Transborder Trade in Plastic Waste and Environmental Concerns: A Case Study from Thailand

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**Abstract:** Thailand has ratified the Basel Convention and is adhering to its restrictions on the importation of plastic scrap. The Thai government has enforced limitations to decrease the influx of plastic scrap imports, thereby protecting the ecosystem. However, Thailand has emerged as a prominent global hub for the export of plastic waste due to its tax-free zone plastic recycling programs and China's ban on such imports in 2018. Thailand's importation of plastic waste for recycling has caused worries due to the accumulation of plastic garbage in the environment. Plastic can be found in seafood, drinking water, rivers, sediments, and wastewater treatment facilities. Thailand is becoming more cautious about importing plastic scraps for recycling due to concerns over the health hazards associated with contaminated plastic. The importation of plastic can significantly impact those engaged in the collection and trade of plastic scrap. Consequently, there are discrepancies in both company operations and plastic management. The ban on plastic scrap imports in Thailand set for 2025 is expected to reduce environmental and human health issues; however, it may also impact the plastic recycling industries and economies both regionally and globally. To address the issue of plastic waste infiltrating the global environment, all nations need to work together at both regional and global levels to establish effective plastic waste management practices, avoiding the practice of transferring plastic waste to other countries.

## 1. INTRODUCTION

The OECD Conference on Improving Plastics Management: Trends, Policy Responses, and the Role of International Cooperation and Trade (OECD 2018) highlighted that the manufacture and disposal of plastics have had a detrimental environmental impact, including substantial greenhouse gas emissions. The reason for this is that the production of plastics entails the conversion of oil or natural gas into the monomers that constitute polymers. The utilization of fossil fuel-derived materials in manufacturing plastics constitutes around 4-8% of the overall output of oil and gas. Improper handling of plastic leads to environmental pollution, while burning plastic emits $CO_2$ and other greenhouse gases. Furthermore, it leads to a simultaneous increase in plastic consumption and the need for end-of-life waste management. Between 1950 and 2015, almost 6.3 billion tons of plastic waste were produced. Out of this, only 9% was recycled, and 12% was incinerated, leaving nearly 80% to accumulate in landfills or be in a state of combustion (Geyer et al. 2017). The seas experience the most significant plastic pollution globally, which has a detrimental impact on ecosystem health and the long-term viability of fisheries and impacts on coastal tourism. According to the UTS Institute for Sustainable Futures and

Asia Pacific Waste Consultants, China, Vietnam, Indonesia, the Philippines, and Thailand are major contributors to plastic pollution in the ocean, both domestically and through imports (Retamal et al. 2020). Furthermore, according to a 2023 World Economic Forum research study, Southeast Asia, including the Philippines, Malaysia, Indonesia, Myanmar, Vietnam, and Thailand, are the top polluting countries that dump plastic waste into the ocean (World Economic Forum 2023). Polyethylene's limited biodegradability has raised significant environmental concerns (Yoezer et al. 2023).

Additionally, the presence of plastics in seafood may also pose a threat to human health. This raised concern over the bioaccumulation of contaminants in the food chain. Tap water and bottled water in several countries are contaminated with microplastics. Plastic contamination has also affected sea salt. The plastics that accumulate in the natural environment will undergo degradation over several centuries or even millennia. According to the OECD's findings in 2022 (OECD 2022) and 2023 (OECD 2023), the life cycle of plastics resulted in the release of 1.8 Gt $CO_2$ eq. This accounted for approximately 3.7% of global greenhouse gas (GHG) emissions in 2019. If new regulations are not adopted, the emissions will double by 2060, reaching 4.3 Gt $CO_2$ eq, equivalent to 4.5% of global GHG emissions. Kittithammavong et al. (2023) reported that Thai individuals discard plastics at the end of their useful lives, resulting in 0.15 kg $CO_2$ eq emissions per household daily, contributing to climate change.

Asia accounted for 74% of global plastic waste imports in 2016, with Mainland China being the largest importer until 2017, importing between 5.8 to 8.3 million metric tons. Simultaneously, China's prohibition on plastic trash imports decreased import levels to 52 kt in 2018. Exports from major exporting nations, including Hong Kong (China), the United States, Japan, and Germany, have declined. Similarly, exports from Vietnam, Malaysia, and other countries have also witnessed a fall. From 2016 to 2018, there was a notable surge in the importation of plastic waste in Asia. Asian countries responded to this dilemma by implementing stringent restrictions on the importing of plastic waste from other countries (Liang et al. 2021).

The methodology of this study entails the collection of data from various sources at both international and national levels concerning the management of plastic waste imports and environmental challenges. This encompasses an understanding of the regulations and procedures of Thai government agencies, along with information acquired from supplementary sources, including training seminar documents and public relations materials. This article presents a literature review and in-depth examination of the most recent improvements in Thailand's handling of imported plastic scraps. The study examined the elements that contribute to plastic management issues and provided efficient solutions to the obstacles connected with the transborder trade of plastic scraps for recycling while considering the benefits and drawbacks of such imports.

## 2. CURRENT STATUS OF THAILAND

Thailand adheres to the Basel Convention as it has become a global destination for electronic waste, including plastic scrap. The Basel Convention sets guidelines (Basel Action Network 21019) for the recycling of plastic scrap (as well as hazardous waste) during its transit (World Customs Organization 2020). The implementation of China's prohibition on the importation of waste plastics in 2018, as shown by Wang et al. (2019), has had a substantial influence on both global plastic manufacturing and the management of solid waste. Thailand is among the nations that are specifically targeted by countries that export plastic scrap. Table 1 shows statistics on the volume of plastic scrap (HS3915) imports into Thailand from 2016-2024 (The Royal Thai Customs 2024).

**Table 1:** Statistics on the volume of plastic scrap (HS3915) imports (The Royal Thai Customs 2024).

| Year | Quantity (tons) | % Changes compared to the previous year |
|---|---|---|
| 2016 | 69,506,145 | - |
| 2017 | 152,737,452 | 119.75 |
| 2018 | 552,912,034 | 262.00 |
| 2019 | 323,167,065 | -41.55 |
| 2020 | 150,861,952 | -53.32 |
| 2021 | 159,622,972 | 5.81 |
| 2022 | 178,090,159 | 11.57 |
| 2023 | 201,714,762 | 13.27 |
| 2024 | 149,196,912 | -26.04 |

Thailand has restricted the import of plastic scrap by implementing the regulations of the Basel Convention and allowing only certified plastic scrap imports authorized by the Ministry of Commerce and the Ministry of Industry. The Ministry of Natural Resources and Environment, the Royal Thai Customs, and the Ministry of Finance are also involved in the import process. The Thai government has effectively tackled the issue by imposing restrictions on the importation of plastic scrap for recycling and implementing more rigorous laws to address environmental concerns. Particularly in the context of recycling plastic scrap, companies are required to release an annual recycling strategy. Every piece of imported plastic scrap requires meticulous cleaning and must be cut into sections no larger than 2 cm on any side. In addition, the container is required to display the specific name and classification of the imported plastic scrap, along with the chemical and physical properties of the plastic material. It is essential to gather comprehensive data regarding the production volume, types of products, feedstock varieties, and additives before initiating the manufacturing process. (The Royal Thai Government Gazette 2008a). The importer must explicitly specify the actions taken to conserve and maintain the safety of the establishment's surroundings to protect the environment. Furthermore, the waste disposal protocols for the manufacturing process encompass strategies for both domestic product sales and overseas exports. The Department of Industrial Works will authorize the importation of the necessary quantities for plant production. It must not exceed the maximum production capacity of plastic manufacturing equipment, and only nations that have ratified the Basel Convention should be eligible to receive plastic scrap. The government has put in place regulations and steps emphasizing the significance of waste separation before disposal. Furthermore, closely monitoring the industry's compliance with plastic scrap processing regulations would improve the quantity and quality of recycled materials, as demonstrated by the issue (The Royal Thai Government Gazette 2008a).

Previously, Thailand would export plastic waste to foreign countries due to a lack of domestic demand for recycling plastic scrap. Nevertheless, there is now a requirement to transform plastic waste into novel or supplementary recycled products. The existence of processing factories in different locations provides evidence to support this assertion. However, many communities may dispose of waste without proper separation. Different types of waste can accompany plastic waste. Thus, the business owner must obtain top-notch plastic scrap from foreign countries and use it in production. Various governmental agencies provide control announcements and rules for overseeing and administering these imports. Furthermore, the rigorous implementation of norms and standards by different governing bodies regarding the importation of plastic scrap might result in discrepancies, operational hindrances, and a decline in the efficacy of their effort. The government authorities' inability to achieve their aims stems from operators' lack of clarity and apprehension over the application and stringency of legislation. These activities have the potential to aid the officers in violating the law and hinder the government's ability to collect taxes. The Cycle of Plastic Waste Generation in Thailand is shown in Figure 1.

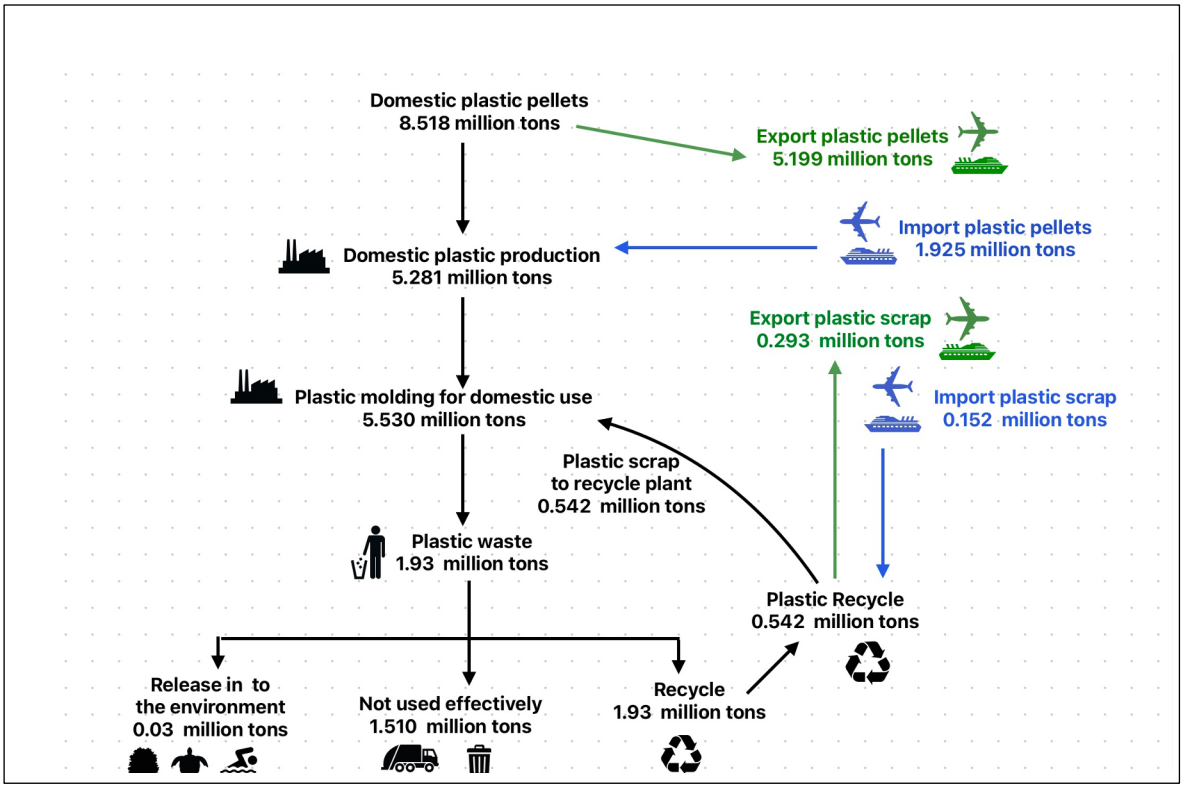


**Fig. 1:** The Cycle of Plastic Waste Generation in Thailand (Adapted from Ministry of Natural Resources and Environment 2020).

## 3. RESTRICTIONS ON THE IMPORTATION OF PLASTIC SCRAP FOR ENVIRONMENTAL PURPOSES

In 2018, Thai government authorities implemented limits on the importation of plastic scrap for recycling after discovering unauthorized electronic gadgets that were causing environmental pollution. Several recycling facilities were seeking information on the importation of non-compliant or illegal plastic scrap, encompassing illicit activities such as smuggling and inaccurate labeling of plastic scrap (Bloomberg 2022). Subsequently, the government halted the importation of plastic scrap to tackle the issue. The government achieved this by implementing official regulations for importing plastic scrap in August 2019 (Thai Post Newspapers 2019). The regulatory modification has had a substantial influence on the sector of importing and processing plastic scrap, which includes a Japanese firm situated in Thailand. The firm imports plastic waste from Japan to use as raw materials in carpet production and then sends the finished carpet goods back to Japan. Following an examination of the Thai regulatory changes on imports, the company's sales declined. The cost of using recycled plastic is equivalent to purchasing new plastic throughout the procedure. Additionally, unsatisfactory government and regulatory services incentivized and permitted recycling businesses to cease the importation of plastic waste and shift their main focus to other commercial activities (Sasaki 2021).

Furthermore, the government has enforced a temporary management scheme with a ban on importing plastic scrap. In April 2019, the government authorized the management of plastic scrap and subsequently enforced a ban on the importation of plastics previously used in specific products. Thailand implemented the policy in late 2019 and will stop importing or using plastic scrap by 2025 (Bangkok Post 2023; Prachachat Turakij Newspaper 2023). This is the initial stage of eradicating single-use plastic from the market, including plastic seals on bottles, PET bottles, plastic additives, and microplastics that are frequently present in cosmetics and

skincare items. The ban included plastic shopping bags that were thinner than 36 microns, polystyrene food containers, single-use plastic cups, and plastic straws (Department of Pollution Control 2019). Retail establishments and department stores cannot distribute or use plastic bags. The Thai government has been diligently working to reduce the spread of the aforementioned plastic goods since the beginning of 2020. By implementing this legislation, the government incentivized citizens to reduce the quantity of waste produced from plastic containers and packaging in their daily routines. Nevertheless, as a result of the ongoing COVID-19 pandemic, people are now choosing to have food delivered to their homes, inevitably exposing themselves to delivery containers (Sutthiluk 2021; Kasikorn Research Center 2018). Restricting the import of plastic garbage will encourage the use of renewable resources and help to manage plastic waste more efficiently across the country (Ministry of Natural Resources and Environment 2020).

Plastic trash management in ASEAN has experienced issues in absorbing waste from both external and internal sources. Vietnam plays a significant role in the importation of plastic waste. Nonetheless, the recycling of both domestic and imported plastic waste continues to pose significant challenges. The current state of waste separation in the country is inadequate, as merely 30% of plastic waste is being properly sorted. A significant amount of waste is discarded in an unsanitary way, contaminating the ecosystem (Okumah 2024). The management of plastic waste in ASEAN exhibits a variety of approaches and encounters distinct challenges. A variety of measures have been implemented by numerous nations, highlighting the necessity for enhanced collaboration and decisive action to effectively and sustainably tackle the issue of plastic waste. The ASEAN member countries, including Thailand, have collaborated to address the issue of plastic waste and approved the Bangkok Declaration in 2019. Concerning the initiatives to tackle marine litter in the ASEAN region and the ASEAN Regional Action Plan for Combating Marine Debris.

**Table 2:** Law enforcement, action plan, and strategies concerning plastic and plastic waste in ASEAN countries, excluding Thailand.*

| Country | Law enforcement/action plan/strategies concerning plastic and plastic waste |
|---|---|
| Brunei | Waste Management Regulation |
| | 3% increase tax on plastic product imports |
| Cambodia | National Waste Strategy and Action Plan (2018-2030) |
| Indonesia | Plan of Action on Marine Plastic Debris (2017-2025) |
| Lao PDR | Environmental Protection Law No. 29 |
| | Regulations on single-use plastic shopping bags |
| Malaysia | Roadmap towards Zero Single-Use Plastics (2018-2030) |
| Myanmar | The National Waste Management Strategy and Master Plan (2018-2030) |
| Philippines | The Republic Act 9003 |
| | Senate Bill No. 2759 (Total Plastic Bag Ban Act of 2011) |
| | Senate Bill No. 1984 (Single-use Plastics Regulation and Management Act of 2018) |
| | House Bill No. 4922 (Beverage Container Disposal Act) |
| | National Plan of Action on Plastics and Marine Litter |
| Singapore | Zero Waste Masterplan (2019) |
| | Mandatory Packaging Report Framework (2021) |
| | Management |
| Viet Nam | National Plan of Action on Plastics and Marine Litter 2030 (launched in 2020) |

*Data Source: The ASEAN Secretariat (2021)

The ASEAN region is actively engaged in efforts to minimize plastic waste, as each nation enacts legislation aimed at eliminating single-use plastics and encouraging the adoption of alternative materials. The initiative seeks to enhance the incorporation of plastic waste within recycling frameworks. Nonetheless, overseeing plastic waste or creating initiatives related to plastic waste management requires considerable financial investment.

Consequently, ASEAN is actively pursuing enhanced funding for the management of plastic waste throughout the region (The ASEAN Secretariat 2021). Table 2 presents law enforcement, action plans, and strategies related to plastic and plastic waste in ASEAN countries, excluding Thailand.

## 4. FREQUENT COMPLICATIONS ARISE IN THE PROCESS OF IMPORTING PLASTIC SCRAP

### 4.1. The principal deterrent against illegal recycling activities in Thailand

Electronic waste categorizes plastic scrap into distinct sections, and the challenges associated with its management mirror the misconceptions surrounding its solutions. The Department of Disease Control monitors the health effects of inadequate dismantling and recycling of electronic waste. The Pollution Control Department and the Regional Environmental Office work together to protect public health. The officers can oversee the pollution and contamination that arise from the disassembly and recycling of electronic waste. According to the law, the local administrative entity is responsible for regulating solid waste and sewage management. These regulations consist of the Public Health Act, B.E. 2535 (1992) (Office of the Council of State 1992), the Ministerial Regulation on General Waste Management, B.E. 2560 (2017) (The Royal Thai Government Gazette 2017), and the Ministerial Regulations on the Management of Toxic or Hazardous Solid Waste from the Community, B.E. 2563 (2020) (The Royal Thai Government Gazette 2020). This rule establishes a system for the proper disposal, collection, and oversight of illicit waste management techniques within a certain area. The law permits an officer to enter a facility or area where recycling activities, treatment, or disposal take place between sunrise and sunset, during business hours, or if there is a reasonable suspicion of a violation or non-compliance.

### 4.2. False Problem of Occurrence at Customs

Subject to Customs laws B.E. 2560 (2017), Section 202: “Anyone who submits, arranges for, or allows another person to submit an incorrect or incomplete customs declaration, document, or information to a customs official, which may cause misunderstanding in any item shown in the customs declaration, document, or information, is subject to a fine of not more than five hundred thousand baht” (The Royal Thai Government Gazette 2017). An issue frequently develops when importers misrepresent used items, such as electronics waste and plastic scrap, as second-hand goods. The importers assert that the item in question is neither harmful nor does it resemble any other form of commerce. For example, individuals commonly describe deliberate imports of hazardous materials as waste, but the industrial sector utilizes these plastics. Nevertheless, due to the reliance of industrial enterprises on imported plastic components and their inability to manufacture them using entirely fresh raw materials, other forms of mixed waste commonly persist. Monitoring and halting the importation of used or second-hand items has become a formidable task. Consequently, the Basel Convention, which specifically governs the import and export of waste, does not encompass it. Indirect statements can be utilized to ascertain the economic worth of imported items. Inspection of imported items is contingent upon the presence of a monitoring system in the nation of origin for these exports.

A false declaration problem at Laem Chabang Customs House, officials inspected illicit plastic debris in a cargo container brought from the United States (Bangkok Post, 2021). Police raided an illegal electronic and plastic scrap plant in Chachoengsao Province that uses false documents and operates without permission (Thai PBS News 2020). Plastic garbage is trafficked into processing facilities under pretenses (Post Today News 2018). False problem of occurrence at Laem Chabang Customs as shown in Fig. 2 (Bangkok Post, 2021). It is considered a violation of Customs Law B.E. 2560 (2017) to transport electronic waste while falsely representing it as old electrical appliances or electronic devices, which require import permission for customs processes, or misrepresenting it as any other item that does not require a permit (Wongwattanatham 2019, Piachan & Chitsawang 2023).

### 4.3. Insufficient monitoring and inspection tools

The system for verifying the transportation path of imported goods from the facility's source is experiencing an issue. This is caused by a lack of a dedicated mechanism within government entities to monitor the import path from the port to the plant, as indicated in the import license. Hence, the Customs Department and the Department of Industrial Works must enforce a stringent inspection protocol for cargo containers (Royal Thai Government 2020). The electronic customs system is susceptible to faults caused by factors such as the internet, electrical systems, or software systems. As a result, it is not possible to organize customs-clearing activities for a specified time. Kumkoon (2017, as cited in Thaweekoon 2021) suggested that the Customs Department must revamp its technological infrastructure and equipment. Implementing intelligent technology to enhance customs control capabilities and support entrepreneurs is essential. According to Deachborvornlak & Mungmaung (2023), the Customs Department is having difficulty effectively handling the importation of plastic scrap to convert it into new materials, as outlined in the 20-year national policy. There are several impediments to company operations and inspections conducted by government personnel, such as identifying misconduct through observing fraudulent statements about other commodities and falsifying paperwork. Importing plastic scraps, electronic waste, or other items mixed with old products is also common. Obtaining a license to import plastic scrap entails compiling a multitude of documents. The product release process is laborious and encompasses numerous stages. Entrepreneurs believe that the plastic scrap recycling sector requires government policies to improve its effectiveness.

**Fig. 2:** Imported plastic scrap that is falsely declared (Bangkok Post 2021)

## 5. POSSIBLE SOLUTIONS TO CONTROLLING TRANSBOUNDARY PLASTIC SCRAP

### 5.1 Government policies on transboundary plastic scraps

In 2022, the Thai government initiated an initial endeavor to prohibit the importation of plastic scraps, but it proved to be ineffective. The Cabinet publicized its resolutions through the media on February 21, 2023. The resolutions stipulate that the importation or use of certain items will cease by the end of December 2024. Only if there is a scarcity or insufficient quantity of plastic scraps within the nation. The annual limit for imported plastic scrap is 372,994 tons, exclusively permitted for 14 specifically specified industrial companies. This refers

to all manufacturing facilities located inside the duty-free zone that use plastic scrap as a primary input for manufacture and export. The import volumes should be equal to the entire production capacity in 2023, but they should not surpass 50% of the production capacity (Advancing U.S. Business in Southeast Asia, 2023; Thansettakij, 2023).

### 5.2 Government policies and action plan on plastic management

#### *5.2.1 Used plastic in the country*

The plastic scrap management phase II action plan (2023-2027) by the Ministry of Natural Resources (Ministry of Natural Resources and Environment 2023**)** aims to decrease and eliminate the use of plastic by switching to strong and environmentally friendly materials. Recycling 100% of plastic scrap is expected to be achieved by 2027. The plastic scrap management action plan has been designed to align with the 20-year national strategy (2018-2037) (The Royal Thai Government Gazette 2018) to achieve economic growth while maintaining an environmentally conscious quality of life.

The 13th National Economic and Social Development Plan (2023-2027) by the Royal Thai Government (The Royal Thai Government Gazette 2008b) stipulates that Thailand must achieve a circular economy and a low-carbon society. This plan aims to promote sustainable growth in a green economic society by implementing policies that encourage both consumption and sustainable production. Thailand advocates for investing in and altering individuals' and organizations' consumption behavior, production, thinking styles, and lifestyles to ensure the most cost-effective and efficient use of resources. The aim is to raise awareness about the environmental consequences of production and encourage the adoption of eco-friendly consumption practices. Utilize economic and social mechanisms to motivate consumers and producers. Enhance government procedures to encourage citizens and the private sector to be more eco-friendly by producing environmentally friendly products, attaching environmental labels to consumer goods, reducing the generation of plastic scrap at the source, and promoting sustainable consumption and production. Promote the growth of urban, rural, agricultural, and ecological sectors by focusing on developing a city that exhibits continuous growth. The objective is to effectively oversee the handling of waste from its point of origin to its final destination, with a particular focus on implementing the principles of the 3 Rs (reduce, reuse, recycle). The nation has established a comprehensive framework to address systemic waste and pollution.

#### *5.2.2. Law enforcement*

Thailand implemented the Hazardous Materials Act, BE 2535 (Office of the Council of State 1992), before officially approving the Basel Convention. Thailand recently revised its laws to forbid the importation of plastic scrap and implemented a strategy to outlaw certain types of plastic. The temporary action aims to control the production of plastic scrap, given its difficult disposal and detrimental effects on the environment. Thailand implemented a program aimed at maximizing the utilization of recycled plastic scrap, with a specific focus on enhancing both the quantity and quality of the materials while also assuring effective supervision. Under the Basel Convention, effective administration and supervision of the transportation of dangerous waste, especially plastic waste, enables the establishment of a viable global recycling system. This system would enable regulation and supervision of the import and export of recovered plastic waste, successfully ensuring equilibrium between demand and supply. The present plastic waste recycling industry has a multitude of problems and challenges. The goal is to reward investment in plastic waste recycling and improve government income collection. The Prime Minister's Secretariat (Royal Thai Government, 2020) proposed that Thailand should enact dedicated laws to regulate the transportation of plastic waste and address the issue of its importation. Maximizing the benefits of import control and tax collection for both private sector and government trade activities is possible.

#### *5.2.3. Integration of government agencies*

There are numerous governmental entities involved, each with a unique set of rules, regulations, and procedures, all subject to varying enforcement limitations. Nevertheless, there are specific phases in which it is still ambiguous which institution holds the obligation and which regulations may be enacted to assist enterprises. This issue presents a significant obstacle to the functioning of the private sector, putting entrepreneurs at a disadvantage while engaging in economic activities. The drawback will incentivize operators to transfer their industrial facilities to other countries that provide more favorable conditions for private investment than Thailand. Furthermore, investors who previously expressed interest in investing in Thailand have now shifted their focus to other countries. We need to consolidate government entities to elucidate their responsibilities and obligations. Cultivate robust interconnection across organizations and enhance the comprehension of public service procedures. Every organization has a unique distribution of roles, responsibilities, and decision-making procedures to improve efficiency. Each organization's services are designed to avoid duplication of work, thereby preventing disparities in the private sector's operations. To prevent illicit imports, it is necessary to have a comprehensive approach that includes several stages and regulations. Thailand should implement these measures to optimize efficiency. Government officials must strictly adhere to the principles of excellent governance, as they are the most important factor in fostering the country's growth. As stated by the researcher (Deachborvornlak & Mungmaung 2023), the government sector must consolidate the work of various institutions to establish a coherent policy regarding the importation of plastic waste. The government should implement policies that encompass trade facilitation and customs control, as well as trade benefits and economic growth, while simultaneously guaranteeing fairness and inclusivity for all parties involved.

#### *5.2.4 Revising the Basel Convention*

Member states have amended the Basel Convention to specifically address the worldwide management of plastic waste. These revisions came into force on January 1, 2021. Each member is dedicated to enhancing the global management of plastic waste flow, encompassing the following areas: 1). Improve the definition of dangerous plastic waste and establish necessary steps, such as obtaining prior informed consent (PIC) from countries that import and transport it. 2) Define non-toxic plastic waste that does not require a formal notification and approval process. The recycling process for virgin plastic, non-halogenated plastics, and fluoropolymers is environmentally friendly and produces minimal waste pollutants. Moreover, it is crucial to segregate and reuse several categories of plastic waste in an environmentally conscientious manner, including polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET). 3) The current legislation should explicitly address certain types and combinations of plastic waste. Notification protocols are not required for this process; nonetheless, clearance from both the importing nation and the transit country is essential. Adhering to the Prior Informed Consent (PIC) criterion is essential for importing or exporting designated categories of plastic waste, as this modifies the stipulations of the Basel Convention. Nevertheless, the existing tariff system lacks a classification for plastic waste taxes that contains six digits. Member nations must include tariff subclasses in their sorting system unless they do not provide six-digit rates for plastic waste. Customs' primary responsibility is to optimize its risk filters, indicators, measurement equipment, and processes to effectively adapt to the Basel Convention's requirements (Office of Customs Affairs the Royal Thai Embassy (ANNEX) Brussels 2021).

### 5.3 Intensify the public's understanding of the significance of the plastic waste problem

Encourage collaboration and awareness-raising among the general population to reduce plastic waste and aid in proper segregation before disposal. There is a need to consistently increase awareness about the objective of minimizing plastic consumption and properly segregating waste. The general population's involvement in the formulation of government policies for plastic waste management is critical. People should voice their opinions,

highlight obstacles, or propose solutions to raise awareness about the importance of managing plastic waste and practicing environmental stewardship. A study of community-based plastic waste management approaches in Indonesia found that community education and awareness are critical for promoting sustainable plastic waste management (Ulum et al. 2024). To establish a circular plastics economy, it is essential to fully understand and include public engagement at all levels. It is critical to carefully consider people's viewpoints and gain their endorsement while simultaneously advocating for and endorsing governmental programs. The implementation of plastic management will lead to the establishment of a circular plastic economic system that can attain long-term sustainable prosperity.

### 5.4 Economic Impact

Although the importation of plastic scrap is not the only source of environmental plastic waste, it is an important issue that Thailand has addressed by establishing a policy to prohibit plastic scrap imports to prevent the entrance of misleading plastic waste. If Thailand stops importing plastic scraps for recycling and instead uses locally available plastic scrap, Thailand's customs imported taxes will be reduced. The customs taxes collected on various types of imported and exported plastic scraps (HS3915) before the ban in 2025 are shown in Figure 3. Furthermore, before entering the recycling system, plastic wastes must undergo sorting, size reduction, cleaning, drying, and compaction into a specific form before being transformed into plastic pellets (Chen et al. 2019). As a result, recycling factories, which are largely in the private sector, may face higher expenses for cleaning plastic trash before it enters the manufacturing process.

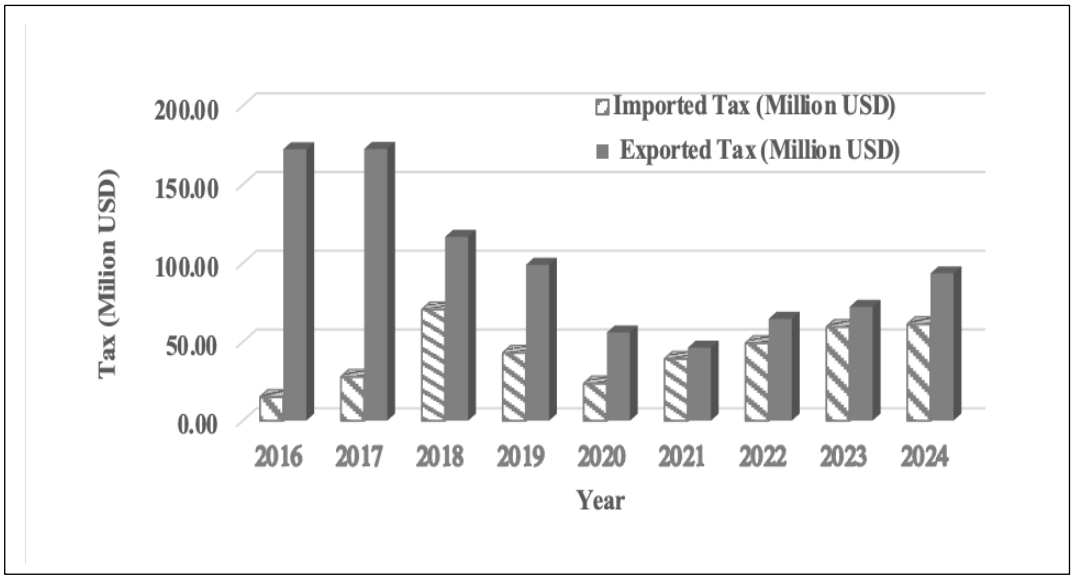


**Fig. 3:** Statistics on tax collection for imported and exported plastic scrap (HS3915) (The Royal Thai Customs 2024). *The exchange rate on January 31, 2025, is 1 Thai Baht = 0.030 USD.

If Thailand keeps importing plastic scrap for recycling and the plastics are not closely controlled, they will leak into the ecology. It will affect the financial availability needed to handle such problems. Plastic waste generates economic losses in Thailand by raising storage and transportation costs, management and treatment costs, as well as environmental and social impacts. The exact monetary value of this loss remains undetermined; however, Thailand has encountered considerable environmental challenges due to microplastics found on six beaches in Phuket Province (Tharamon et al. 2016), the premier marine tourism destination in the southern region of Thailand. Consequently, both tourism and the health of the marine ecosystem may be at risk. Microplastics accumulate in intertidal invertebrate groups, primarily as a result of plastic pollution on beaches

(Thusharia et al. 2017). Thailand consumes seafood, including bivalves (*Danax sp*. and *Paphia sp*.) (Tharamon et al. 2016), oysters, mussels (Wisespongpand et al. 2020), shrimp tissues (Vitheepradit & Prommi 2023), and dying marine life (Thongnonghin 2021). Researchers have also found microplastic in drinking water (Dumrongsiri & Chanpiwat 2021), surface water (Ong-oard & Tantipanatip 2022), and freshwater sediment (Tabburee et al. 2022).

Recycling domestic plastic waste and engaging in the plastic circular economy can have positive outcomes. Reduce the costs associated with the importation of plastic waste, regardless of its domestic distribution status. Reduce the storage and disposal costs associated with plastic waste. Furthermore, environmental conservation provides an additional benefit. Therefore, if Thailand follows the plastic waste management roadmap outlined in the 2018-2030 plan, it will save 3.9 billion baht/year, or 0.117 billion USD/year, in solid waste management costs by lowering the volume of plastic waste that must be disposed of by approximately 780,000 tons/year. Sorting garbage and repurposing plastic waste can save around 400 ha in landfill areas. Recycling plastic, rather than using fresh raw materials, saves energy equivalent to crude oil, about 7.54 million barrels, or 300 billion baht or 9 billion USD. Moreover, it has the potential to reduce greenhouse gas emissions by 1.2 million tonnes of $CO_2$ equivalent (Ministry of Natural Resources and Environment, 2020).

The issues associated with plastic reach far beyond environmental concerns within individual countries; they also affect the global economy and the well-being of people around the world. The impending ban on plastic scrap imports in Thailand in 2025 has emerged as a significant matter that necessitates international collaboration. Thailand must implement stringent oversight of plastic scrap transportation across its borders, ensuring legal compliance and enhancing the effectiveness of the Customs Department, particularly regarding its resources and the proficiency of its staff. Furthermore, fostering public collaboration in the effective management of plastic waste will contribute to the establishment of a robust circular plastic economy and enhance plastic waste management in Thailand.

## 6. CONCLUSIONS

The importation of plastic scrap for recycling in Thailand under the Basel Convention has resulted in heightened environmental degradation due to contamination from local sources. The Thai government and the commercial sector have partnered to devise remedies and avert future problems. Consequently, the Thai government enacts legislation and rigorously enforces current prohibitions. Nonetheless, the importation of plastic waste by several government agencies complicates law enforcement, as each agency possesses distinct regulations that may conflict with one another. Moreover, the complex labor process renders the management of plastic scrap imports burdensome or unfeasible to oversee. To ensure success in the worldwide trade of plastic waste and tackle environmental concerns in Thailand, the government must develop a comprehensive and precise plan for importing plastic waste. The government must prioritize trade facilitation and customs control in its specific policies. Thailand must implement specific legislation to restrict the importation of plastic waste to tackle the issue of receiving refuse from other countries. This would yield trade advantages and economic expansion while guaranteeing fair treatment and involvement for all parties concerned. Moreover, garnering public support is essential for tackling plastic pollution by highlighting the necessity of raising awareness regarding plastic waste in the environment.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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