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# A Holistic Approach to Addressing Marine Plastics Pollution in East Asia

A Comparison of Prevention, Mitigation, Removing and Behaviour-changing Measures to Curb Marine Plastic Pollution from Land-based Sources in China, Indonesia, The Philippines, Vietnam, Thailand and Malaysia.

## Topic and Research Question

Marine plastics pollution has quickly emerged to become one of the most pressing global environmental issues for the international society to tackle. An estimated 300 million metric tonnes (MMT) of plastic is currently found in all layers of the world's oceans. The full spectre of consequences connected to the presence of plastic in the marine environment is still largely unknown, although evidence points to mammal and fish fatalities, loss of marine diversity, and ultimately human health impacts as a consequence of marine plastics pollution.

80%, or 9,6 MMT, of the estimated 12 MMT of plastics leaking into the marine environment every year originates from land-based sources. Out of these 9,6 MMT, East Asia, largely led by China, Indonesia, Malaysia, The Philippines, Vietnam and Thailand, accounts for up to 60% of all plastics leaking into the world's oceans. Hence, domestic policies targeting marine plastics pollution from land-based sources are imperative in East Asian countries in the global combat against the issue.

To examine and compare what tools countries in East Asia employ in their effort to curb the leakage of plastics into the oceans from their territories, the research question of this thesis is: *"How do domestic government efforts to control marine plastics pollution from land-based sources differ between China, Indonesia, the Philippines, Vietnam, Thailand and Malaysia?"*

## State of the Art

Research interest on marine plastics pollution has grown steadily since research on the issue started being published in the early 1960s. Literature on the topic tends to fall into four categories, where the findings from one category has led to research on the next: 1) the presence of, 2) the sources of, 3) the consequences of, and 4) the responses to plastics in the marine environment. Literature on all four categories are found from the 1960s until today. Laist (1997) made significant contributions in documenting the consequences of plastics pollution for marine life, but it was Richard Thompson's (2004) coining of the term "microplastics", and the sense of emergency that derived from it, that accelerated efforts in finding the sources, consequences and responses to the issue of marine plastics pollution. Auta et al. (2017) was also

integral in documenting the consequences of and possible solutions for marine plastics pollution. Jambeck et al. (2015) and Tibbetts (2015) have been particularly prominent in furthering an understanding of the sources of marine plastics pollution, with both pointing to East Asia as the largest source. Several international bodies have developed documents outlining policies needed to curb the leakage of plastics into the marine environment from land-based sources, the most prominent of which is The Honolulu Strategy developed under the auspices of UNEP.

However, neither of these international documents, nor the mentioned research, assess the degree of implementation of government policies. In this context, the thesis aims to fill a research gap by assessing whether selected countries in East Asia - being the region with the largest outflow of plastics from land-based sources - have implemented the policy needed to address the issue, and the degree of implementation.

## Methodology and Approach

There have not been conducted any comprehensive assessments and comparisons of holistic government efforts to curb marine plastics pollution from land-based sources in East Asia, meaning that there is also no established academic framework on the topic in existing literature. However, the response to curb marine plastics pollution from land-based sources is interlinked with the response to manage and control marine litter, since plastics make up as much as 70% of all marine litter. The author of this thesis has, therefore, developed an eclectic framework that sheds light on this issue through adapting and modifying a framework made by Chung-Ling Chen (2015, p. 414). Chen's framework outlines the following regulatory and management measures against marine litter: 1) Prevention, 2) Mitigation, 3) Removing, and 4) Behaviour Changing Measures.

The thesis has complemented each of these four measures with sub-criteria that seek to assess the employment of specific tools to target particular types of marine plastics pollution by governments. Most sub-criteria are given as yes/no questions, as the thesis does not seek to assess the success of the measures, but rather seeks to find whether a policy has been implemented or not, and to facilitate a comparison of the countries chosen for analysis.

The full analytical framework for the thesis is summarised in table 1 below:

Criteria	Sub-criteria
1. Preventive measures	Ban on microbeads in cosmetics and hygiene products (Yes/No)
	Legislation on single-use plastic bags (Tax/Fee, Ban, Nothing)
	Does the country ban smoking on beaches? (Ban / Partial Ban/ No Ban)
2. Mitigating measures	Existence of an overarching national marine litter strategy and action plan (Yes/No)
	Implementation of Extended Producer Responsibility (EPR) on plastic packaging (Yes/No)
	Legislation on MSW at open landfills (Ban/No Ban)
3. Removing measures	Estimated waste-to-energy (WtE) capacity (in percentage)
	Existence of national debris monitoring programme (Yes/No)
	Does the Government support and facilitate national clean-up initiatives (Yes/No)?
4. Behaviour-changing measures	Does the country initiate national education campaigns on land-based sources to marine plastics pollution (Yes/No)
	Existence of container deposit legislation (CDL) as an economic incentive to recycle plastic bottles (Yes/No)
	Are the 3Rs (Reduce, Reuse, Recycle) on MSW officially promoted by the government? (Yes/No)

Table 1: Analytical Framework

## Main Facts

None of the countries investigated in the thesis have implemented all the three **preventive measures** to curb the outflow of plastics into the marine environment from land-based sources. No country has established a ban on microbeads and smoking on beaches, while only one country, China, has legislation on single-use plastic bags, although enforcement seems to be weak.

Furthermore, none of the countries investigated have established all the four **mitigating measures** assessed. Only one country, Indonesia, has implemented an overarching national marine litter strategy and action plan. None of the countries have implemented EPR on plastic packaging, and none of the countries have a ban on open landfills. Two countries, China and Indonesia, have established a significant Waste-to-Energy (WtE) capacity to get rid of plastics through incineration.

As for **removing measures**, all countries have implemented either a national debris monitoring programme, or support and facilitate national cleanup initiatives, except Vietnam, where none of these measures are implemented.

Vietnam also stands out as the only country with no **behaviour-changing measures**, with all the other five countries having at least implemented a promotion of the 3Rs of Reduce, Reuse, Recycle. Indonesia stands out as the only country who has initiated national education campaigns on land-based marine plastics pollution.

## Results

The findings from the case studies have found that China, Indonesia, the Philippines, Vietnam, Thailand and Malaysia have more similarities than differences in their domestic efforts to control marine plastics pollution from land-based sources. Evidence shows that all the six countries analysed have a long way to go in terms of establishing proven, effective government efforts to stop the leakage of plastics into the marine environment. None of the six countries have pursued a holistic approach through the four measures prevention, mitigation, removal and change of behaviour, although all countries have established certain efforts to support one or more of the measures.

In theory, the four measures need to be done simultaneously to ensure an efficient combat against marine plastics pollution. In practice, however, lack of resources, political will, technical know-how, and citizen engagement means that the six countries analysed fail in pursuing the four-measure approach by focusing on only a few of the measures, failing to employ a holistic approach.

Marine pollution is a domestic and a global issue simultaneously: Should the international society seek to intensify its efforts in stopping the leakage of plastics into the oceans from land-based sources through binding agreements, none of the countries analysed have the policy framework needed to support it.

The findings of this thesis could act as a guideline for countries to identify in which areas they need to scale up efforts in order to create a holistic response to marine plastics pollution from land-based sources.

## References

All references can be found in the full version of the MA thesis available at <http://othes.univie.ac.at>

## About the Author

Kristian Viflot holds a BBA (Hons) in Global Supply Chain Management from the Hong Kong Polytechnic University, Hong Kong S.A.R. He has gathered several years of international experience through work and studies in Asia, Africa, and Europe.



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Examination Date: 02.08.2019