EUROPEAN UNION

CIRCULAR ECONOMY AND PLASTICS:
A GAP-ANALYSIS IN ASEAN MEMBER STATES

Enhanced Regional EU-ASEAN Dialogue Instrument

E-READI

Disclaimer

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EXECUTIVE SUMMARY

More than a waste management issue

Preventing and reducing plastic pollution is about more than waste management. This report applies a circular economy perspective to plastics and presents frameworks for addressing related sustainability challenges. A shift to a circular economy will require coordinated policy interventions at all stages of the life-cycle of plastics, including: resource extraction and refining, design and manufacture of products, trade and retail, use and reuse, recycling, and final disposal when necessary.

A circular economy approach to materials such as plastics entails keeping them in the economy for as long as possible - to reduce the need for new materials - and to derive as much use and value from them as possible. This means: designing products with long lifetimes and necessary warranties; avoiding single-use plastics unless where necessary; adopting business models and social solutions that enable reuse, repair and product sharing; avoiding the use of harmful additives and preventing unintentional contamination; setting up effective and efficient source-segregated waste collection systems; and recycling plastics to sufficiently high-quality grades to substitute for virgin materials. It also means to replace conventional plastics with alternatives, in applications where this results in lower environmental impacts. Promoting such practices requires integrated and coherent ways of drafting and implementing public policies.

Efforts to increase recycling are a key element of a circular economy approach, but such actions by themselves are insufficient for transforming the current linear economy model. Recycling also has a number of limitations, which means that it needs to be pursued as part of broader circular economy strategies. Limitations include: technical challenges associated with recycling all types of plastics to high-quality grades (quality losses), the impossibility of collecting all end-of-life plastics for recycling (quantity losses), and the fact that recycling chains - collection, transport, cleaning, and processing - require energy and other inputs, which can cause pollution (i.e., recycling is not fully “green”, although it often results in lower impacts than processes involving the use of virgin materials).

Current situation in the ASEAN region

All national governments of the ASEAN Member States recognise the need to address the issues of plastics, but the rationale for taking action varies. Marine debris, air pollution from open burning, and visual pollution from uncollected or inappropriately managed waste appear to be the strongest drivers of government initiatives. At the local level, challenges in securing land for disposal of growing volumes of waste is often also seen as a strong motivating factor. In addition, different ministries within each government may often have specific sectoral concerns and objectives related to plastics and thus differ in their priorities regarding government interventions.

While some recently published national strategies and action plans (such as those developed by Indonesia, Malaysia, and Thailand) reflect an ambition to tackle plastics issues through a circular economy approach, existing government policies and initiatives have a decidedly downstream focus. This means that plastics-related problems are mainly regarded and tackled as waste management issues, not as broader systemic issues of materials design and utilization. Broadening the scope of government action on plastics, beyond the predominant focus on waste, is key to overcoming the multiple issues associated with the life-cycle of plastics.

At present, there are few efforts to engage upstream businesses and hold them accountable for developing improved solutions. Although some countries in the ASEAN region have laws that in principle require producers to take responsibility for the end-of-life treatment of their products (extended producer responsibility), no government has so far developed any policies to this end. In addition, although all governments in the region agree with the need for more and better recycling, few countries have policies that effectively contribute towards these objectives.

Governments also recognize the regional nature of challenges related to plastics and the need for joint action. Starting from a number of information-sharing events,[1] the region’s cooperation has taken a more substantial form. Recent declarations at the highest political level[2] indicate countries’ determination to work together to tackle these issues.

1 Such as the ASEAN Conference on Reducing Marine Debris, held in November 2017, and the workshop Managing Packaging Waste – Preventing Marine Litter, in October/November 2018.

2 In particular the ASEAN Plus Three Marine Plastic Debris Cooperative Action Initiative and the East Asia Summit Leaders’ Statement on Combating Marine Plastic Debris, both adopted in November 2018, and the Bangkok Declaration on Combating Marine Debris in the ASEAN Region, adopted at the ASEAN Summit in June 2019, where leaders welcome the ASEAN Framework of Action on Marine Debris and encourage its timely implementation.

Gaps in plastics management across ASEAN Member States

The study identifies four main types of gaps common to addressing plastics in the region: Information and Knowledge; Policy and Governance; Technical Capacity; and Markets and Finance.

1. Information and knowledge

In the absence of good quality data and knowledge, governments can make assumptions and take decisions on plastics that do not effectively address the problem. Similarly, businesses and consumers may take actions that seem, but fail, to provide solutions. Examples of gaps in information and knowledge related to plastics issues across ASEAN Member States:

- Data on use patterns and trends, as well as on waste handling and recycling routes
- Understanding of types of plastics and their properties, applications and benefits, associated issues at different life cycle stages, and sustainable alternatives
- Knowledge on the relative merits of different recycling options, including “down-cycling” and “closed-loop” recycling
- Awareness on issues associated with hazardous chemicals and substances of concern found in plastics
- A life-cycle understanding of plastics and of how global value chains can both amplify and help in addressing issues concerning plastics

2. Policy and governance

Governance for plastics needs to be more systematised and deliberate among ASEAN countries and businesses. Addressing gaps in governance remain some of the most essential steps in formulating coordinated and effective responses to plastic issue for governments, users and business actors across the value chain. Examples of gaps on policy and governance related to plastics issues across ASEAN Member States:

- Clarity on mandates, roles and responsibilities at different levels of and agencies of government
- Comprehensive frameworks with policy packages and instruments to turn national strategies and plans into action on the ground
- Effective approaches for governments to engage and coordinate with diverse stakeholders
- Tools and guidelines to support actions by stakeholders

3. Technical capacity

Addressing plastics issues requires technical know-how in a range of areas, access to effective technical equipment and systems, and the capacity for R&D and innovation. Examples of gaps in technical capacity related to plastics issues across ASEAN Member States:

- Limited technical training of responsible personnel in the complexities of plastics, including chemical, supply chain, and environmental aspects of different types of plastics
- Technological and human-resource constraints associated with managing post-use plastics, often including lack of infrastructure for preventing environmental leakage of plastics
- Low capacity for innovation, especially among SMEs
- Few initiatives to encourage innovation, including social innovation to reduce plastic use as well as technical innovation on sustainable alternatives

4. Markets and finance

Markets and finance play a major role in shaping the flow of plastics across the value chain. However, a clear understanding of linkages between market mechanisms and plastics has yet to be fully incorporated into region-wide solutions. Examples of gaps in markets and finance related to plastics issues across ASEAN Member States:

- Access to financing for eco-solutions, including development of alternatives to plastics and efficient post-use processing
- Shared and accepted standards for recyclables to ensure quality control and bring trust to the market
- Access to markets for recyclables
- High perceived market uncertainty, hampering investments
- Uncertainty on how to effectively transition from fully market-driven (and largely informal) recycling systems to more regulated and formalised systems

Recommendations: Regional initiatives for addressing plastics across ASEAN Member States

While several actions can and should be taken at the national level to address the identified gaps, the transboundary nature of issues associated with plastics and the interlinked economies of ASEAN Member States require that some initiatives need to be implemented through region-wide collaboration. In addition, actions addressing problems common to most or all ASEAN Member States can be made more effective when operationalised at a wide scale. The proposed regional initiatives summarised below are aligned with the recently adopted ASEAN Framework of Action on Marine Debris[3] and would support its implementation.

1. Technical standards for plastics, recycled plastics and plastic products

This involves developing voluntary technical standards for plastics, recycled plastics, and products made of plastics (or recycled plastics) that are harmonised across ASEAN. Adopting such standards would be in line with the on-going ASEAN economic integration process. Notably, the plastics industry has already been proposed as a work area for the ASEAN Consultative Committee on Standards and Quality (ACCSQ), although it has not yet been taken up. Standards that are related to a shift to a circular economy could include, for example, quality standards for recycled polymers and performance standards for products made of recycled plastics.

2. Guidelines on circularity in plastics use

This recommendation entails developing circular economy guidelines on options and decision-making processes regarding plastics production, use and post-use management, including: avoidance of plastics and selection of alternatives; plastics choice optimisation; enhancing disposal, collection and sorting systems; and introducing reuse or recycling systems suitable for the ASEAN region. Such guidance should be based on an informed understanding of the life-cycle of different types of plastics, more sustainable alternatives to plastics, technologies suitable for processing different types of plastics, and requirements concerning sorting and cleaning, etc. In addition, such guidance would also address what uses/applications are suitable for secondary plastics from different types of recycling processes and for bio-based and bio-degradable plastics.

3. Phasing out of harmful additives

Also of importance is initiating a regional process to phase out and substitute plastic additives of concern. Plastic products commonly include additives, such as flame-retardants and plasticisers, many of which have known or suspected detrimental impacts on health and ecosystems. Recycling, when not well managed, can increase the risk that such substances end up in products where the risk for human exposure or environmental leakage is high. There is thus a need to develop a regional approach to identify and substitute problematic plastic additives. Such an initiative could draw from the extensive technical expertise of the EU.

3 ASEAN Framework of Action on Marine Debris. Available at: https://asean.org/storage/2019/06/3.-ASEAN-Framework-of-Action-on-Marine-Debris-FINAL.pdf. (Accessed: 20 August 2019)

4. An ASEAN-wide network for research and innovation on plastics

Building up an ASEAN-wide research and innovation network on sustainable polymers, packaging and circularity will be key for addressing plastics issues. Doing so would nurture a regional pool of expertise, as well as stimulate innovation and entrepreneurship. The envisaged network could focus on identifying alternatives to petroleum-based plastics (both polymers made from other feedstock and alternatives to polymers), designing business models that reduce or eliminate single-use plastics or enable the use of reusable plastic items, as well as documenting new ways of recycling plastics into products with high quality and use value.

5. ASEAN framework agreement on plastic pollution

An ASEAN framework agreement on plastic pollution could be negotiated to create a common regional approach to plastics of which the region serves as a hotspot. A regional agreement would demonstrate the resolution and ability of ASEAN Member States to jointly address common challenges and could set a precedent for a future global agreement on plastics. This would be seen as the next logical step for the region in terms of building on the momentum of recent declarations, with a view towards creating a formal framework to oversee the implementation of regional action plans, including the ASEAN Framework of Action on Marine Debris. Such an agreement should cover both land-based and sea-based sources of plastic pollution, and could also include trade aspects. It would serve as a response to the recent modification to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The recent decision to apply the Basel Convention's Prior Notice and Consent rules to plastic waste[4] will likely reduce shipments of difficult to recycle plastic waste from OECD countries to South-East Asia. Nevertheless, there will still be a need to strengthen countries' border controls and to better monitor trade within the ASEAN region.

4 The CoP of the Basel Convention decided on 10 May 2018 to include most plastic wastes under the control mechanisms of the Convention. The CoP agreed that most plastic wastes should be included in Annex II or VIII of the Convention, which oblige exporting countries to obtain the authorisation of the importing countries before the transactions can take place ("prior informed consent" mechanism).

CHAPTER 1:

INTRODUCTION

1.1. Background: Plastic issues and Southeast Asia

Plastic has been called a miracle material, associated with the numerous properties that have made it useful for applications in medical and health practices, food preservation, transportation, and leisure - almost every facet of modern life. And yet, the versatility and wide-ranging applications of plastics also make them a problem, reflecting the symptoms of runaway consumerism that comes at the expense of the environment on which we all depend.

In the last few years, there has been renewed interest in plastics issues, resulting in plastics receiving strong attention from media, civil society, academia, international organisations, governments and the private sector. One contributing factor to the current focus on plastics is arguably its role in ocean pollution and the highly visible damage this does to marine life. Plastics, conventionally made of petroleum or fossil gas, can remain in the environment for hundreds of years. Unlike other substances, most plastics do not biodegrade; instead they slowly photodegrade, and in the process break down into small plastic fragments that can easily be taken up by plankton and other organisms where they can accumulate in body tissues. The growing amount of plastics in the world's oceans harms marine life and fisheries, and poses a threat to human health. The growing use and inappropriate management of plastics also contribute to other problems, such as shrinking landfill space, clogging of sewers, and emission of greenhouse gases. In addition, several common plastic additives have known or suspected detrimental impacts on health and ecosystems.

Southeast Asia, with its high population density, strong economic dynamism, and generally inadequate waste management systems, is a hotspot for these challenges. In Indonesia, more than 40% of its plastics are imported from Malaysia, Thailand, Singapore, Europe and the US.[5] Also, Indonesia and Thailand have the biggest markets for flexible plastic packaging (sachets, pouches, bags and films).[6] Packaging production in ASEAN drives not only domestic consumption but also export markets. The rapid increase in production and consumption of plastics in the region is accompanied by a growing inflow of plastic waste from abroad, exacerbating domestic challenges. China previously imported over 7 million tonnes of plastic waste annually,[7] but since banning this trade in early 2018, countries in Southeast Asia have suddenly become major export destinations for these materials.[8]

According to some estimates, four ASEAN countries (Indonesia, the Philippines, Thailand, and Viet Nam) together with China are responsible for approximately half of the world's marine plastic litter generation. Among these five countries, around 2.5 to 6.7 million tonnes of plastic waste was found to leak from coastal areas into the ocean in the year 2010, compared to a global leakage of 4.8 to 12.7 million tonnes in the same year.[9] In many countries across the region, less than half of the waste generated is collected and treatment is often rudimentary, polluting the environment and harming residents. Material recycling, where it exists, is to a large extent handled by cottage industries consisting of small-scale, mostly informal, enterprises. The equipment used is often simple, resulting in poor quality and low economic value and giving rise to occupational hazards and pollution. Even so, such business activities play an important socioeconomic role by providing livelihoods for millions of people, most of whom have a low level of education and lack formal skills.

The issues associated with society's use of plastics are complex. They need to be addressed through coordinated actions at multiple levels and require changes not only in technologies, but also in business models and behaviour. Government policies have a key role to play in making such changes happen. ASEAN and the EU have agreed to work together to address these challenges through exchange of policy experiences, technical advice, and capacity strengthening.

5 Regional Resource Center for Asia and the Pacific at the Asian Institute of Technology (AIT RRC.AP). Circular Economy Briefing Series: County Profile Indonesia: Management municipal solid waste and packaging waste. GIZ (2018). Available at: https://www.giz.de/de/downloads/giz2018_Indonesia-Country-Profile_web.pdf. (Accessed: 3 July 2019)

6 ASEAN Flexible Packaging Market Snapshot. *Transparency Market Research* (2017). Available at: https://www.transparencymarketresearch.com/asean-flexible-packaging-market.html. (Accessed: 3 July 2019)

7 Brooks, A., Wang, S. & Jambeck, J. The Chinese import ban and its impact on global plastic waste trade. Science Advances 4 (2018). Available at: http://advances.sciencemag.org/content/4/6/eaat0131. (Accessed: 3 July 2019)

8 Plastic waste export tide turns to south-east Asia after China ban. Financial Time (2018). Available at: https://www.ft.com/content/94ee72d0-6f26-11e8-852d-d8b934ff5ffa. (Accessed: 30 September 2018)

9 Jambeck, J. et al. Plastic waste inputs from land into the ocean. Science 347, 768-771 (2015).

1.2. Enhanced Regional EU-ASEAN Dialogue Instrument (E-READI)

E-READI is a European Union (EU) funded dialogue instrument that supports EU-ASEAN policy dialogue and ASEAN regional integration. It does so through sharing European regional integration experience and know-how in policy areas of joint interest. It also promotes ASEAN peer-to-peer learning/exchanges through sectoral policy dialogues, thereby supporting policy development processes and capacity building. Working with policy-makers from the EU, ASEAN institutions, and ASEAN Member States (AMS), E-READI aims to enhance interaction with the civil society, the private sector and other relevant stakeholders across different policy domains. The overall objective is poverty reduction through inclusive and sustainable growth.

This report is written to support the dialogue on Circular Economy facilitated by E-READI, titled: "Towards a Circular Economy for Plastics in the ASEAN Region". It is part of a broader EU-ASEAN Dialogue on Environment and Climate Change, which derives from the 2018 EU Plastics Strategy,[10] in which the EU has committed to assist other regions in shifting towards a circular economy for plastics, and upon which ASEAN and the EU have agreed to collaborate.

As an important first part of this collaboration, the EU and the ASEAN Secretariat commissioned the Institute for Global Environmental Strategies (IGES) to compile this report, analysing gaps in the state of plastics management in the region, and opportunities for circular economy approaches in ASEAN Member States. The report therefore serves as a knowledge base for follow-up collaborative actions by the EU to inspire and assist in circular economy approaches to plastics issues in the ASEAN region.

1.3. Methods: Research and consultations

This gap-analysis report is based on a combination of desktop research and semi-structured interviews, country visits involving interviews with governments and strategic stakeholders, consultations with initiatives with similar objectives, and expert review workshops. The report provides a broad framework regarding the circular economy, reflecting on the unique characteristics of developing countries in Asia, potential applications to plastics and plastic waste, current status/gap analysis, and policy and programme recommendations.

The project began by mapping and examining related emerging initiatives on plastics in Southeast Asia, noting the growing interest in plastics and the number of development partners seeking to initiate activities. In parallel, drawing from policy research and existing practices, a circular economy framework for plastics was developed and adapted to the unique needs and circumstances of the ASEAN Community and its Member States. This framework was then modified to address the specific issue of plastics pollution and subsequently used as a conceptual framing for further data collection and analysis. Initial consultations with ASEAN government officials were held on the sidelines of the Workshop on "Managing Packaging Waste - Preventing Marine Litter" held in Bali, Indonesia from 31 October to 1 November 2018.

The proposed circular economy framework was thereafter used to conduct reviews of official government documents related to plastics, reports by experts in and on ASEAN Member States, newspaper publications, business reports, online resources, and other related literature. The project team visited ASEAN Member States and conducted interviews with government officials, topic experts, businesses and other relevant stakeholders. The data obtained led to the development of country briefs outlining specific policies on plastics and status of implementation. These briefs were further analysed to identify common patterns, trends, and policy gaps across the broader ASEAN community, serving as the basis for recommendations on actions that can be taken to address these gaps.

A draft report was circulated to national representatives for comments. Following that, a two-day workshop was organised in Kuala Lumpur, Malaysia with experts, national representatives from ASEAN Member States and development partners on 11 to 12 June 2019. The workshop sought to review study findings, add missing information, and fine-tune conclusions. In addition to confirming findings of the report, ASEAN Member States engaged in the workshop with a view towards ensuring that recommendations could be made more actionable, including by elaborating on potential collaborative activities between the EU and ASEAN for addressing existing gaps and advancing a regional circular economy approach to plastics.

10 EU Plastics Strategy. European Commission (2018). Available at: https://ec.europa.eu/commission/news/eu-plastics-strategy-2018-nov-20_en. (Accessed: 18 July 2019)

1.4. Report structure

Following this introductory chapter, chapter two introduces a circular economy perspective to plastics and presents a framework for addressing related sustainability challenges. It argues that a shift to a circular economy involves looking beyond waste management, which includes carrying out coordinated policy interventions at all stages of the life-cycle of plastics. Chapter three uses the circular economy lens to present an overview of plastics pollution policies in the region, showing broad regional tendencies and some examples of actions that have been taken. These issues are analysed in detail within Annex I of the report, which contains country briefs that outline the status of plastic policies and interventions in ASEAN Member States. Chapters four and five together offer various options for solutions. Chapter four identifies common existing gaps in policy and practice across the region, clustering them into four broad categories: policy and governance; information and knowledge; technical capacity; and markets and finance. Discussions of these gaps are followed by sets of recommended actions, several of which could be implemented at the national level, and a number of which could be components of broader regional collaboration among ASEAN Member States. Finally, chapter five outlines five opportunities for ASEAN region-wide initiatives with potential for addressing several of the common gaps found across ASEAN countries and which in turn would complement and strengthen national actions. The initiatives cover guidelines on circularity in plastics use, research and innovation, technical standards for plastic products and recycled plastics, phasing out of harmful additives to plastics, and an ASEAN framework agreement on plastic pollution.

As put forward in this report, undertaking the proposed regional actions would help contribute to the international response on plastics issues, help deepen ties within the ASEAN community, and strengthen cooperation between the region and its key partners.

CHAPTER 2:

CIRCULAR ECONOMY AND PLASTICS

This chapter provides a framing for the analysis and recommendations presented in the following chapters of the report. It introduces the circular economy concept as a critique against the currently dominant mode of production and consumption, which is characterised by high material throughput and rapidly escalating demand for natural resources. It notices the many benefits of plastic materials for human society while also highlighting the serious challenges that are also associated with the widespread and rapidly increasing use of plastics. The following section applies a circular economy perspective to plastics and presents a framework for addressing related sustainability challenges. In brief, the chapter argues that a shift to a circular economy will require coordinated policy interventions at all stages of the life-cycle of plastics, including: resource extraction and use, design and manufacture of products, trade and retail, use, recycle, and final disposal when necessary. Approaching plastics through a life-cycle approach depends very much on more integrated and coherent ways of drafting and implementing public policies.

2.1. Circular economy as an emerging approach to sustainable resource management

Human society is consuming ever-increasing amounts of natural resources and producing rapidly growing amounts of waste, pushing strongly against biophysical boundaries and threatening the integrity of the planet's life-supporting systems. This escalating material throughput is a consequence of the current economic system, which has been labelled a linear economy, or more colloquially, a "take-make-waste" economy. The linear system is based on a worldview where natural resources are believed to be bountiful and easy to substitute, and where it is assumed that there will always be enough sinks for unwanted materials (i.e., waste).

The circular economy approach,[11] in contrast, reflects the recognition that such a linear worldview is flawed and threatens the longevity of human civilization. It responds to the need for new economic models, adapted to biophysical realities, aimed at enabling humans to thrive within planetary boundaries. As such, the circular economy approach calls for major changes in how we define and seek to satisfy human needs and aspirations, in how we organise production and consumption of goods and services, and the ways economic activities are conducted at the global, national, and local levels.

Although there is no widely adopted definition of a circular economy, there are some principles that many practitioners and scholars working in this area largely agree on. The circular economy approach is inspired by the material flows found in nature, which are powered by solar energy and where there is virtually no waste—where all by-products can degrade to become building blocks for new life. In order for human society to use plastics sustainably over the long run, systems of production and consumption need to follow similar principles as the flow of materials in nature, taking care to avoid overwhelming terrestrial and marine environments and overshooting the biophysical carrying capacity of the planet; utilising renewable energy sources for production and recycling; optimising use and reuse of all plastic products, components and materials; and reducing to an absolute minimum the production of and diversion of plastics to waste.

The circular economy approach distinguishes between biological materials, which can biodegrade, and technical materials (such as metals) that cannot. From a circularity perspective, these two types of materials are fundamentally different and such differences need to be reflected in the way they are utilized in economic systems. For biological materials, the challenge is to manage the inflow and outflow of these materials to and from nature. This means ensuring that habitats and biota are not systematically overused and degraded, where by-products of human society return and regenerate natural systems. In order for this to be possible, efforts must be made to avoid the contamination of materials with substances that pose ecological harm. For technical materials such as plastics, the challenge involves keeping them in the economy for as long as feasibly possible, including by reducing the need for mining and production of virgin materials (see Figure 1). Implications for plastics range from designing products with long lifetimes, and necessary warranties ensured; avoiding single-use plastics unless where necessary and there are no viable alternatives; adopting business models and social solutions that enable reuse, repair and product sharing; setting up effective and efficient waste collection systems; and to recycle such materials to high quality grades.

11 The circular economy approach as described in this chapter is strongly inspired by the work of the Ellen MacArthur Foundation (EMF), which is one of the leading international proponents of this approach. However, the chapter also draws from other sources, including literature that criticizes mainstream interpretations of the circular economy approach for being too narrowly focused on technical solutions and business driven initiatives. Examples of such critical perspectives can be found in for example Kirchherr, J., Reike, D. and Hekkert, M., 2017. Conceptualizing the circular economy: An analysis of 114 definitions. Resources, Conservation and Recycling, 127, pp.221-232 and Hobson, Kersty and Lynch, N. 2016. Diversifying and de-growing the circular economy: radical social transformation in a resource-scarce world. Futures 82, pp. 15-25.

Figure 1: Flows of plastic materials in a circular economy

The circular economy approach draws from related concepts that in practice tend to focus mainly on recycling, including industrial ecology and 3Rs principles (reduce, reuse, recycle), yet at the same time addresses society's resource consumption from a broader perspective, highlighting the need for radical changes in how products are designed, distributed, and used. This is based on the insight that we cannot achieve sustainable resource use by only tackling waste management issues. In this context, although recycling plays an essential role in a circular economy, the approach should not be simply equated with promotion of recycling.

The term "circular" can easily invite the misconception that the circular economy is mainly about more and better recycling, which misses the dynamic and holistic nature of the approach. There are several reasons why recycling, by itself, is far from sufficient for ensuring sustainable management of resources and materials (see Box 1: Why recycling is not enough). For this reason, a circular economy approach is also about shrinking and slowing down the resource flows in the human economy.[12] This approach frames the challenge of transitioning from the current linear economy mainly as a matter of product redesign and innovation in business models, while also stressing the need for enabling conditions, including favourable government policies and regulations, for such changes to materialise.

Shifting towards a circular economy also involves assessing the need and keeping track of hazardous substances and chemicals of concern. Increasing recycling rates can amplify contamination risks and lead to substances ending up in applications where they may cause harm. There exist many documented incidents where recycled plastics containing hazardous substances have been used inappropriately, for example to produce toys for children.[13] The circular economy approach therefore stresses the need for improved chemicals management and stricter policies.

12 Mulrow, J. & Santos, V. Moving the Circular Economy Beyond Alchemy. Discard Studies (2017). Available at: https://discardstudies.com/2017/11/13/moving-the-circular-economy-beyond-alchemy/. (Accessed: 3 July 2019)

13 Straková, J., DiGangi, J., Jensen, G. K., Petrlík, J. & Bell, L. Toxic Loophole: Recycling Hazardous Waste Into New Products. (2018).

Box 1: Why recycling is not enough

Recycling holds significant potential for reducing waste and for limiting the need for natural resources. The benefits of recycling are well documented and widely known. However, there are limits to what recycling can achieve, as shown below:

- Recycling can save resources, but it also requires input of energy and other resources, which can partly offset the gains. The whole recycling chain, including collection, transportation, cleaning, and material processing requires energy (currently often in the form of fossil fuels) and can also generate pollution;
- The quality of recycled plastics can be inferior to that of virgin resin, either as a result of physical or chemical degradation of the material itself or due to contamination. Such plastics can only be used for applications with low technical, hygienic and aesthetic demands;
- Even under favourable circumstances, it is unfeasible to collect and recycle all post-consumer plastics; some of these discarded materials will inevitably be lost. The relatively low market value of most types of plastics contributes to this challenge;
- There are dissipative losses when plastics are released to the environment due to wear and tear, for example microfibers released from synthetic textiles during washing or rubber abrasion from tires;
- Certain types of plastic waste, such as laminated packaging, are technically challenging to recycle with high quality; and
- The global amount of materials-in-use, including plastics, continues to increase. The demand associated with growing material stocks cannot be met through recycling, even if recycling rates would reach 100%; it requires input of virgin resources.
- These examples do not refute the importance of recycling. The emphasis is on recognising limitations, and not relying on recycling as the only approach towards realising a circular economy.

Source: Modified from: Akenji, L., Bengtsson, M., Bleischwitz, R., Tukker, A. & Schandl, H. Ossified materialism: introduction to the special volume on absolute reductions in materials throughput and emissions. J. Clean. Prod. 132, 1–12 (2016).

2.2. Sustainability issues related to plastics

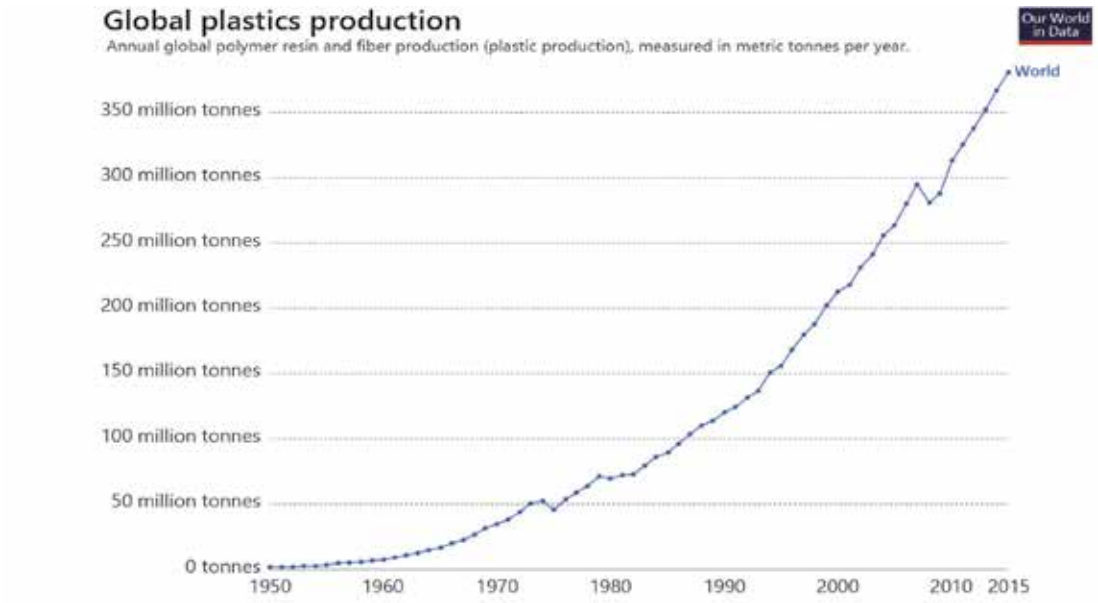
Plastics have only existed at scale since the 1950s but in recent decades the global production has surged to reach around 400 million tonnes per year (Figure 2: Global production of plastics, 1950-2015). That corresponds to over 50 kilograms of plastics per person per year.

Plastics, a catchall term for a diverse group of polymers, have a number of features that quickly made them very popular among industrial designers as well as among consumers. For example, plastics are relatively cheap, can be made transparent and can easily be coloured, are light-weight, can be made flexible or hard, are usually waterproof, and can be blown into foam with good heat insulating properties. As a result of its versatility and many desirable features, plastics soon started to replace other materials - not the least for packaging food and other consumer products. Plastics also contributed to new business models and provisioning systems, including those related to processed and pre-packaged food and daily goods. Because plastic materials extended the shelf life of many food products and made it easier to store and transport food over long distances, they also shaped consumer preferences regarding hygiene, aesthetics, and convenience. Plastics have also made many household appliances and home furnishings more affordable. It is no exaggeration to say that plastics have played a role in enabling modern urban lifestyles, as we currently know them![14]

Durability is one of the many attractive features of plastics, but this is at the same time one of the main reasons why society's escalating use of plastics remains problematic. Plastics, conventionally made of petroleum or fossil gas, do not rust or corrode; discarded plastic items can remain in nature for hundreds of years. Unlike organics substances, most plastics do not biodegrade but rather slowly photodegrade, in the process they break down into small plastic fragments (micro-plastics and nano-plastics) that can easily be taken up by plankton and other living beings where they accumulate in body tissues.

14 Thompson, R. C., Swan, S. H., Moore, C. J. & vom Saal, F. S. Our Plastic Age. Philos. Trans. R. Soc. B. 364, 1973–1976 (2009).

Figure 2: Global production of plastics, 1950-2015



Source: Data from Geyer, R., Jambeck, J. & Law, K.
Production, use, and fate of all plastics ever made. Science Advances (2017).

The widespread use of plastics was criticised already in the 1970s, when it became framed as a littering issue to be solved mainly through changes in consumer behaviour and expanded recycling.[15] In the last few years, there has been a renewed interest in plastics issues, which now receive strong attention from media, civil society, academia, international organisations, governments and the private sector. One contributing factor to the current focus on plastics is arguably its role in ocean pollution and the highly visible damage this does to marine life. However, looking across the entire life cycle of plastics, this material is associated with a number of health and environmental issues from the local to the global scale (Table 1). Preventing leakage of plastics to the oceans, while important and urgent, is only one aspect of creating a sustainable way to use plastic materials.

Table 1: Local and global issues associated with the life-cycle of plastics, and their impacts

Plastics issue	Impacts
Local	
Increased volume of waste to be collected, transported and treated	Costs for municipalities, reduced life-time of landfills
Open (or poorly controlled) burning of plastics	Air, water and soil pollution -> Health and environmental impacts. Odour -> Nuisance
Clogging of sewers	Worsening of floods -> Damage on property, risk to human lives and health, impacts on transport
Litter	Visual pollution -> Nuisance, impacts on tourism, costs for clean-up Home for pests and insects -> Nuisance, risk for vector-borne diseases

15 Buranyi, S. The plastic backlash: what's behind our sudden rage – and will it make a difference? The Guardian (2018). Available at: https://www.theguardian.com/environment/2018/nov/13/the-plastic-backlash-whats-behind-our-sudden-rage-and-will-it-make-a-difference. (Accessed: 3 July 2019)

Plastics issue	Impacts
Global/regional	
Greenhouse-gas emissions from all stages of the life-cycle of plastics	Increasing concentration of greenhouse gases in the atmosphere -> climate change
Pollution and hazardous waste from oil and gas extraction and refining, and from the production of plastics	Impacts on human health and ecosystems
Marine debris and pollution	Impacts on marine life, fisheries, human health
Hazardous additives (plasticisers, colorants, flame retardants, etc.) and contaminants	Impacts on marine life, soils, human health

2.3. Circular economy approach to plastics

Overcoming the plastics-related issues listed in *Table 1: Local and global issues associated with the life-cycle of plastics, and their impactsby* transitioning to a circular economy will require multi-pronged strategies. *Box 2:* Plastic packaging in a circular economy below introduces a vision for what a circular economy for plastics could look like, based on seven elements. These elements could serve as a framework for government actions to address plastics challenges.

Box 2: Plastic packaging in a circular economy

What could a circular economy vision for plastics look like? This section presents a framework for envisioning a circular economy future for plastics, focusing on packaging, which is by far the single largest use category for plastics (see Geyer et al. 2017). A multi-pronged strategy to realising a circular economy for plastic packaging could be based on the following seven approaches:

1. Eliminate unnecessary plastic packaging through innovation, redesign, and alternative delivery models
   - Examples: reformulated consumer products, such as solid shampoo bars instead of liquid shampoo, or local production/consumption systems.
2. Reduce the need for single-use packaging by adopting reuse models wherever possible
   - Examples: refillable beverage bottles and food containers, reusable crates for delivery services.
3. Design all plastic packaging to be reusable, recyclable, or compostable
   - Examples: packages made of higher quality types of plastics,
4. Ensure that all plastic packaging is actually reused, recycled (as material, not through waste-to-energy), or composted
   - Examples: extended producer responsibility systems that require manufacturers to play major roles in collecting and treating post-consumer packaging, deposit-refund schemes to incentivise collection
5. Decouple the use of plastics from the consumption of non-renewable resources
   - This can be achieved by reducing the consumption of new plastics, recycling plastics in closed loops where recycled resins substitute for new plastics, and increasing the use of bio-based plastics (while considering potential trade-offs, including increasing land use and food prices).
6. Ensure that all plastic packaging is free of hazardous chemicals
7. Protect the health, safety, and rights of all people involved with the life-cycles of plastics

This framework is modified from the vision outlined in an Annex of the Ellen Macarthur Foundation, (2016). The New Plastics Economy: Rethinking the future of plastics. www.ellenmacarthurfoundation.org/publications/the-new-plastics-economy-rethinking-the-future-of-plastics/.

When discussing the future of plastics and how to make our society's use of these materials more sustainable, it is also important to consider associated climate impacts. A recent global study found that under business-as-usual conditions, the plastics industry alone may use upwards of 15 percent of the global carbon budget by 2050.[16] The

16 Zheng, J. & Suh, S. Strategies to reduce the global carbon footprint of plastics. Nature Climate Change 9, 374-378 (2019).

study further analysed how society's production and use of plastics would need to be transformed in order to be aligned with the ambition to keep global warming to less than 2°C. The study identified four basic approaches to achieving this objective:

- Curb the expected growth in plastic consumption
- Shift to biobased plastics
- Expand recycling
- Power all processes along the life-cycle of plastics with renewable energy

The study concluded that a combination of strong efforts in all these four areas remains a prerequisite for a low-carbon plastics system to emerge over the next few decades. These recommendations are largely consistent with the actions required for moving towards a circular economy for plastics as outlined in *Box 2*.

2.4. Policy tools applicable along plastics supply chains

Bringing about the transformative changes outlined in *Box 1*: Why recycling is not enough will require policy interventions at all supply chain stages of plastics. This section identifies key actions at each main stage and indicates relevant types of policy tools/instruments.

Main types of policy tools/instruments:

R – Regulatory, legally binding rules
F – Financing/ Economic incentives and disincentives
T – Technical
V – Voluntary agreements, non-binding
I – Information and education

Table 2: Policy tools applicable along plastics supply chains

Stage in supply chain	Important considerations
Resource (raw materials, recycled or reused plastics)	• Research and new innovations to identify alternative materials for plastic (single-use plastics) (R/F/T/V/I) • Standards/ technology development to identify biodegradable plastic (R/T) • Ban use of hazardous additives from primary plastics (R/T) • Set strategy/targets to use plastic more as resource than energy (R/T)
Design/production	• Practice design-for-environment - easy to reuse, repair, recycle (T/F) • Avoid use of toxic chemicals in plastics (e.g. benzene and styrene in Styrofoam, and harmful additives in children's toys) (R/T) • Design/produce longer lasting products (T) • Improve energy efficiency and use of renewable energy sources • Ban microbeads in personal care products and cosmetics (R) • Minimise input of virgin material/resins (F/R/T) • Use EPR regulation to drive supply of materials and increase economies of scale, reduce costs and increase resilience (R) • Phase-out or ban (R) single-use plastics care products and cosmetics (R/V)
Trade (trade in raw materials, recyclables, etc.)	• Prioritise trade in, and use of recycled and recyclable plastics over virgin resources/ resins (R/F/V) • Place disincentives (e.g. eco-tax) on difficult-to-manage and most unsustainable plastics (R/F) • Develop and share market information to allow actors to expand into new markets (R/F/V/I)

Stage in supply chain	Important considerations
Retail	• Obligate manufactures to setup buy back systems for their products (e.g. deposit-refund schemes for plastic packaging) (R/F) • Reduced packaging (T/V) • Prioritise alternative (more sustainable) packaging material (T) • Consumer awareness and education on optimised plastics use (I)
Use (domestic and business)	• Charge waste producers for collection and disposal (pay-as-you-throw) (F) • Use of recycled and recyclable products (R/V) • Waste separation at source (R/V)
Reuse/repair	• Prioritise reduce/reuse before recycling based on waste hierarchy (R) • Identify local systems/mechanisms on reuse/repair and set incentives for their application (R/F/V/I) • Awareness raising/information sharing on repair/reuse opportunities (T/I)
Recycle	• Standardise effective waste collection systems (R) • Set limits and targets for recycling (R/T) • Reduce illegal waste trafficking (R) • Mobilise investment for developing countries to improve collection, sorting and processing systems (F) • Development of better and cost-effective technologies for recycling (T)
Disposal	• Zero plastic to landfills (R) • Enforcement to reduce illegal dumping and waste burning (R) • Downcycling to lower-grade construction materials and other products as an interim solution (T/V/I)

CHAPTER 3:

PLASTICS AND RELATED POLICIES IN ASEAN

Southeast Asia has emerged as a global hotspot for tackling plastic-related issues for a number of reasons. Major economies in the region have been found to be among the largest contributors of marine plastic pollution globally, and several countries in the region have seen surging inflows of plastic waste from high-income countries following China's instituted ban on plastic imports in 2018. In this context, the growing consumption of plastics occurring across the region adds to already dire challenges of waste collection and treatment.

Taken together, the current situation in low and middle-income countries across Asia remains quite different from how the use of plastics expanded in Western countries in the second half of the 20th century. When plastics consumption grew strongly in the West, these countries already had high collection rates for solid waste and treatment facilities that to a high degree could prevent environmental leakage. However, such systems are not well established in most Southeast Asian countries; as business practices and consumer preferences have shifted to industrial production and distribution models favouring the intensive use of plastic packaging, this has naturally created problems. This inconsistency between the rapidly growing use of plastics and the general lack of infrastructure for safe end-of-life management of plastic materials consequently leaves governments struggling.

This chapter summarises the current situation in the ASEAN region focusing on government policies related to plastics from a circular economy perspective. It draws mainly from the Country Briefs under Annex I of this report and highlights some of the main differences and similarities in the ways governments are tackling plastics-related challenges. The chapter begins by providing a broad-brush picture of how governments in the region frame and address plastics issues. It goes on to map specific policy initiatives on plastics in each country, showing diversity in existing policy approaches and indicating opportunities for additional and more comprehensive government action. It ends with an outlook towards more comprehensive policy approaches covering all major life-cycle stages, which also serves as a segue into the following chapter outlining options for narrowing existing gaps in policies and practices.

3.1. Government actions on plastics - focus areas

All ASEAN member state governments recognise the need to address plastics issues, but the main rationale for taking action varies widely. Ocean debris, with its impacts on marine life, tourism and coastal communities, air pollution from open burning and its associated health impacts, as well as the nuisance of visual pollution from uncollected or inappropriately managed waste appear to be the strongest drivers for national government action. At the local level, challenges with securing sufficient resources and land for collection and disposal of growing waste volumes are often also a strong motivating factor. In addition, different ministries within each government can often have specific concerns related to plastics and related industries and differ in their priorities regarding government interventions.

The issues listed above all appear at the downstream and post-use stages of the plastics life-cycle, and thus lend themselves to solutions focused on improving overall waste collection and management. This is also where governments tend to focus most of their efforts. Table 3: Typical actions by national governments in Southeast Asia in relation to the main life-cycle stages of plastics summarises typical actions by ASEAN national governments in relation to the main life-cycle stages of plastics. This overview highlights the limited attention that is currently given to the upstream stages of material/product design and manufacturing as well as to the recycling chain.

Table 3: Typical actions by national governments in Southeast Asia in relation to the main life-cycle stages of plastics

Life-cycle stage	Typical government actions
Plastics production and trade	· Regulated as any other industry · In some countries, the plastics industry is seen as an important engine of economic development and job creation; this creates a possible policy conflict where the expansion of this industry is promoted despite the challenges associated with increasing use of plastics.
Manufacturing and trade of plastic goods, including packaging	· Regulated as any other industry and commodity · Basically no attempts to discourage problematic kinds of plastics, combinations of materials, or designs · Weak or non-existent regulations of plastic additives, including hazardous substances · Very limited attempts to encourage alternative materials, including bio-based plastics and bio-degradable/compostable plastics
Distribution and use	· Increasing number of initiatives to discourage plastic items provided to consumers at the point of purchase (such as carrier bags, food trays, drinking cups, cutlery, straws) but mainly initiated at local level and with uneven implementation effectiveness · Few efforts to influence packaging design or amount, or to stimulate business models based on reusable packaging, or business models that reduce packaging need in the first place
Waste collection and management	· Often the responsibility of local governments, insufficient coverage of collection services, large leakage to the environment due to inappropriate disposal (both of uncollected waste and of collected waste that has been disposed of in dump sites), fairly widespread open burning · Little formally organised segregated collection of waste plastics · Many local efforts to remove plastics from rivers and beaches · Considerable collection of waste plastics in many cities, mainly through diverse informal channels, often focusing only on a few kinds of plastics
Recycling and use of recycled plastics	· Some government initiatives to stop highly polluting recycling activities, but overall limited efforts to increase the volume of recycling and to improve the quality and sustainability performance of recycling chains · Few efforts to stimulate the demand for recycled plastics
Import of plastic waste for recycling	· Regulated or banned by many governments but enforcement often challenging

Interventions focused on the downstream stages of the plastics life-cycle are also reflected by the way central governments typically assign responsibility to various ministries on plastics issues. In most countries, ministries in charge of environmental protection are delegated a leading role, sometimes together with ministries responsible for municipal solid waste management. While such arrangements are logical in a sense – reflecting concerns over the environmental impacts of plastics – they may not be an ideal basis for developing and implementing comprehensive policy strategies aimed at shifting to a circular economy. In most countries, not only in Southeast Asia, but also in many parts of the world, environmental ministries have limited ability to engage constructively with the business community and to coordinate the work across government on matters related to industrial development, commerce, trade, and science and technology – in other words, policy areas that are all pivotal to a transition to a circular economy.

3.2. Government actions on plastics - policy approaches

This section takes a closer look at national governments' actions on plastics. Table 4: Mapping current plastics policies and strategies of ASEAN Member Stateson the following pages gives an overview of the policy approaches to plastics employed by each ASEAN Member State. The ten approaches included are: national strategies, bans on single-use items, charges on single-use items, deposit-refund schemes, extended producer responsibility, source-separated collection, pilot projects and voluntary schemes, bans on marine dumping and land-based dumping, and import regulations.

As can be seen, while there exist considerable differences in the way governments seek to address plastics-related challenges, there are also some important commonalities. For example, while some governments have developed national strategies or plans on plastics to better coordinate actions by related ministries and stakeholders, others have not (or not as of yet) drawn up associated policy documents. Similarly, while number of countries have introduced bans or charges on single-use plastic items (often targeting shopping bags, and only in some cities or regions), far from all have yet to do so. Perhaps surprisingly, no country has sought to boost collection rates or post-consumer packaging through deposit-refund systems. Extended producer responsibility (EPR) has been discussed in several countries – and in a couple of cases there is a legal basis in place – but heretofore no such systems have been introduced. Source segregation and separated collection of solid waste is generally encouraged, and in a few countries even mandated by law, but the actual share that is collected in this way tends to be relatively low.

The highlighted differences provide an opportunity for member states to learn from diverging policy experiences in the ASEAN community. Countries that have experience with a certain policy approach are likely to have learnt lessons along the way that other countries could benefit from.

This overview also highlights that some policy approaches are infrequently used at present, and in some cases not used at all. In addition, it shows that while some countries have fairly diverse policy "portfolios", the way they have combined approaches varies considerably. In sum, there appears to be both considerable potential for countries to learn from the respective experiences of other member states and for all governments to broaden and diversify their respective policy portfolios.

3. Mapping current plastics policies and strategies of ASEAN Member States

Table 4 : Mapping current plastics policies and strategies of ASEAN Member States
See Annex I (Country Briefs) for details

Exists	Does not currently exist	Partially exists or is under development

Country	Plastic-specific Strategy	Ban of single-use plastics	Levy/charge on single-use plastics	Deposit-refund scheme	EPR-based recycling policies	Sorted collection	Voluntary scheme/ pilot projects	Import regulation
Brunei							No Plastic Bag Everyday Initiative	3 percent excise duty imposed on plastic imports
Cambodia			Sub-Decree on Management of Plastic Bags (2017)			Sub-decree on plastic waste management		

Country	Plastic-specific Strategy	Ban of single-use plastics	Levy/charge on single-use plastics	Deposit-refund scheme	EPR-based recycling policies	Sorted collection	Voluntary scheme/ pilot projects	Import regulation
Indonesia	National policy and strategy on solid waste management (including plastic waste) regulated by Presidential Regulation No. 97/2017. National Action Plan on Marine Debris (2017-2025)	Bali Province and 18 cities and regencies have enacted regulations banning single-use plastic including shopping bags, straws, and foam containers for food.	Finalising government regulation concerning excise on plastic shopping bag. Based on modern retailer association initiative, some stores charge IDR200 per plastic shopping bag.	Planning to use DRF scheme for PET bottle and aluminium can.	Finalising ministerial regulation on EPR road map to prevent and reduce product and packaging waste from brand owner manufacturer, retailer, and food/beverages service industry.	Partially implemented in some cities and regencies.	Three pilot projects of take-back and recycle scheme for PET bottle, TetraPak carton, and flexible plastic (sachets and pouches).	Import of waste (any types of waste including plastic waste) is prohibited by Law. However, import of plastic scrap that is ready for recycling is still accepted.
Lao PDR						Mandatory by law but not enforced	Community solid waste management project	
Malaysia	Roadmap towards Zero Single-Use Plastics (2018-2030)	Drinking straw ban	Pollution charge; Ban on non-biodegradable plastics; Levy on plastic bags		Planned –but not yet applied	Pilot level in selected city areas		Taxation of waste plastics
Myanmar	National MSW strategy includes plastics section					Pilot level in selected city areas		Notification No 22/2019 of Ministry of Commerce: all import of wastes to Myanmar is restricted
Philippines	Under development	Partial bans on the use of plastic bags			Proposal under discussion in the Senate	Yes	Local bans on the use of plastic bags	
Singapore					Reporting requirements for packaging data and 3R plans for packaging in 2020	National Recycling Programme	Singapore Packaging Agreement; Schools Recycling Corner Programme; Voluntary commitment to ban plastic straws etc. in food industry	

Country	Plastic-specific Strategy	Ban of single-use plastics	Levy/charge on single-use plastics	Deposit-refund scheme	EPR-based recycling policies	Sorted collection	Voluntary scheme/ pilot projects	Import regulation
Thailand	Thailand Roadmap on Plastic Waste Management (2018-2030)	Phasing out of single-use plastics by 2022 - Products containing Oxo - Plastic cap seals - Plastic bags thinner than 36 micron - Foam containers for foods - Straws and glasses	Tax reduction for retailers using biodegradable plastics - Planning levy or tax on single use plastic products and packages	Studying possibility of deposit-refund system for packaging	Development of WEEE and 3R promotion laws with concepts of EPR and circular economy	The Ministry of Interior and the Ministry of Public Health notifications on municipal solid waste separation and collection	- Pilot project on plastic waste collection in Coastal area - Reduction of plastic bag in department stores and convenience stores	Import ban on plastic wastes
Viet Nam	Planning (National Strategy on ISWM to 2025, vision to 2050)		Levy on non-biodegradable plastics		Not yet applied		Program on control of waste from plastic bags	Trade import regulation for quality; Considering tax for import of single-use plastics

3.4. Broadening the scope of government action - from waste to circularity

Broadening the scope of government action on plastics, beyond the predominant focus on waste, is key to overcoming the multiple issues associated with the life-cycle of plastics. This does not mean that improvements in waste management are of low importance but that efforts related to waste can be more effective when pursued as part of broader life cycle-oriented strategies.

The progress towards a circular economy for plastics that can be achieved by focusing on the waste management and recycling stages is limited, and to a high degree influenced by decisions taken at earlier stages of the life-cycle. Environmentally safe waste treatment and high-quality, closed-loop recycling is much easier to attain if upstream businesses avoid plastic materials and designs that are problematic to deal with at the downstream stages, adopt reuse systems for packaging, limit the use of materials in general, and take other eco-design measures. But in the current situation, there are few efforts to engage the upstream businesses that make many of these key decisions and to hold them accountable for innovating and implementing improved solutions.

In addition, although most or all ASEAN governments recognise the importance of increased and improved recycling, they also tend to play a relatively minor role in realising such objectives. What happens with recycling and use of recycled polymers is currently mostly left to market forces, although there is wide potential for governments to play a much more active role – not only in "policing" rules violations but also with regard to fostering better and more sustainable practices and stimulating demand for products containing recycled plastics.

As many ASEAN governments seek to rapidly reduce plastic marine litter, there is a risk that they adopt solutions that are more linear than circular – solutions that reduce one problem while worsening others. More specifically, landfill disposal and incineration of plastics can help divert materials away from the oceans but are not viable solutions for a circular economy over the longer term. There is even a danger that widespread adoption of such waste treatment methods for plastics could reduce the interest in pursuing circular economy strategies, including eco-design and closed-loop recycling.

When assessing the impacts of plastic pollution and formulating responses, it is important to be aware of how such impacts affect different groups in society. Women, children, and disadvantaged groups are often exposed to disproportionate impacts. Adopting a gender and human rights perspective is therefore important, but such concerns are not well reflected in existing policies and strategies (see Box 3: Understanding the impacts of plastic pollution: the importance of a gender perspective).

Some recently published national strategies and action plans (such as those of Indonesia, Malaysia, and Thailand) reflect an ambition to tackle plastics issues more holistically, largely in line with circular economy principles. This is encouraging, but it is important to be aware of the challenges related to the implementation of such strategies. In order for governments to be able to make substantive progress towards the objectives of these plans, they will need to establish mechanisms for working effectively across policy domains: drafting, implementing and monitoring policies in more integrated ways, involving multiple ministries as well as government bodies at different levels. Active cooperation among the ASEAN countries and effective support from the region's partners will also be of key importance for navigating the path towards more circular economies for plastic.

Box 3: Understanding the impacts of plastic pollution: the importance of a gender perspective

A recent study by UN Environment and the Stockholm Environment Institute (SEI)-Asia Centre, analyzed gender and human rights aspects of marine plastic litter. The impacts of plastic pollution are particularly severe for disadvantaged groups, including women, children, informal waste pickers and coastal communities. Issues around plastic products and pollution affect members of these groups in unique ways based on biology, culture, income, gender and social norms. The study conducted a gender analysis of the plastics value chain, from production to consumption, waste generation and management to leakage into the ocean. Main findings include:

- The policy environment at global and regional level currently does not constitute a conducive environment for countries to ensure respect, protection and promotion of gender and human rights when addressing the challenge of marine plastic litter.
- Women and other vulnerable groups are impacted in different ways as plastic journeys from production to the ocean. Specifically, research findings show that plastics affect workers who handle hazardous materials and are exposed to endocrine disruptors (BPA, vinyl chloride, styrene, acrylonitrile and phthalates) in the production stage, causing infertility, spontaneous abortions, adverse birth outcomes and increased risk of breast cancer.
- As major consumers of plastic products (cosmetics, feminine hygiene products and household goods), women are more risk-exposed but can also be engaged as champions for mitigating marine plastic litter in household consumption and waste disposal.
- Women and children in the informal waste sector face multiple disadvantages and are exposed to health and social protection threats posed by mismanaged plastic waste. Their contributions to recovery and recycling of valuable plastics in the face of underdeveloped formal waste management systems are largely overlooked and unsupported.
- The economic, social, and health implications show the urgency to decisively manage this growing challenge to mitigate the worsening trend of marine plastic pollution. Plastic value chain management is complex and requires change on a structural and systemic level. Action is needed to increase consumer awareness, develop circular economy policies and sustainable waste management systems, and essentially to reduce fossil fuel-based production of avoidable or hard-to-recycle plastic that would enter waste streams and the environment. The impacts on disadvantaged groups must be internalized into the cost of plastic production and pollution to protect the rights and interests of the most vulnerable.
- The cost of clean-up and recovery of plastic that has entered marine and coastal environments is generally higher compared to the cost of preventing plastic leakage through waste management on land, especially when considering gendered economic and social impacts of marine plastic that endangers the health and human rights of individuals and coastal communities.

Source: UN Environment (2019) Marine plastic litter in East Asian Seas: Gender, human rights and economic dimensions

CHAPTER 4:

TOWARDS A CIRCULAR ECONOMY FOR PLASTICS IN ASEAN I: MAJOR GAPS AND POTENTIAL ACTIONS

This chapter identifies common existing gaps in policy and practice across the region. Based on the current status of countries in the ASEAN region (see Country Briefs under Annex I), this study has identified some of the major gaps in addressing issues associated to plastics. The gaps identified fall into four broad categories common across the region: policy and governance; information and knowledge; technical capacity; and markets and finance. While all these gaps are not present in every country, most of them can be observed in almost all ASEAN Member States. The four types of gaps are discussed below, each followed by a set of related actions, several of which could be implemented at the national level, and a number of which could be components of broader regional collaboration among ASEAN Member States. Note that the actions listed are not necessarily readily applicable policy recommendations, but rather a range of responses combining immediate and longer-term actions.

4.1. Policy and governance

Effective governance for plastics requires national governments to create a conducive environment for dialogue between all stakeholders, offer or support development of practical tools, and facilitate a decisive shift away from the problems related to plastics in society and the environment. It also relates to ensuring businesses take responsibility for their own actions or those of affected stakeholders, and change their business practices in order to address these problems accordingly. Furthermore, an effective governance system for plastics issues needs to be adaptive to changing circumstances and be able to identify and effectively eliminate the most problematic materials and products while at the same time stimulating technical and social innovation towards better solutions.

Gaps in policy and governance

Governance for plastics would need to be more systematized and deliberate among ASEAN countries and businesses. Addressing gaps in governance remain some of the most essential steps in finding coordinated response to plastic issues for governments, users and business at all stages of the value chain. Examples of gaps in policy and governance observed across ASEAN Member States are:

- Clarity on mandates, roles and responsibilities at different levels and agencies of government
- Comprehensive frameworks with policy packages and instruments to follow up on national strategies and plans
- Effective approaches for governments to engage stakeholders
- Tools and guidelines to support action by concerned stakeholders

The predominant narrative to governance of plastics in ASEAN is in terms of waste management, and therefore is commonly framed as an end-of-pipe issue. This has in many countries resulted in a suite of national waste management strategies, often including engineered landfill disposal, source segregation and recycling, and – more recently – some bans on certain single-use plastic items. However, most of these plans – although well-crafted and full of worthy ideas and ambitious objectives – have not been implemented as intended.

The end-of-pipe approach to plastics has brought with it the problem of governance often associated with waste management in general: unclear and sometimes confusing mandates between municipal and national authorities, and inarticulate mechanisms for coordination among ministries as well as between national and sub-national governments. In addition, coordination is often expected to be handled by government bodies in charge of environmental protection or waste management, whereas plastics issues are strongly related to trade, manufacture, design and even culture – areas that these government bodies typically have little or no influence over. The case is similar for businesses where fragmented governance in business supply chains leads to disconnections among different parts of the value chain – such as where the recycling industry is not well linked with efforts to improve product design.

Effective governance requires strong communication and coordination among diverse actors and stakeholders, and governments often need to play a key role as convener and facilitator. However, in Southeast Asia there is a shortage of platforms for government-business dialogue. Effective exchange is also hampered by the fact that the private sector has a high share of SMEs and that businesses in many cases are not organised in associations. This lack

of business representatives speaking on behalf of their members creates challenges for governments in engaging effectively with the business community. Such challenges are even more pronounced for the informal sector, which in many countries plays a dominant role in plastic waste collection and recycling.

Addressing gaps in policy and governance

To address these shortcomings, it would be beneficial to establish mechanisms that support collaboration among and facilitate engagement among and across different stakeholder groups, including the following:

- Multi-sector industrial working groups to formalize agreements on waste exchanges across different main categories of plastic waste; this could over time be linked with regional ASEAN initiatives
- Regular dialogues on public-private partnerships
- Business-to-business networks on closed-loop solutions
- Platforms for dialogue between upstream (packaging/fillers) and downstream (waste management and recycling) businesses
  - » This can inspire material selection and product design that enable cost-efficient, high-quality recycling
- Cooperatives linking informal/community-based plastic waste collectors and formal collection systems
  - » This can reduce the competition that easily occurs when formal waste collection systems are introduced, and the threat this often poses to informal waste-workers' livelihoods, by establishing mutually beneficial role-sharing
- Inter-ministerial mechanisms to reduce fragmentation between national/local authorities
  - » This could involve assigning lead responsibility for facilitating a shift to a circular economy for plastics to a government body with authority and capacity for effective coordination
  - » The process of drafting, reviewing and updating national plans of action on plastics offers opportunities to improve policy coherence – but for that to happen such processes need to be broad-based and inclusive

One specific governance reform related to plastics involves making producers fully or partially responsible for the end-of-life collection and treatment/recycling of their products, known as extended producer responsibility (EPR). Extending responsibilities in this manner has the potential to provide incentives for product redesign, increase collection and recycling rates, and lower costs for municipalities. However, EPR is not a fixed policy "tool" but an approach that needs to be tailored to specific circumstances, needs and objectives. An adaptive approach allows for each country to design appropriate responsibilities and effective mechanisms of implementation based on their own situation, which can also shift over time. EPR schemes can be designed and implemented in various ways, depending on the main objective and reflecting both the enforcement capacity of governments and the compliance capacity of industry. At the same time, an important distinction can be made between financial and physical responsibility. In the case of financial responsibility, producers pay for end-of-life treatment costs for their products, either fully or partly. In the case of physical responsibility, producers themselves organise collection and end-of-life treatment for their products. Actions to consider in relation to EPR include the following:

- Requesting producing companies to propose their own designs for EPR systems for each plastic type and major product category
- Mandating the use of deposit-refund systems for selected types of products or packaging, to increase source separation and collection rates
- Introducing regulations such as minimum recycling requirements for key products and materials
- Setting up an online platform to better address information and coordination issues on EPR among participating businesses
- Exploring how existing informal sector activities could become part of EPR systems

In addition to EPR schemes, various types of market-based instruments can shift economic incentives for business, such as:

- Taxing the production and import of virgin plastics and allocating revenue towards innovation funding mechanisms
- Using public procurement to expand the market for alternatives to plastics and for products containing recycled plastics, and encourage large institutional buyers to apply similar criteria for their purchases

4.2. Information and knowledge

Quality information and knowledge are important elements for designing an effective course of action. In the absence of information, or without good quality data and relevant knowledge on how to use it, countries can make assumptions and take decisions on plastics that do not effectively address the problem or that may have unintended consequences. Similarly, businesses and users can take actions that seem, but fail, to provide solutions. Informed decision making and sound priority setting requires data on the current situation in each country, including trends in plastics use. Health and environmental hazards associated with plastics and additives (e.g. colorants, plasticizers, etc.) need to be clarified, as well as their benefits (e.g. in the health sector and food preservation). In designing solutions, data and researched understanding is needed, for example, in assessing the pros and cons of bio-based, biodegradable/compostable and oxo-degradable plastics, new types of emerging plastics and its alternatives, as well as recycling and disposal options.

Gaps in information and knowledge

Identified information and knowledge gaps on plastics issues in ASEAN include areas such as:

- Data on current use patterns and trends, as well as on waste handling and recycling routes
- Systems for making information widely accessible
- Understanding of different types of plastics and their properties, as well as alternatives
- Clarity on the problems associated with different kinds of plastics and applications for plastics, as well as on their benefits
- Knowledge on the magnitude of the various issues associated with the life-cycle of plastics, for example their socio-economic impacts and their consequences for different groups in society
- Knowledge on the relative merits of different recycling options, including on the role of recycling in a circular economy
- Awareness on issues associated with hazardous chemicals and substances of concern found in plastics
- A life-cycle understanding of plastics and of how globalised value chains can both amplify and help addressing issues around plastics

In many ASEAN countries – as is the case in most countries worldwide – there exist a range of misconceptions about plastics and associated problems, as well as insufficient knowledge on their benefits and positive attributes. In addition, most actors have only partial knowledge on the life-cycle stages of plastics, and few have a sufficient grasp of the extent and complexity of the plastics problem overall. Conventionally, plastics are often framed as a waste issue, without proper analysis of trade aspects, sectoral interactions, design, manufacture, and use patterns – as well as how these factors contribute to problems or affect solutions. Many consumers and proponents of change often make the blanket assumption that all plastics are bad. Similarly, some governments can reach premature conclusions that plastics should be banned, without sufficient consideration of, for example, availability and impacts of alternatives or other spillover effects of across-the-board actions. Some businesses, in working to become eco-friendly, shift to alternatives that might, with limited information, seem to be more sustainable but which could be ultimately more problematic or simply shift the problem elsewhere.

Addressing information and knowledge gaps

The following actions could address needs on research, data, and education relating to plastics issues in AMS:

- Strengthen the national capacity to assess patterns and trends in the use of plastics, differentiating between different types of plastics and applications for plastics
  - » This would provide a knowledge base for strategic priority setting and planning
  - » It would also involve requiring all major manufacturers and importers to disclose information on the amounts and types of plastics placed on the market
- Conduct assessments to determine priority plastic waste streams
  - » This would be part of the development of a more differentiated and targeted policy approach to plastic and plastic wastes
  - » It would also help in identifying problematic products and business models

- Establish a monitoring system to better understand the material flow of plastic waste, including on the flows through various recycling routes (formal as well as informal)
  - » This would facilitate access to information not only for the government but for stakeholders involved at various stages of the plastics life-cycle
- Conduct locally adapted life-cycle assessments of proposed alternatives to plastic products and strengthen capacity to conduct, effectively commission and correctly interpret such studies
  - » Life-cycle assessments based on local data can provide better guidance for decision making and are often regarded as more credible
  - » Such assessments are fairly complex and using them properly requires a good understanding of the methodology, including how modelling assumptions and other methodological choices can influence the results
- Support R&D on eco-design, closed loop recycling processes, polymers from renewable feedstock (including waste biomass) and other new product development
  - » Improved innovation systems in this area – involving businesses, academia, and funders – can facilitate a transition towards a circular economy
- Assess pros and cons of plastic waste solutions, including recycling treatment solutions
  - » This would help increase understanding of the practical feasibility of recycling
- Intensify institutional capacity building of local governments, who play a key role in addressing plastics issues "on the ground"
  - » This would help address the commonly seen imbalance between local governments' responsibilities and their capacity
- Raise public awareness on plastics issues, including through:
  - » Campaigns to change the image surrounding plastic consumption, influencing social norms
  - » Education programs in schools around plastic use, its benefits and its problems
  - » Targeted media initiatives
  - » Health and tourism branding initiatives, such as plastic-free cities

4.3. Technical capacity

Addressing plastics issues requires knowledge and technical know-how in a range of areas, as well as access to relevant technologies and the capacity for R&D and innovation. Technical capacity includes both access to technical hardware and related human skill-sets.

Gaps in technical capacity

Some gaps in technical capacity that have been identified across several ASEAN Member States include:

- Limited technical training of responsible personnel in the complexities of plastics, including chemical, supply chain, and environmental aspects of different types of plastics and their effects
- Technological and human-resource constraints in managing post-use plastics, often including lack of appropriate infrastructure for preventing environmental leakage of plastics
- Low capacity for innovation, especially among SMEs
- Few initiatives that encourage innovation, including social innovation to reduce plastic use, and technical R&D to find sustainable alternatives

These identified gaps result in insufficient capacity, for example, especially in terms of quality recycling, waste separation and collection, and processing plastic waste – as well as for the development of sustainable alternatives to problematic types of plastics and designs. Moreover, there is often a lack of absorptive capacity for tailoring selected technologies to local contexts in existing waste management systems, largely attributed to the application of costly and complicated imported technologies that are difficult to maintain. For instance, several municipalities report difficulties with managing running costs for imported recycling or incineration technologies, a lack of technical skills for proper maintenance, and a continued reliance on foreign expertise for their operation.

Addressing gaps in technical capacity

Narrowing these gaps in technical capacity requires actions on multiple fronts. These are some measures to consider in the ASEAN context:

- Assess existing technical expertise related to plastics and circularity in each member state, including in academia and the private sector
- Strengthen the capacity to assess the pros and cons and feasibility of various end-of-life technologies, including conversion of plastics into fuel as substitutes for coal and petroleum, and the use of waste plastics in road and building construction
- Design customised capacity development and education initiatives targeting public/private and other concerned actors.
  - » Examples include training of young industrial designers on design-for-reuse, recycling processes, and on the use of recycled materials
- Launch an annual national (and possibly regional) competition and award scheme for innovative packaging systems and alternative materials to plastics and facilitate wide-scale adoption of winning solutions
- Develop and promote eco-industrial parks or recycling clusters where circular businesses are located close to each other and have access to infrastructure for safe treatment of residual waste and wastewater treatment
- Improve separation and collection systems of plastics from households and dumping sites

International technology transfer clearly has a role to play in strengthening technical capacity, but - as noted above - such transactions are seldom straightforward. In addition, calls for technology transfer often ignore the fact that the transfer of technology is mainly a matter of business-to-business interaction where governments can play a facilitating role but seldom take an executing role.

4. Markets and finance

Markets and finance play major roles in facilitating the flow of plastics across the value chain, and thus remain key to addressing attendant sustainability issues in ASEAN. However, a clear understanding of linkages between market mechanisms and plastics issues has yet to be fully realised and incorporated into national responses as well as in region-wide solutions.

Gaps related to markets and finance

Gaps that have been identified across several ASEAN member states include:

- Poor access to financing for eco-solutions, including R&D and commercialisation of alternatives to plastics and efficient post-use processing
- Lack of shared and widely accepted technical standards for recyclables and products to ensure quality control and bring trust to the market
- Poor access to markets for recyclables – difficult for sellers and potential buyers to find each other and to agree on terms of business
- Unstable supply of recyclable plastics, creating uncertainty for potential buyers
- High entry barriers for responsible businesses, unfair competition by companies that violate environmental regulations and act unethically
- High perceived market uncertainty, hampering investments
- Overall lack of transparency and deficiencies in accountability
- Uncertainty regarding how to effectively transition from completely market-driven (and largely informal) recycling system to more regulated and formalised systems

Evidence of these gaps can be observed in poor market routes and infrastructure – contributing to unregulated markets, mismanagement, pollution and health impacts. There is limited availability to comprehensive information regarding buyers, sellers, prices of recyclables; as well as a lack of transparency and accountability in the marketplace, which is sometimes controlled by “strongmen”, or characterised by monopolistic or oligopolistic conditions that result in poor competition for recyclables and sustainable alternatives. It also remains difficult to access loans to finance opportunities for more sustainable solutions, partly due to lack of transparency in the market but also due to high interest rates for such loans. A lack of collaboration in trade regulations, leading to conflicts through bans and often resulting in leakage into informal sector operations can also be observed in several countries. Such factors inadvertently lead to a prioritisation of existing (and often unsustainable) business practices over innovative (and often more sustainable) ones.

Addressing gaps in markets and finance

There are many ways in which markets for plastics and plastic waste can be better aligned with the vision of a circular economy, including but not limited to the following measures:

- Establish technical standards for plastic recycling and for recycled plastics, and ensure adoption of these standards in the market
  - » Technical standards are voluntary tools that can help facilitate market transactions. They reduce uncertainty by providing buyers and sellers with a common reference. An example is a standard for recycled plastics that specifies maximum concentrations of residual contaminants
- Develop technical guidelines for improved recycling, including for small-scale operations with low investment needs
- Develop and promote systems that enable plastics buyers to identify plastics that have been collected and recycled in environmentally-responsible and socially fair ways
  - » This will enable manufacturing companies who want to be frontrunners in their respective industries to favour good recycling practices in their supply chain
  - » It would also make it possible to charge a higher price for sustainably sourced recycled plastics

- Stimulate domestic demand for recycled plastics in order to nurture the domestic recycling industry and reduce dependence on global markets
- Introduce non brand-specific standardised reusable bottles and containers for beverages and dry or conserved food
  - » Develop and register multinational corporations such as international manufacturers/food and beverage industry in standardisation and take-back programs for reusable plastics bottles and containers
- Create a hotline for reporting waste and recycling related crimes; encourage responsible businesses to exert peer-pressure against illegal and unethical practices to protect the reputation of the industry as a whole
- Set industrial standards for products containing recycled plastic for purposes of public procurement
  - » This could also involve encouraging large buyers in the private sphere to adopt such purchasing standards
- Encourage local consumption/production food systems
  - » This could reduce the need for plastic packaging, which is often used to give products long shelf-lives
- Establish domestic financing schemes for formal collection/recycling businesses
  - » These sectors often face difficulties in accessing finance from conventional sources such as private banks
- Increase predictability and lower perceived market risks by having clear policy directions and by announcing changes well in advance
  - » This involves also resolving the competition over plastics that may occur if countries expand investments in incineration facilities
- Introduce tax incentives to encourage the use of recycled plastic, such as VAT exemptions, levies on virgin materials, or regulations on minimum contents of recycled plastics

CHAPTER 5:

TOWARDS A CIRCULAR ECONOMY FOR PLASTICS IN ASEAN II: REGION-WIDE INITIATIVES FOR ADDRESSING PLASTICS ISSUES

The previous chapter analysed gaps common to many countries in the region and provided ideas on actions that could help narrow those gaps. While several of those measures can be implemented at the national level, or through bilateral or trilateral partnerships, there are also opportunities for ASEAN region-wide initiatives addressing several common gaps. By targeting challenges and gaps that are common to most or all ASEAN Member States, such initiatives could be streamlined and made more cost efficient. They could also help address issues that are international by nature, such as trade. Additionally, region-wide initiatives can advance the deepening of the ASEAN community.

Such initiatives, by providing development partners with actionable opportunities to support the ASEAN region, could potentially also help strengthen ties between the region and its key partners. Since the current study is part of EU-ASEAN cooperation, the initiatives presented below focus on areas where joint activities involving these two regions could be beneficial.

This chapter outlines five regional initiatives for ASEAN that could complement and strengthen national actions. The initiatives include:

1. ASEAN regional guidelines on circularity in plastics use
2. ASEAN-wide network for research and innovation on plastics
3. ASEAN technical standards for plastic products and recycled plastics
4. ASEAN regional approach to phasing out harmful additives in plastics
5. ASEAN framework agreement on plastic pollution

The five initiatives are designed to complement each other. They address different gaps and issues associated with plastics and target different actor groups. Although they are all developed with a focus on plastics, it would be possible to widen their scope to a circular economy in a more general sense - either right from the start or at a later stage.

Governments recognise the regional nature of challenges related to plastics and the need for joint action. Starting from a number of information-sharing events,[17] cooperation in the region has taken on a more substantial form. Recent declarations at the highest political level[18] indicate the countries' determination to work together to tackle these issues.

The initiatives presented here are aligned with the recently adopted ASEAN Framework of Action on Marine Debris[19] and would support its implementation, in particular the Actions and Suggested Activities related to Policy Support and Planning, Research, Innovation and Capacity Building, and Private Sector Engagement.

Discussions are currently underway about establishing a new ASEAN Working Group on the circular economy or sustainable consumption and production. Such a group would serve as a strategic node for the implementation of future initiatives. However, given the cross-cutting nature of the circular economy and plastics, it will be also necessary to engage other ASEAN bodies beyond the environmental community. Exploring how that can be done in practice is a key issue for the operationalisation of regional initiatives on plastics.

17 Such as the ASEAN Conference on Reducing Marine Debris, held in November 2017, and the workshop Managing Packaging Waste – Preventing Marine Litter, in October/November 2018.

18 In particular the ASEAN Plus Three Marine Plastic Debris Cooperative Action Initiative and the East Asia Summit Leaders' Statement on Combating Marine Plastic Debris, both adopted in November 2018, and the Bangkok Declaration on Combating Marine Debris in the ASEAN Region, adopted at the ASEAN Summit in June 2019, where leaders welcome the ASEAN Framework of Action on Marine Debris and encourage its timely implementation.

19 https://asean.org/storage/2019/06/3.-ASEAN-Framework-of-Action-on-Marine-Debris-FINAL.pdf

It should be noted that the initiatives presented here are intended to stimulate discussions and should be seen as input to further consultations among the ASEAN Member States as well as with the EU and other partners. However, it should be mentioned that an earlier version of this proposal was shared with the ASEAN Secretariat and the European Commission and revised based on their initial comments. A later draft was presented and extensively discussed at the EU-ASEAN regional workshop on circular economy (Kuala Lumpur, Malaysia, 11 to 12 June 2019). The current version has been revised to reflect comments and incorporate ideas from that meeting.

5.1. ASEAN regional guidelines on circularity in plastics use

The development of regional circular economy guidelines on options and decision-making processes regarding plastics production, use and post-use management could help disseminate policy experience and good practices, both among AMSs and reflecting experiences in other regions. Such guidelines could help disseminate policy experiences and good practices, both among AMSs and reflecting experiences in other regions. They could also promote a better understanding of a circular economy approach to plastics in general.

Such guidance would provide research-based knowledge about different types of plastics, their use and management from a circular economy perspective. Target groups and potential users would vary depending on the topic of each guideline, but governments at various levels would be key users, as well as businesses and other stakeholders. Initial topics could include for example: avoidance of plastics and selection of alternatives; plastics choice optimisation; design principles for a circular economy of plastics; suitable applications for compostable plastics; safety assessments for food packaging containing recycled plastics; hazards associated with plastic additives; disposal, collection and sorting systems; and reuse or recycling systems suitable for the ASEAN region.

In order to be effective, guidelines should respond to member state needs and priorities. Countries' national action plans and roadmaps provide useful starting points for identifying additional topics that are relevant to several countries. As member state governments review progress made on such strategies in consultation with the private sector and other stakeholders, they may identify areas where knowledge is weak or lacking, and this could initiate the development of new regional guidelines.

Some guidelines may need to be tailored to specific circumstances as plastics use patterns, conditions for post-use management, and capacity for waste management vary significantly across geographies. In general, guidelines should be flexible and adaptable. Some guidelines addressing business practices may serve as the basis for voluntary agreements between governments and companies.

Institutional arrangements

The development of guidelines could be handled on an ad-hoc basis by existing ASEAN bodies or by topic-specific task forces. Identifying specific actors for engagement would depend on the topic of each guideline, but given the cross-cutting nature of the circular economy and plastics, participation from both the environmental and economic communities would in many cases be necessary. Government officials from the region may serve as a reference group for the development of new guidelines, whereas topical experts would conduct the drafting of such guidelines.

To ensure greater continuity and more systematic generation of knowledge in this area, a new regional knowledge hub for circular economy and plastics could be established and tasked with the coordination of guidelines development. Such an entity could also handle outreach and communications in relation to the proposed guidelines and organise related training programmes. Such a hub could also coordinate data collection on plastics and related impacts, potentially in collaboration with ASEAN Member States.

Where to situate a new knowledge hub (if established) within the ASEAN structure requires further discussion, however candidates to consider include the soon to be launched ASEAN Centre for Sustainable Development Studies and Dialogue (ACSDSD) or the recently started ASEAN Institute for the Green Economy (AIGE). However, as these two bodies are still fairly new it may be safer to locate the hub in an established institution with a track record of engaging various entities within the ASEAN system.

5.2. ASEAN-wide network for research and innovation on plastics

Building up an ASEAN-wide research and innovation network on more sustainable polymers, packaging and circularity would nurture the regional pool of expertise in this area, and help stimulate innovation and entrepreneurship. Membership should ideally be diverse with a strong representation of academia and business but with participation also of governments and relevant stakeholders.

The network could cover alternatives to petroleum-based plastics (both polymers made from other feedstock and alternatives to polymers), business models that reduce or eliminate single-use plastics or enable the use of reusable plastic items, as well as new ways of recycling plastics into products with high quality and use value.

Activities could include for example:

- Policy advice and training on effective policy design to address plastic waste, and how governments can support and orchestrate innovation systems
- Programmes to facilitate access to funding for start-ups and early stage commercialisation, which can involve partnerships with private banks
- Award contests and mentoring programmes for young entrepreneurs
- Networking of university-affiliated incubators and other start-up hubs, with focus on circular economy solutions
- Scholarships for PhD programmes and postdoc research positions in this area, designed to stimulate movements among the ASEAN countries as well as researcher exchange between ASEAN and the EU. Opportunities to utilise or expand ongoing academic exchanges under ASEAN-Share should also be explored.
- Sharing of good practices regarding science-policy interface – how governments can more effectively consult academic expertise and utilise scientific knowledge in policy processes – as well as considering protection of intellectual property rights.

This initiative is in line with the suggestion by the ASEAN Complementarities Initiative to establish an ASEAN Resources Panel, modelled after and with a broader mandate than the International Resources Panel hosted by UN Environment. Accordingly, the ASEAN Resources Panel "would go beyond merely conducting analysis and actively engage policymakers and relevant stakeholders in translating results of such analysis into policy and practice. It would pool together national and regional scientists, experts, practitioners and governments to conduct analysis and provide advice and connections between policymakers, industry and the community on ways to improve global and local resource management". Combining the need for such a science-policy knowledge and innovation platform with strong political commitment on associated plastics issues offers an opportunity to build and strengthen ASEAN institutions for addressing priority problems.

The research and innovation network could also have an associated ASEAN-EU public-private platform on a circular economy for plastics. Such a platform could, for example, serve to advance applied research and development for the circular economy (joint and/or independent), promote exchange of expertise and best practices through regular dialogue, initiate or organise business match-making events involving also companies from outside of the ASEAN region (potentially in partnership with EU Chambers of Commerce in the region), and support trade, market and finance aspects of the circular economy.

Institutional arrangements

Establishing such a network would require identifying one or several member states willing to take the lead, finding an institution that could serve as a secretariat (at least in the interim), and involving a diverse core group of businesses, academics, and others. A regional knowledge hub on the circular economy and plastics (if established, mentioned in the section above) could play a coordinating role for the network. When planning for the network, it would be valuable to review experiences of similar initiatives around the world. The recently established "Circular Materials Lab" in Singapore could serve as a source of inspiration.

There are several options for how to anchor the initiative in the ASEAN structure. Ideally, it should be connected to relevant environmental Working Groups and to relevant bodies under the ASEAN Economic Community, including the ASEAN Committee on Science, Technology and Innovation (COSTI). COSTI does not currently include the plastics industry as part of its work programme, nor does it have any explicit focus on the circular economy, but it has some

potentially relevant subcommittees, including on materials science and technology, infrastructure and resource development, and food science and technology. The possibility of linking a research and innovation network to COSTI would need to be further explored, first within the ASEAN Secretariat. A concrete next step could be to invite the chair persons of relevant environmental working groups to a small meeting back-to-back with the COSTI meeting in the first half of 2020. Other relevant ASEAN bodies include the Consultative Committee on Standards and Quality and the Working Group on Food Safety,

Member state governments may wish to explore which ministry or agency would be suitable as a lead agency or focal point for the initiative. While this would depend on how the initiative is anchored in the ASEAN structure, it seems critical to have government bodies related to industry, innovation, and science involved as well as bodies in charge of the environment. Involvement also of other ministries may turn out to be beneficial; for example, ministries of foreign affairs may need to be involved in a coordinating role.

5.3. ASEAN technical standards for plastic products and recycled plastics

This recommendation involves supporting the development of technical standards for plastics, recycled plastics, and products made of plastics (or recycled plastics) harmonised across ASEAN. The kind of standards proposed here are voluntary tools that can facilitate business transactions by reducing uncertainty and transaction costs. Both buyers and sellers can benefit from knowing that a product or service meets certain established and well-known criteria. Adopting such standards would be in line with the vision of the ASEAN region becoming a fully integrated market. Standards that are related to a shift to a circular economy could include, for example, quality standards for recycled polymers and standards for products made (partly or entirely) of recycled plastics.

To support standardisation, it would be important to review relevant ISO standards and assess their applicability in the ASEAN region. In 2018, the International Organization for Standardization (ISO) established a new working group to update the standard ISO 15270 Plastics - Guidelines for the Recovery and Recycling of Plastics Waste, with an aim to explore the need for additional standards related to plastics recycling, design for recycling, and use of recycled plastics. In addition, ISO has just recently launched a new working group on standards related to the circular economy. To ensure that standards are actually used, it would also be necessary to raise awareness on their existence and to invest in developing the capacity of businesses to effectively utilise them.

Institutional arrangements

The plastics industry has already been proposed as a work area for the ASEAN Consultative Committee on Standards and Quality (ACCSQ), although this proposal has not yet been taken up. A renewed push could be made to include plastics in this regional process, building on the political will to address challenges related to plastics.

In the ASEAN context, standards are firmly linked to trade so it would be needed to involve the trade policy constituencies within the Community.

Common packaging designs

A complement to standardisation as described above is harmonisation of plastic packaging across the region. Packaging accounts for some of the widest use of plastics in the region, and for most of the plastic waste that ends up in landfills and water bodies. Because of the variety in plastic types and multitude of packaging designs, collecting, sorting and processing systems, packaging plastic waste stands as a major challenge – resulting in often poor-quality recyclables from mixed packaging with low returns on investment. However a number of steps could be taken to harmonise this, including for example: limiting the variety of plastics that can be used for packaging consumer products; harmonising the design of packages across categories; and optimising collection systems and recycling technologies to concentrate efforts, taking advantage of less variation in the market.

Such an idea has earlier been introduced in analyses aimed at reducing packaging waste in Asia and the Pacific,[20] and described as follows. Within similar product groups, most plastic packaging variations are intended to differentiate brands and consumer segments. However, this can also be achieved through labelling rather than different types of packages. Thus, brand owners in similar product groups could be mandated to either find alternative materials or to develop common plastic packaging standards; where such packaging is harmonised, and a life-cycle perspective

20 Akenji, L. & Bengtsson, M. Is the Customer Really King? Stakeholder Analysis for Sustainable Consumption and Production Using the Example of the Packaging Value Chain. in Sustainable Consumption and Production in the Asia-Pacific Region: Effective Responses in a Resource Constrained World 23–26 (IGES, 2010).

demonstrates net benefits, such packaging could move beyond single-use applications. This will reduce the need to continually produce new disposable packaging: harmonised refillable packaging would be used across brands and replicated elsewhere. Furthermore, by adding a deposit-refund fee, many consumers would return empty plastic packaging to collection centres.

ASEAN countries acting in collaboration not only would be effective but could also potentially deliver large-scale results. Harmonising plastic packaging requirements policies across ASEAN Member States would demonstrate political commitment to ensure that brand owners take responsibility for the plastic packaging they put on the market. It would also be easier for major businesses if one set of packaging policies were in place following common regional requirements, than having to comply with a patchwork of rules across the region.

5.4. ASEAN regional approach to phasing out harmful additives in plastics

Another area for harmonisation includes developing a regional approach to phasing out plastic additives with known or suspected health and environmental impacts. Plastic products commonly include additives, such as colorants, flame retardants and plasticizers, many of which have known or suspected impacts on human health and ecosystems. Use of such products can have unintended consequences on health, and when these chemicals are released, they pollute the environment. Recycling, when not well managed, can increase the risk that harmful substances – residual additives, substances formed in the recycling process, or other kinds of contaminants – and end up in products where the risk for human exposure or environmental leakage is high. Trade in products with such additives is often international, making it challenging for one country alone to control or stop their production. However, countries in an economic union such as ASEAN can operate at a broad scale to take action, especially as there exist viable alternatives to such additives.

The initiative could involve assistance in identifying problematic substances (baseline hot-spot analyses), in designing regulatory tools, in monitoring, in public education and awareness-raising, and in promoting effective substitutes. In addition to hard policy tools, such as regulations and bans, voluntary codes of practice could also be developed based on multi-stakeholder consultations. One specific topic could be how to enhance transparency and information disclosure by industry. That is an area where EU experiences could be of interest to the ASEAN region.

The interface between the circular economy and chemicals management is receiving increasing attention in Europe but awareness of these issues in Asia is still relatively low. Such an initiative could draw from the extensive technical expertise of the EU, including at the European Chemicals Agency (ECHA) and national chemical agencies as well as in academia and NGOs.

Institutional arrangements

Anchoring this initiative in the ASEAN structure, the Working Group on Chemicals and Waste, in collaboration with Working Groups on Coastal and Marine Environment, Environmentally Sustainable Cities, and Environmental Education, would ensure the topic is reflected in the ASEAN Action Plan. Lead countries for the initiative could be one or more of those with sizeable plastic industries (Indonesia, Malaysia, and Thailand).

A regional approach to chemicals in plastics would benefit from being linked to the other initiatives described in this chapter, including standards, guidelines, and research and innovation. Awareness-raising within and beyond the business community would be a critical first step.

Existing international processes to consider when planning the initiative include the chemicals conventions and SAICM, especially the programme on chemicals in products. The Basel Convention Regional Centre for South-East Asia could play a role in the initiative, especially in relation to capacity building and information sharing.

5.5. ASEAN framework agreement on plastic pollution

An ASEAN framework agreement on plastic pollution could be negotiated in response to the recent call for a "regional directive" on plastics and marine litter.[21] It can be seen as a logical next step for the region to build on the momentum of recent declarations and to create a formal framework to oversee the implementation of regional action plans, including the ASEAN Framework of Action on Marine Debris. It could be designed so that all countries set their own targets (e.g. on per-capita consumption of plastic packaging and other single-use plastics, recycling rates, leakage of plastics to the oceans, etc.) aiming to reduce plastic pollution overall reflecting national circumstances, take action, and report back to each other on a regular basis. Such target setting, monitoring and reporting would be in line with what countries have agreed to do at the global level in conjunction with UNEA and the Basel Convention.

In terms of geographical scope, a regional framework agreement could be made for the ten AMS, ASEAN+3 members, or for COBSEA member countries.[22] A regional agreement in Southeast Asia could set a precedent for a future global agreement on plastics, as currently considered in the context of UNEA.

Recognising that plastics cross-cut multiple waste streams, an agreement should have a strong focus on a systemic and circular approach to plastics throughout the full value chain. Changing the way plastics are designed, produced, used, discarded and recycled can greatly contribute to reducing plastics pollution and marine litter, by reducing unnecessary plastics, and preventing plastics waste by converting used plastics into secondary raw materials.

Such an agreement could also address sea-based sources of litter such as from fishing, aquaculture and shipping, which are very relevant for the ASEAN region, in close cooperation with FAO and IMO; it could also address issues of monitoring plastic litter in seas and coasts, in cooperation with UN, not least to assess effectiveness of policies to tackle plastic pollution.

This could also include an ASEAN regional approach to transboundary movements of waste plastics. The recent decision to apply Basel Convention Prior Notice and Consent rules to plastic waste4will likely reduce shipments of mixed, difficult to recycle plastic waste from OECD countries to concerned ASEAN countries. However, there might still be a need to strengthen those countries border controls and to better monitor trade within the region. EU support in this area could be linked with on-going assistance for the ASEAN Customs Transit System (ACTS), if synergies can be identified.

Institutional arrangements

Negotiating a regional framework agreement would take considerable time so it is essential that initiatives with expected near-term impacts are launched as quickly as possible. Should member states decide to embark on the process of developing a framework agreement, the first steps would involve leadership dialogue to agree on the scope and main objective(s). The process would need to be guided by a vision showing how the agreement would contribute to sustainable development in the region, including not only protection of environmental and human health but also creation of jobs and strengthened international competitiveness. The agreed scope of the agreement would determine what government bodies would need to be consulted or involved in the process, but it seems clear that ministries in charge of industry and trade would need to play key roles.

A first concrete step would be to submit a proposal to relevant ASEAN Working Groups and to the ASOEN for their consideration and guidance. If ASOEN is in favour of initiating a process towards a framework agreement, each member state would need to conduct broad-based consultations on scope and objectives, seek buy-in from related ministries and invite views of relevant stakeholders. An ad-hoc task force of ASEAN Member State representatives could be established to refine the details of a proposed framework agreement. The membership of such a task force would ideally extend beyond the environmental community.

The development of a regional framework would need to consider existing relevant agreements and policy processes. In addition to the Basel Convention and UNEA, this includes the following: EAS Leaders Statement on Combating Marine Plastic Debris, COBSEA RAP-MALI, Bangkok Declaration on Combating Marine Debris in ASEAN Region, and the ASEAN Framework of Action on Marine Debris.

21 At its meeting in May 2018, the ASEAN Working Group on Chemicals and Waste came up with the tentative proposal for a "regional directive" to address plastics issues in the region.

22 https://www.cobsea.org/aboutcobsea/membercountries.html

5.6. Operationalizing ASEAN regional initiatives on circular economy and plastics

Although the initiatives outlined above could be worked on in parallel, they would have far greater impact if implemented as a package. Several key issues to consider in the process of launching and ensuring the initiatives remain operational over the long term include the following:

- Collaboration between different parts of the ASEAN system, especially between bodies related to environment and those focusing on industry and trade. Such cross-cutting collaboration has historically been difficult to achieve, but the systemic issues associated with plastics are unlikely to be solved unless a different, more cooperative working style is introduced. Encouraging different ASEAN entities to work together could make the community stronger and better equipped to tackle the many interlinked sustainability challenges of the current century.

- Ownership, partnership and stakeholder engagement remain key to success. Governments have unique roles to play in guiding society towards a more sustainable future on plastics, but a broad range of stakeholders need to be fully and actively involved in realising this vision, underlining the importance of fostering dialogue across all levels and sectors.

- When exploring how to embed new initiatives in the ASEAN structure, there is often a choice between trying to revise the work programme of an existing body or to establish a new institutional mechanism. Both of these options involve associated challenges and advantages. Trying to add a new initiative to the work stream of an established body might be met with resistance since available resources may already be stretched. A new institution, in contrast, always runs the risk to not being able to mobilise enough support from member states and to engage effectively with established bodies.

- It is critical that the planning of new regional initiatives, including those introduced here, capitalise on existing political momentum. In the case of plastics and the circular economy, there seems to be significant political will to take action. The challenge is to design practical activities that effectively utilise the basis for joint action while gradually raising the level of ambition. One option to consider for accelerating the formulation of regional initiatives is to hold a dedicated ASEAN Plastics Week. This could help create visibility for the region's determination to tackle plastics issues, provide room for dialogue and deliberation on effective solutions, and help connect different ASEAN bodies that would need to be involved.

ASEAN MEMBER STATES COUNTRY BRIEFS

COUNTRY BRIEF

BRUNEI DARUSSALAM

The Sultanate of Brunei Darussalam is located on the island of Borneo where it shares border only with Malaysia. With a population of 442,400 (2018), it is the least populous of the ASEAN Member States,[23] and with an area of 5,765 km2 it is also one of the smallest nations in the region.[24] Most of the population is classified as urban – 77.6 percent (2018[25]) – and around 70 percent of the population lives in the metro area around the capital city of Bandar Seri Begawan.[26] Mainly due to its oil and gas resources, Brunei Darussalam is a high-income country with a GDP (PPP) per capita exceeding USD 80,000 (2018[27]). The country's economy is highly trade dependent with export and import constituting 52 and 42 percent of GDP, respectively (2018[28]). Brunei Darussalam is an absolute monarchy ruled by its Sultan, who also serves as the country's Prime Minister.

Key data

Brunei Darussalam generates around 1.3 kg of solid waste per capita per day,[29] which is among the highest in the ASEAN region. The government aims to reduce this amount to 1 kg by 2035. It is estimated that 16-20 percent of disposed waste is plastic.[30,31]

At the current rate of waste generation, the government predicts that the country's main disposal site, the Sungai Paku Engineered Landfill, will run out of capacity by 2030.[32] Moreover, the government estimates that approximately USD1.2 million annually is spent on managing the country's final disposal sites.[33] Taking these issues into account, effectively addressing plastic waste in Brunei will require moving from a "use and dispose mentality", including by introducing waste-to-resource technologies, whilst continuously pushing to improve and install 3R (reduce, reuse, recycle) practices and habits across all sectors and communities nationwide.

Institutional and legal framework

The main government agency responsible for management and protection of the environment is the Department of Environment, Parks and Recreation (JASTRe), which is part of the Ministry of Development. JASTRe is in charge of issuing Environmental Acts and Guidelines, as well as information to the general public.

Brunei Darussalam has a relatively recent environmental legislation in the form of its Environmental Protection and Management Order (2016), which focuses mainly on permit issuance, environmental impact assessment, and liability in cases of environmental incidents. There is no specific legal act or government order in place regulating the management of non-hazardous waste, including for municipal solid waste and recyclable materials. Nevertheless, the country maintains strict laws against littering in public places under its Minor Offenses Act; littering can lead to fines or even imprisonment.[34]

23 Ministry of Finance and Economy of Brunei Darussalam 2019. National Statistics. Available at: http://www.depd.gov.bn/SitePages/National%20Statistics.aspx (Accessed 1 August 2019)

24 World Bank 2019. World Development Indicators database. Available at: https://databank.worldbank.org/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=BRN (Accessed 1 August 2019)

25 World Bank 2019. World Development Indicators database. Available at: https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=BN (Accessed 1 August 2019)

26 Ministry of Finance and Economy of Brunei Darussalam 2019. National Statistics. Available at: http://www.depd.gov.bn/SitePages/Population.aspx (Accessed 1 August 2019)

27 World Bank 2019. World Development Indicators database. Available at: https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=BN (Accessed 1 August 2019)

28 World Bank 2019. World Development Indicators database. Available at: https://databank.worldbank.org/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=BRN (Accessed 1 August 2019)

29 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019

30 Bakar, R. Lack of data may hinder Brunei's eco-initiatives. The Scoop (2018). Available at: https://thescoop.co/2018/08/25/lack-data-may-hinder-bruneis-environmental-conservation-efforts/. (Accessed: 3 July 2019)

31 Department of Environment, Park and Recreation. Plastic Bags in Brunei Darussalam. Ministry of Development Brunei Darussalam. Available at: http://www.env.gov.bn/SitePages/Plastic%20Bags%20in%20Brunei%20Darussalam.aspx. (Accessed: 3 July 2019)

32 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019

33 Govt may privatise dumpsite operations. Modasys.net (2019. Available at: http://modasys.net/3g/index.php/news-events/around-brunei/local-news/31624-legco-2018-govt-may-privatise-dumpsite-operations.html. (Accessed: 3 July 2019)

34 E-mail communication with the Department of Environment, Parks and Recreation, April 2019.

The disposal at sea of plastics is in principle prohibited under the Prevention of Pollution of the Sea (Garbage) Regulations (under the Prevention of Pollution of the Sea Order, 2005).[35] Brunei Darussalam is also listed as a member of The East Asia Civil Forum on Marine Litter, a network of non-profit organisations working to address issues of ocean pollution across the sub-region.[36]

Brunei Darussalam has a legal basis for regulating the transboundary movement of hazardous waste, in the form of its Hazardous Waste (Control of Export, Import and Transit) Order (2013). The importation of plastic waste is strictly prohibited,[37] although the country places no restrictions on the type of plastics and plastic products that can be imported. A 3 percent excise duty is imposed on these items, following recent amendments to Brunei's customs import and excise duties rules that took effect 1 April 2017.[38]

Recycling

Although there is a lack of national estimates on waste recycling in Brunei, the government has set a target to achieve a 30 percent recycling rate by 2035.[39] It encourages citizens to separate recyclable materials, including plastics, at source. This is done through awareness raising and education, for example through brochures and campaigns, as well as through the provision of collection infrastructure via communal waste collection centres. Plastic bottles are cited as the most commonly recovered plastic material, collected both by public and private operators.[40] Separate recycling bins are installed in the Brunei Muara District, the largest of all districts in the country, home to 80 percent of the country's population. The government has highlighted its ambition to progressively introduce recycling bins to all remaining districts. Other information and education initiatives include maintaining a list of companies that collect and process recyclables.[41]

Recyclable materials such as plastics, metals and papers are mainly exported for processing since the country lacks recycling facilities.[42] Recycling of plastics is regulated under the country's Environmental Protection and Management Order (2016), the Customs Order (2006) and the Workplace Health and Safety Order (2009).[43] Extended producer responsibility schemes remain voluntary,[44] but the government is making efforts to encourage its wider adoption through targeted education and awareness campaigns.[45]

The government also has established a material recovery facility for used tyres, where a private company has been contracted to recycle used tyres, which are converted into fuel oil by pyrolysis and, in the process, separating the rubber from the metal.[46] In 2011, the government, together with Tetra Pak and a local recycling company, started a project to collect and recycle beverage cartons.

One obstacle to the scaling-up of recycling is the challenge of providing end-to-end services. Although waste collection centres allow residents to dispose of recyclables separately, there have reportedly been cases where transport companies have mixed all kinds of waste.[47] Looking at the overall situation for recycling in Brunei Darussalam, an assessment conducted in 2013 concluded that the country was still at an "infant stage".[48] This characterisation appears still to be valid for the situation for plastics.

35 Constitution Of Brunei Darussalam (Order Under Article 83(3)) Prevention Of Pollution Of The Sea Order. Brunei Darussalam government gazette (2005). Available at: http://www.agc.gov.bn/AGC%20Images/LAWS/Gazette_PDF/2005/EN/S018.pdf. (Accessed: 3 July 2019)

36 UNEP. Ad hoc open-ended expert group on marine litter and microplastics. United Nations Environment Assembly of the United Nations Environment Programme (2018). Available at: https://papersmart.unon.org/resolution/uploads/unep_aheg_2018_1_inf_4_unea2_edited.pdf. (Accessed: 3 July 2019)

37 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019

38 Ministry of Finance. Amendments to the Customs Imports and Excise Duties Effective 1st April 2017 (2017). Available at: http://tradingacrossborders.gov.bn/Downloadable/Siaran%20Akhbar%20Perubahan%20Kadar-Kadar%20Cukai%20(Eng).pdf. (Accessed: 3 July 2019)

39 E-mail communication with the Department of Environment, Parks and Recreation, April 2019.

40 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019

41 Ahmad, N., Kamis, N. & Mahdini, S. Brunei: Moving Forward: Brunei's sustainable measures for a successful environmental development. ALSA Academic Journal (2016). Available at: https://alsajournal.com/2016/08/31/brunei-moving-forward-bruneis-sustainable-measures-for-a-successful-environmental-development/. (Accessed: 3 July 2019)

42 Bakar, R. Lack of data may hinder Brunei's eco-initiatives. The Scoop (2018). Available at: https://thescoop.co/2018/08/25/lack-data-may-hinder-bruneis-environmental-conservation-efforts/. (Accessed: 3 July 2019)

43 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019

44 Ibid.

45 Department of Environment, Parks and Recreation. Recycle 123 Handbook. Ministry of Development Brunei Darussalam (2015). Available at: http://www.env.gov.bn/Recyclers/Recycle%20123%20Handbook%204%20Nov%202015.pdf. (Accessed: 3 July 2019)

46 Country Analysis Paper (Draft) Brunei Darussalam. UNCRD Fourth Regional 3R Forum in Asia (2013). Available at: http://www.uncrd.or.jp/content/documents/Country%20Analysis%20Paper_Brunei.pdf. (Accessed: 3 July 2019)

47 Hayat, H. Solution for better waste management. Borneo Bulletin (2017). Available at: https://borneobulletin.com.bn/solution-better-waste-management/. (Accessed: 3 July 2019)

48 Country Analysis Paper (Draft) Brunei Darussalam. UNCRD Fourth Regional 3R Forum in Asia (2013). Available at: http://www.uncrd.or.jp/content/documents/Country%20Analysis%20Paper_Brunei.pdf. (Accessed: 3 July 2019)

Source reduction

The government urges manufacturers and consumers to try to reduce the amount of plastic used for packaging and other single-use items. The campaign slogan, "If you can't reuse it, refuse it", is used to persuade consumers to reconsider the need for single-use items.[49]

In 2011, the government started the No Plastic Bag Weekend initiative, a voluntary agreement with 11 stores and businesses to stop providing plastic bags on weekends. In 2012, the initiative was expanded to include Fridays to make it a complete 'green' weekend. The initiative was further expanded in 2018 to include the remaining days of the week leading to the No Plastic Bag Everyday Initiative, starting with the addition of Thursdays in conjunction with Earth Day celebrations that fit the theme "End Plastic Pollution".[50] Since 1 January 2019 the participating stores have phased out the distribution of single-use plastic bags completely. The number of businesses has also grown; currently over 60 stores participate, including most of the leading supermarkets.[51] However, smaller businesses, local convenience stores and especially stalls in markets still to a large extent distribute single-use plastic bags. Some participating stores have reported significant cost savings[52] and many of them regard the phase-out of single-use plastics as part of their CSR activities. Surveys have also suggested that Brunei consumers are widely in favour of instituting a ban on plastic bags, although few respondents report making regular use of reusable bags.[53] This initiative is spearheaded by the Ministry of Development, through the Department of Environment, Parks and Recreation (JASTRe).[54]

The government is also leading by example through its Plastic Bottle Free Initiative, launched in June 2018 in conjunction with the World Environment Day celebration, which carried the theme "Beat Plastic Pollution". Under this initiative, the Ministry of Development has banned the use of single-use plastic beverage bottles on its premises.[55]

Styrofoam containers are also targeted by the government, due to its negative impacts not just on the environment but also human health. As part of the "Reduce the Use of Styrofoam' initiative that was launched in 2013, JASTRe collaborated with the Ministry of Education via the Science, Technology and Environment Partnership (STEP) Centre to socialise the campaign in schools to curb styrofoam usage in canteens, as well as to encourage the use of more environmentally-friendly alternatives such as reusable containers. Currently, also many food and beverage businesses (including small/local establishments) have phased out styrofoam trays, although in most cases they have switched to other kinds of single-use plastic containers, often made of transparent polystyrene.[56]

Clean-up campaigns

To reduce marine pollution, the government is also funding regular river clean-up campaigns.[57] In the summer of 2018, 20,000 large bags were filled with waste from the Brunei River, most of it consisting of plastic shopping bags and bottles. Clean-up campaigns at various scales are also frequently organised by different government agencies, the private sector, local communities and educational institutions,[58] as well as civil society groups.[59]

Education and awareness-raising

The government has initiated the establishment of eco-clubs in 2006 in a number of schools where the children learn about why and how to take better care of the environment. With the implementation of the ASEAN Environmental Action Plan (AEEAP) 2008-2012 under the ASEAN Socio-Cultural Blueprint 2009-2015, the ASEAN Guidelines on Eco-Schools was developed that serves as a reference and as a regional standard for environmentally-friendly model

49 Department of Environment, Park and Recreation. Plastic Bags in Brunei Darussalam. Ministry of Development Brunei Darussalam. Available at: http://www.env.gov.bn/SitePages/Plastic%20Bags%20in%20Brunei%20Darussalam.aspx. (Accessed: 3 July 2019)

50 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019.

51 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019.

52 Bakar, R. Majority of Bruneians support push to eliminate plastic bags. The Scoop (2018). Available at: https://thescoop.co/2018/04/20/majority-bruneians-support-push-eliminate-plastic-bags/. (Accessed: 3 July 2019)

53 Ibid.

54 Bakar, R. Brunei aims to phase out plastic bags in supermarkets by 2019. The Scoop (2018). Available at: https://thescoop.co/2018/04/16/brunei-aims-phase-out-plastic-bags-2019/. (Accessed: 3 July 2019)

55 Kon, J. Brunei ministry launches initiative to curb use of plastic bottles. Asia News Network (2018). Available at: http://www.asianews.eu/content/brunei-ministry-launches-initiative-curb-use-plastic-bottles-74272. (Accessed: 3 July 2019)

56 Department of Environment, Park and Recreation. No Styrofoam. Ministry of Development Brunei Darussalam (2013). Available at: http://www.env.gov.bn/SitePages/No%20Styrofoam.aspx. (Accessed: 3 July 2019)

57 E-mail communication with the Department of Environment, Parks and Recreation, 1 May 2019

58 Ibid.

59 Bakar, R. More than 20K bags of rubbish pulled from Brunei River in past two months. The Scoop (2018). Available at: https://thescoop.co/2018/06/06/kg-ayer-cleaning-project-hope-tackle-bruneis-plastic-pollution/. (Accessed: 3 July 2019)

schools in the region.[60] The establishment of eco-schools in Brunei Darussalam is under the purview of the Science Technology Environment Partnership (STEP) Centre, Ministry of Education.

In 2009, JASTRe also initiated the Brunei Environment Youth Envoys (Brunei EYEs) network to nurture youth environmental advocates, in collaboration with the STEP Centre, Ministry of Education. EYE members develop awareness-raising campaigns and lead volunteer actions addressing environmental issues.[61]

Hazardous substances in plastics

The government informs citizens about the potential detrimental impacts of Bisphenol A (BPA in plastics but, based on available information, does not ban or restrict the use of BPA or require labelling of products containing this substance. The government has also expressed concern over other toxic substances used in plastics, such as lead and cadmium, and calls upon manufacturers to avoid such additives.[62]

Major gaps and opportunities for follow-up action

- Brunei Darussalam faces significant data constraints with regard to waste management and recycling; addressing this challenge remains an important first step towards determining future actions for mitigating plastic pollution

- Waste separation, collection and recycling facilities need to be massively scaled up to address existing deficiencies in service provision; this will require determining whether existing waste management systems should continue to be publicly financed or fully privatised, which will help to better foster consensus on ways to more effectively tackle plastic waste

- Strong public support for plastic waste management initiatives, including buy-in from leading commercial operators provides a strategic opportunity to upscale and expand future activities, such as introducing fees for single-use bags and containers in partnership with other participating retailers

- Civil society organisations in Brunei Darussalam are already engaged in a regional network seeking to advance multi-country solutions to plastic waste; these groups can assist national and local authorities in Brunei Darussalam with driving forward information and education campaigns on plastic waste including by communicating good practices

Acknowledgment

In addition to the sources listed, this chapter also benefited from early comments by Ms. Mas Dino Radin and helpful contributions and edits by officials at the Department of Environment, Park and Recreation.

60 The ASEAN Secretariat. ASEAN Guidelines on Eco-Schools. The ASEAN Secretariat (2015). Available at: https://environment.asean.org/wp-content/uploads/2015/06/ASEAN-Guidelines-on-Eco-schools.pdf. (Accessed: 3 July 2019)

61 Country Analysis Paper (Draft) Brunei Darussalam. UNCRD Fourth Regional 3R Forum in Asia (2013). Available at: http://www.uncrd.or.jp/content/documents/Country%20Analysis%20Paper_Brunei.pdf. (Accessed: 3 July 2019)

62 Department of Environment, Park and Recreation. Plastic Bags in Brunei Darussalam. Ministry of Development Brunei Darussalam. Available at: http://www.env.gov.bn/SitePages/Plastic%20Bags%20in%20Brunei%20Darussalam.aspx. (Accessed: 3 July 2019)

COUNTRY BRIEF

CAMBODIA

Geographically located in the southern Indochina peninsula of Southeast Asia, sharing contiguous borders with Thailand, Laos PDR, and Viet Nam, the country of Cambodia comprises 181,035 square kilometres (69,898/square miles). Cambodia is divided into two dominant topographical regions: one is formed by the Tonle Sap and the Bassac river systems, located in the central part of the country. The other is made up by the Mekong River, which rises in Tibet, flows through Southeast Asia into Cambodia for about 486 kilometres and continues on to the South China Sea via southern Viet Nam. The Mekong has been identified as one of the ten most polluting rivers in the world in terms of ocean plastic leakage.[63]

Cambodia is predominantly a rural country. With an estimated population of 16.48 million, roughly 80 percent of Cambodia's population resides in rural areas, with a population density of 82 per square kilometre (212/square mile).[64] Having maintained an average growth rate of 7.7% between the years 1995 and 2018, Cambodia has long held the status of being one the fastest growing countries in the world.[65] Due in part to these trends, domestic consumption has expanded rapidly, accompanied by widening gaps in waste service provision.

Key data

Municipal Solid Waste (MSW) generation in Cambodia totals 4.09 million t/year (2015);[66] MSW per capita stands at 0.73 kg/day. Information on overall waste composition in the country has so far been limited to waste management surveys conducted at landfill sites in larger Cambodian cities, such as such as Phnom Penh Municipality, Battambang, Siem Reap and Kampong Cham.[67] Moreover, as much as 60 percent of Cambodia's waste has been determined to be organic in content, with plastic averaging roughly 10 percent overall (Table 5: Waste Composition of Selected Cambodian Cities).[68] Of this, plastic was estimated to comprise 21 percent of Phnom Penh's overall waste composition in 2016;[69] estimates for the City of Battambang range from 14-20 percent.[70]

Plastic imports/exports

Plastic imports to Cambodia are controlled by several large trading companies; estimated at over USD100 million per year, the majority of these imports are from Thailand and Viet Nam, of which plastic bags make up a significant percentage.[71] Cambodia also exports a range of recyclable materials, including PET bottles, to several major destination countries, including Thailand, Vietnam, Malaysia, Singapore, South Korea, China and Taiwan; plastic exports are on the increase after falling significantly from a high of over 25,000 tonnes in 2015 (Figure 3:).[72]

63 Patel, P. Stemming the Plastic Tide: 10 Rivers Contribute Most of the Plastic in the Oceans. Scientific American (2018). Available at: www.scientificamerican.com/article/stemming-the-plastic-tide-10-rivers-contribute-most-of-the-plastic-in-the-oceans/. (Accessed: 3 July 2019)

64 Cambodia Population 2019. World Population Review (2019). Available at: http://worldpopulationreview.com/countries/cambodia-population/. (Accessed: 11 April 2019)

65 The World Bank in Cambodia. The World Bank (2019). Available at: https://www.worldbank.org/en/country/cambodia/overview. (Accessed: 11 April 2019)

66 National Waste Management Strategy and Action Plan of Cambodia (forthcoming)

67 Ibid.

68 Ibid.

69 Denny, L. Reforming Solid Waste Management in Phnom Penh. The Asia Foundation & ODI (2016). Available at: www.asiafoundation.org/wp-content/uploads/2016/06/Working-Politically-and-Flexibly-to-Reform-Solid-Waste-Management-in-Phnom-Penh.pdf/. (Accessed: 11 April 2019)

70 Interview with Cambodian Education and Waste Management Organisation (COMPED), 19 April 2019

71 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

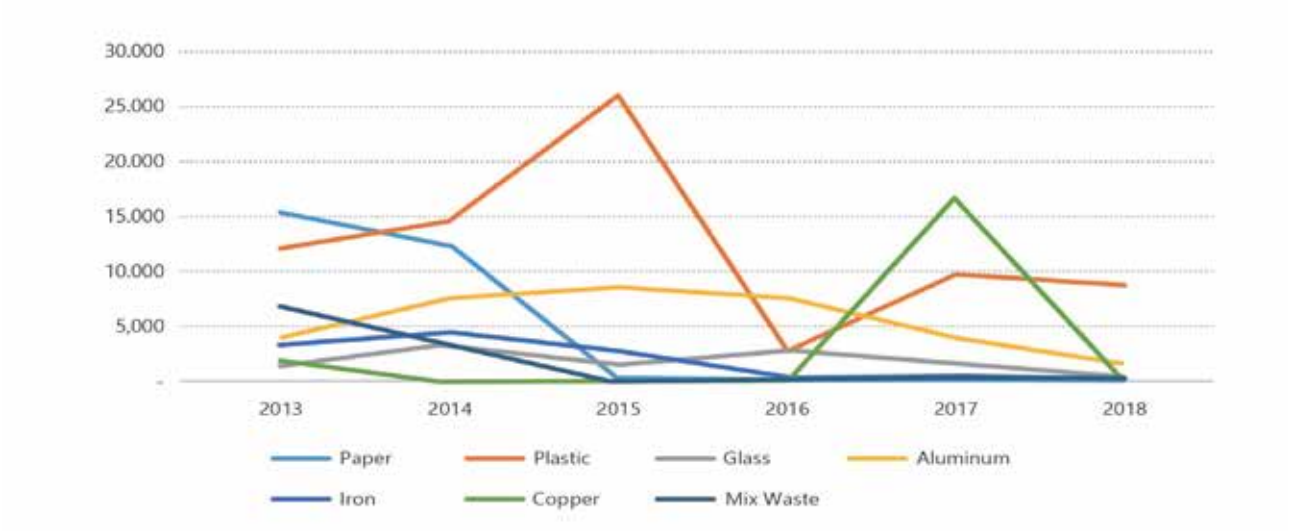
72 National Waste Management Strategy and Action Plan of Cambodia (forthcoming)

Table 5: Waste Composition of Selected Cambodian Cities

City	Waste Composition at Disposal Site (%)							
	Organic	Paper	Plastics	Metals	Textile	Glass	Wood and Dry Matter	Others
Phnom Penh	70	5	6	2	3	2	6	6
Battambang	71	2	10	3	2	4	6	2
Siem Reap	54	6	11	1	3	3	11	11
Kampong Cham	60	5	12	1	1	2	3	16
Average	64	4	10	2	2	3	6	9

Source: Sang-Arun, et al 2011[73]

Figure 3: Export Volumes of Recyclable Materials



Source: National Waste Management Strategy and Action Plan of Cambodia (forthcoming)

Manufacturing

Plastic production is at present negligible in Cambodia. However, the Cambodian Chamber of Commerce has hosted discussions with foreign firms looking to invest in domestic plastic manufacturing in anticipation of future growth.[74] It has also been reported that some manufacturing of bio-based alternatives to plastic is becoming more prevalent in Cambodia.[75]

Consumption

Information on plastic consumption is mainly limited to observations of plastic bag use driven by the retail sector, representing a major data gap. Retail activities (both consumer and wholesale) have been identified as the largest source of low value plastic waste generated by households.[76]

73 Sang-Arun, J., Heng, C.K., & Al. E. A Guide for Technology Selection and Implementation of Urban Waste Utilisation Projects in Cambodia. Institute for Global Environmental Strategies (2011).

74 Vannak, C. Thai firms seek investments in local plastic sector." Khmer Times (2018). Available at: www.khmertimeskh.com/527682/thai-firms-seek-investments-in-local-plastic-sector/.

75 Interview with European Chamber of Commerce in Cambodia, (EuroCham) Green Business Executive Committee 19 April 2019.

76 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

An average urban resident in Cambodia is estimated to use an average of 2,000 plastic bags per year, with 10 million plastic bags consumed in Phnom Penh every day.[77] Plastic bags used in Cambodia can be classified into several broad categories, varying in terms of cost, dimensions, thickness and other specifications, with different bags corresponding to specific retail purchases.[78] Single-use plastic bottles have also been identified as growing waste challenge, with some reports estimating that 4.6 million bottles end up in Cambodian waterways post-consumption.[79]

Collection

Collection of plastic waste in Cambodia is characterised by both formal and informal activities. In larger Cambodian cities, local authorities have negotiated long-term franchise agreements with private contractors for waste services (collection, transport, disposal), subsidised by monthly user fees; a number of private companies have reported difficulties with cost recovery due to a low willingness-to-pay among communities.[80]

There is also evidence that many low and middle-income households voluntarily sort plastic bottles (primarily PET) and carry out private collection arrangements with informal waste actors, who in turn resell to larger buyers.[81] Informal waste actors (also known as "Etchays") regularly operate in communities underserved by formal collection services due to transport and logistic challenges.[82]

Lower income and peri-urban residents lacking access to collection services frequently rely on open dumping and burning of waste, including but not limited to plastics,[83] with low awareness of associated health and environmental impacts (especially at the village level).[84]

Recycling

Aside from pre-processing recycling activities led by informal collectors, the domestic recycling industry in Cambodia remains largely underdeveloped, although small scale recycling facilities (i.e., plastic shredding) have been documented in the city of Battambang.[85] Junkshops are the main channel for recycling plastics (mainly PET) and other valuable materials in Cambodian cities; according to government estimates, nearly 25,000 tonnes of plastic were purchased by junkshops across the country in 2016 (Figure 4: Amount of Recyclable Waste Purchased by Junkshops in Cambodia).[86]

As much 19.5 percent of plastic waste was found to be collected in Phnom Penh and exported for recycling in 2005.[87] Cambodia's recycling sector is dominated by several major export firms;[88] research suggests that future growth potential of Cambodia's recycling industry is hindered by a largely monopolistic market, coupled with challenges in developing appropriate recycling infrastructure.[89]

77 Ibid.

78 Ibid.

79 McCormick, E. Saying NO to plastic bottles. Khmer Times (2019). Available at: www.khmertimeskh.com/50587007/saying-no-to-plastic-bottles/. (Accessed: 3 July 2019)

80 Singh, R., Dickella, P., Yagasa, R. and Onogawa, K. (2018). State of Waste Management in Phnom Penh, Cambodia 2018. Available at: https://www.ccet.jp/sites/default/files/2018-07/State%20of%20Waste%20Management%20in%20Phnom%20Penh%2C%20Cambodia%20_web.pdf. (Accessed: 3 July 2019)

81 Ibid.

82 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

83 Ibid.

84 Dingjan, L. Burning plastics in Cambodia. (2018). Available at: www.nowhereandeverywhere.co/change/burning-plastics-cambodia/. (Accessed: 3 July 2019)

85 Interview with European Chamber of Commerce in Cambodia, (EuroCham) Green Business Executive Committee 19 April 2019.

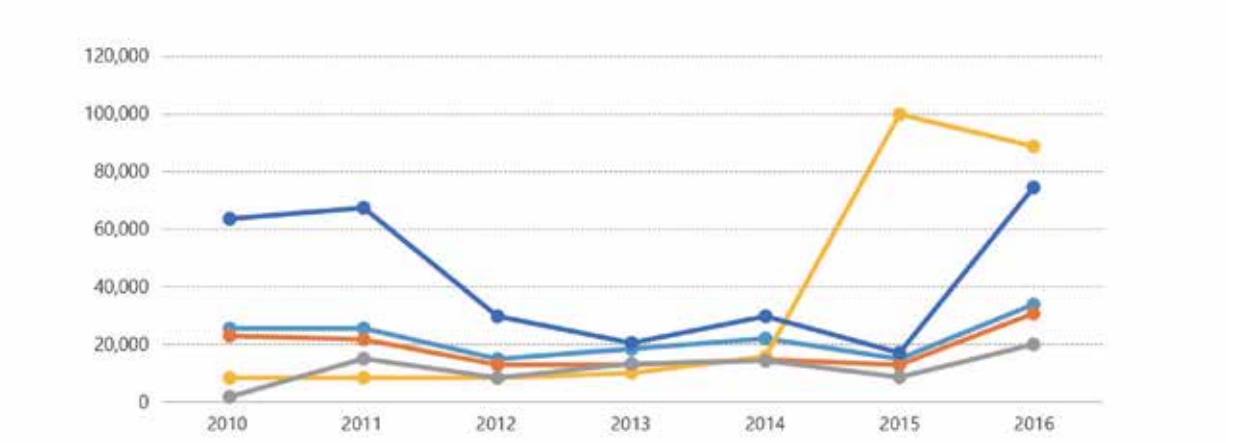
86 PPCA, IGES, Nexus, UN Environment, CCCA. (2018). Phnom Penh Waste Management Strategy and Action Plan 2018-2035. Phnom Penh, Cambodia. Available at: www.ccet.jp/publication/phnom_penh_waste_management_strategy_and_action_plan/. (Accessed: 3 July 2019)

87 Japan International Cooperation Agency and Municipality of Phnom Penh. The Study on Solid Waste Management in the Municipality of Phnom Penh in the Kingdom of Cambodia; Main Report. JICA and MPP (2005).

88 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

89 National Waste Management Strategy and Action Plan of Cambodia (forthcoming)

Figure 4: Amount of Recyclable Waste Purchased by Junkshops in Cambodia



Source: PPCA, IGES, Nexus, UN Environment, CCCA (2018)[90]

Estimated leakage

Other than plastic bags, scant data is available on the environmental impact of waste plastics in Cambodia. One study indicates that plastic bags comprise 20 percent of waste litter collected by urban street sweepers in the cities of Phnom Penh, Sihanoukville and Siem Reap.[91] In Siem Reap, plastic bags were found to make up 60 percent of the waste obstructing wastewater runoff; the financial impact of plastic bags on sewerage and drainage systems contributing to urban flooding in Phnom Penh estimated to exceed USD100,000 per annum.[92] Some studies also suggest that Cambodian municipalities continue to spend as much as USD600,000 for urban street sweeping per year.[93]

Related priority issues

An emerging area of concern is the potential leaching of additives and colorants from plastic bags into the ambient environment, such as lead and cadmium.[94] Possible toxic discharges from plastic bags into water bodies and associated bioaccumulation in aquatic organisms is an important area for further research; inland fisheries provide roughly 75 percent of Cambodia's annual fish catch and 60 percent of the country's total protein intake.[95]

Food packaging waste, such as styrofoam,[96] as well single use plastic bottles is also a growing source of environmental pollution in Cambodia.[97] Packing hot food into single-use plastic has been observed to be a growing phenomenon in Cambodia that warrants further study in view of potential endocrine disruption risks.[98] Further, based on interviews with development partners, scaling up recycling of plastic waste components of certain e-waste products has been identified as a potential area for future intervention.[99]

90 PPCA, IGES, Nexus, UN Environment, CCCA. (2018). Phnom Penh Waste Management Strategy and Action Plan 2018-2035. Phnom Penh, Cambodia. Available at: www.ccet.jp/publication/phnom_penh_waste_management_strategy_and_action_plan/. (Accessed: 3 July 2019)

91 Arduino. S., Assessment on the Cost of Plastic Bags in Cambodia: Full Research Report. Fondazione ACRA (2016). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Cost_of_Plastic_Bags.pdf. (Accessed: 3 July 2019)

92 Ibid.

93 Ibid.

94 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

95 Hirji, R., & Davis R. Environmental Flows in Water Resources Policies, Plans, and Projects: Case Studies. The International Bank for Reconstruction and Development/The World Bank (2009).

96 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

97 McCormick, E. Saying NO to plastic bottles. Khmer Times (2019). Available at: www.khmertimeskh.com/50587007/saying-no-to-plastic-bottles/. (Accessed: 3 July 2019)

98 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

99 Interview with UN-Habitat, Cambodia Office, 17 April 2019.

National legislation, policies and other initiatives

Legal framework

Cambodia's Law on Environmental Protection and Natural Resource Management (1996) designates the Ministry of Environment (MoE) as the leading agency tasked with formulating policies, issuing regulations and coordinating actions on waste management and pollution control. The country's Inter-Ministerial Declaration of Ministry of Interior and Ministry of Environment on Waste and Solid Waste Management in Provinces/ Municipalities of Cambodia (2003) defines the responsibility of concerned national authorities and relevant institutions for carrying out implementation of solid waste management at the provincial and city levels.

Solid waste management

Cambodia classifies solid waste into three categories: i) domestic/household waste; ii) commercial waste; and iii) industrial and hazardous waste including medical waste; it is important to note that waste plastics cross-cut all categories. The Sub-Decree on Solid Waste Management (1999) sets out directives on the regulation of solid waste management concerning all aspects of storage, collection, transport, recycling and disposal; assigns responsibilities for the management of solid waste to provincial authorities, yet mandates that the commissioning of large-scale storage, treatment, or final disposal facilities requires authorisation from MoE.

Likewise, Cambodia's Sub-Decree on Water Pollution Control (1999) prohibits the storage or disposal of any solid waste that leads to pollution of public waterways. The Sub-Decree on Urban Solid Waste Management (2015) extends the remit to capital, municipal and district authorities, tasking sub-national administrative units with the responsibility of preparing annual waste management action and budget plans, coordinating waste service provision with the private sector (including issuing contracts for collection, transport and disposal), determining appropriate fees for waste services, generating source revenue through the collection of service fees and accessing financial resources from central authorities, inter alia.[100]

Guidelines on Plastic Waste Management aim to provide authorities at all levels with instructions on environmentally sound ways to effectively manage solid waste and plastics. The country's Sub-Decree on Management of Plastic Bags (2017) prohibits the importation, local production, distribution and use of plastic bags exceeding thickness of 0.03 millimetres with a base width from 25 centimetres or 10 inches; requires a permit issued by MoE for commercial production and bulk importation of plastic bags; introduces tax exemptions for the importation of biodegradable or bioplastic bags; prescribes charges for consumers requesting plastic bags at supermarkets and business centres (0.10 USD per bag), with corresponding penalties for violations from 10 April 2018.[101]

Status of implementation

Enforcement of the above sub-decrees is uneven and generally inconsistent, with illegal dumping and burning of waste commonplace.[102] Although charges for plastic bags are reported to be effective for discouraging plastic bag use in major supermarket chains,[103] distribution of single-use plastic bags has been observed in local markets, despite issuance of Sub-Decree No. 168 on Management of Plastic Bags.[104]

Some studies estimate that the Government of Cambodia budgets upwards of USD1 million per year on public antilittering and environmental campaigns; nevertheless, awareness of plastic waste issues has not translated into visible behaviour changes on the part of citizens.[105] Some reports have indicated that the Government of Cambodia has announced a target to cut the use of plastic by half within 2019 and by 70 percent over the next seven years;[106] some have noted that the Central Government has made similar pronouncements on waste without consideration of practical realities, or consultation with respective Line Ministries and local authorities.[107]

100 Mun, V. Progress and Challenges of Deconcentration in Cambodia: The Case of Urban Solid Waste Management. Cambodia Development Research Institute Working Paper Series 110 (2016). Available at: https://www.academia.edu/30956411/Progress_and_Challenges_of_Deconcentration_in_Cambodia_The_Case_of_Urban_Solid_Waste_Management. (Accessed: 3 July 2019)

101 New Sub-Decree on Management of Plastic Bags. Available at: http://zico.group/blog/legal-alert-cambodia-new-sub-decree-on-management-of-plastic-bags/. (Accessed: 3 July 2019)

102 Arduino. S., Assessment on the Cost of Plastic Bags in Cambodia: Full Research Report. Fondazione ACRA (2016). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Cost_of_Plastic_Bags.pdf. (Accessed: 3 July 2019)

103 Interview with Cambodian Education and Waste Management Organisation (COMPED), 19 April 2019.

104 Interview with UN-Habitat, Cambodia Office, 17 April 2019.

105 Ibid.

106 Promchertchoo, P. Young Cambodian women on green mission to build roads with plastic waste. Channel News Asia (2019). Available at: www.channelnewsasia.com/news/asia/cambodian-women-on-green-mission-build-roads-with-plastic-waste-10396120/. (Accessed: 3 July 2019)

107 Interview with UN-Habitat, Cambodia Office, 17 April 2019.

Capacity for monitoring, policy design and implementation

The Ministry of Environment cites budgetary, technical and capacity related constraints as the main bottlenecks to effective waste management, underlining the need for further institutional reforms, new strategy development and improved collection and transport systems.[108] National and local authorities have been found to lack technically competent officers to monitor and enforce existing laws and regulations.[109] Some development partners note that overlapping responsibilities between MoE and other ministries (Ministry of Rural Development, Ministry of Public Works, Ministry of Industry) pose a challenge for coordinating actions on addressing plastic waste dumping in peri-urban waterways.[110]

National initiatives

Cambodia's National 3R Strategy for Waste Management in Cambodia (2008) supported by UN Environment outlines principles and actions for reducing, reusing, and recycling solid waste, including but not limited to plastics. The National Waste Strategy and Action Plan for Cambodia (2018-2030) (forthcoming), developed with technical support from the Institute of Global Environmental Strategies' Centre Collaborating with UN Environment on Environmental Technologies (IGES-CCET) also defines a roadmap for improving current waste management practices in Cambodia, including by promoting landfill diversion through segregation of plastic waste and instituting projects for banning the use of plastic bags.

Cambodia's National Environment Strategy and Action Plan (2016–2023), developed with technical assistance from the Asian Development Bank, outlines policy priorities and recommended governance improvements together with supportive financing mechanisms for environmentally-sustainable development.

Furthermore, MoE has instituted a reusable "eco-bag" bag distribution campaign in larger supermarket chains, though has reportedly made little impact.[111] In 2013, the Ministry of Tourism announced plans to establish an initiative called "Eco-Clubs" in various municipalities with a view to promote environmental awareness and improve the image of Cambodian cities through better management and disposal of plastic bags, including by agreements with plastic bag manufacturers and retailers; there has been little evidence to show that this initiative was ever implemented.[112]

Stakeholder initiatives

Examples of international collaboration/assistance

The Japanese International Cooperation Agency (JICA) has provided technical support for a number of waste management activities in Cambodia, including capacity building and infrastructure development for improving collection and final disposal in Phnom Penh; funding was terminated in 2008 due to municipal authorities failing to meet specific conditions of support in terms of modifying its existing service agreement with CINTRI Cambodia, Ltd. (Seng, et al, 2011).[113] JICA's Cambodia Office has confirmed that it is now looking to renegotiate the terms of development assistance with the Cambodian Government; in the interim, the agency is providing funding to a series of pilot projects focused on waste management; this includes providing seed funding to a feasibility study on the use of Japanese technologies for converting waste plastics into construction materials (plastic timer, road aggregate). Based on the findings of this study, JICA is now supporting Koua Shouji Co., Ltd (Cambodian firm name Gomi Recycle 101: see below) with USD1 million for operations and equipment; construction is set to commence in 2019.[114]

The Asia Foundation has conducted extensive research on solid waste management and collaborated with CINTRI, Phnom Penh's private waste contractor on a waste collection reform programme as part of its larger Urban Services Programme: this included a 2014 pilot project conducted with CINTRI and Phnom Penh Municipality aimed at

108 Singh, R., Dickella, P., Yagasa, R. and Onogawa, K. (2018). State of Waste Management in Phnom Penh, Cambodia 2018. Available at: https://www.ccet.jp/sites/default/files/2018-07/State%20of%20Waste%20Management%20in%20Phnom%20Penh%2C%20Cambodia%20_web.pdf. (Accessed: 3 July 2019)

109 Ibid.

110 Interview with UN-Habitat, Cambodia Office, 17 April 2019.

111 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

112 Rann, R. Government promotes clean cities in Cambodia. The Phnom Penh Post (2013). Available at: https://www.phnompenhpost.com/business/government-promotes-clean-cities-cambodia. (Accessed: 3 July 2019)

113 Seng, B., Kaneko, H., Hirayama, K. & Katayama-Hirayama, K. Municipal solid waste management in Phnom Penh, capital city of Cambodia.Waste Management & Research 29, 491-500 (2010).

114 Interview with JICA Cambodia Office, 19 April 2019.

optimising private waste collection through the use of GPS and GIS systems.[115] The Korean International Cooperation Agency (KOICA) implemented a waste management project in Cambodia from 2012–2014 with a focus on strengthening capacity for waste management strategy development.[116]

The EU-funded "ASIA PRO-ECO Programme" sought to build the capacity of public and private actors involved with implementing waste management in Phnom Penh, as well as developing technical guidelines for solid waste treatment and disposal (MoE and COMPED, 2006).[117] The IGES Centre Collaborating with UNEP on Environmental Technologies has been active in Cambodia, providing policy and technical guidance towards the formulation of national and city level strategies and action plans on waste management.[118]

SWITCH-Asia's "Combine in One" Campaign targeted local market vendors in Phnom Penh with an education campaign focused on reducing the use of plastic bags; the programme reports a substantial success rate, noting that average plastic bag daily usage in one market (Psar DemKor) fell from 1.048 kg to 0.853 kg per day (19%).[119]

Examples of sub-national initiatives

There is evidence that Phnom Penh has been working to address plastic waste dating back to 2012, when municipal officials first hosted a stocktaking workshop on a plastic bag reduction project implemented selected supermarkets across the city.[120] With assistance from IGES and the Cambodian Education and Waste Management Organisation (COMPED), the City of Battambang conducted a project on organic waste separation (with an additional focus on plastic waste segregation) in local markets between the years of 2012-2013; source separation of plastic waste has been successfully replicated in various locations across the City (see below).[121]

Examples of private sector initiatives

Gomi Recycle 101 is a Japanese company (Japanese firm name Koua Shouji Co., Ltd.: see above) operating in Cambodia that specialises in recycling plastic and rubber wastes and converting these into furniture components and construction materials (plastic timber, road aggregate). Since 2016, the company has been working towards investing in a recycling facility in Svay Rieng City to produce end-recycled products for local markets;[122] the company has recently secured funding from JICA-Cambodia of USD1 million[123] and signed a partnership agreement with the Governor of Svay Rieng City to begin operations.[124] Gomi Recycle 101 is currently collecting industrial and commercial plastic waste from Phnom Penh's Special Economic Zone (SEZ) and has finalised a cooperation agreement with Chipmong, Cambodia's largest construction firm, for recovering plastic waste from sites in the south of the city.[125]

The Green Business Committee of the European Chamber of Commerce in Cambodia (EuroCham) regularly convenes advocacy discussion forums on environmental issues targeting private, as well as public and civil society stakeholders; in March 2019 the group organised an event focused on plastic waste with a view to identify showcase business solutions and make proposals to responsible authorities; this followed a similar event held in 2018 with the hospitality industry focused on waste management, which led some hotels to support a voluntary initiative requesting their suppliers to avoid the use of plastic packaging; EuroCham has also conducted discussions with key Government Ministries, including MoE, the Ministry of Tourism, and the Ministry of Industry and Handcrafts on the topic eco-labelling.[126]

115 Denny, L. Reforming Solid Waste Management in Phnom Penh. The Asia Foundation & ODI (2016). Available at: www.asiafoundation.org/wp-content/uploads/2016/06/Working-Politically-and-Flexibly-to-Reform-Solid-Waste-Management-in-Phnom-Penh.pdf/. (Accessed: 11 April 2019)

116 Singh, R., Dickella, P., Yagasa, R. and Onogawa, K. (2018). State of Waste Management in Phnom Penh, Cambodia 2018. Available at: https://www.ccet.jp/sites/default/files/2018-07/State%20of%20Waste%20Management%20in%20Phnom%20Penh%2C%20Cambodia%20_web.pdf. (Accessed: 3 July 2019)

117 Ministry of Environment of Cambodia and COMPED-Cambodian Education and waste Management Organization. Environmental Guidelines on Solid Waste Management in Kingdom of Cambodia. (2006). Available at: https://comped-cam.org/Documents/developmentguideline/06_03_25_Environmental%20gl%20on%20swm_END.pdf. (Accessed: 3 July 2019)

118 IGES Centre Collaborating with UNEP on Environmental Technologies. About CCET. Available at: http://www.ccet.jp/. (Accessed: 13 April 2019)

119 Quicksand. Excess Baggage: Reducing Plastic Bag Waste in Major Cities in Cambodia: Recommendations for policy considerations. Fondazione ACRA (2017). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Policy_Recommendations.pdf. (Accessed: 3 July 2019)

120 ASEAN ESC Model Cities. Phnom Penh's Initiative on Reducing Plastic Bag Usage (2012). Available at: www.aseanmodelcities.org/news/phnom-penhs-initiative-on-reducing-plastic-bag-usage/. (Accessed: 3 July 2019)

121 Interview with Cambodian Education and Waste Management Organisation (COMPED), 19 April 2019.

122 PPCA, IGES, Nexus, UN Environment, CCCA. (2018). Phnom Penh Waste Management Strategy and Action Plan 2018-2035. Phnom Penh, Cambodia. Available at: www.ccet.jp/publication/phnom_penh_waste_management_strategy_and_action_plan/. (Accessed: 3 July 2019)

123 Interview with JICA Cambodia Office, 19 April 2019.

124 Interview with European Chamber of Commerce in Cambodia, (EuroCham) Green Business Executive Committee 19 April 2019.

125 Interview with JICA Cambodia Office, 19 April 2019

126 Ibid.

The start-up Eco-Plastic operating in Phnom Penh focuses on making use of plastic waste as an aggregate for road construction.[127] Other initiatives include the Refill Not Landfill Campaign, a social impact company working in Cambodia and across Southeast Asia to raise awareness about the pollution generated from single-use plastic containers by selling reusable stainless steel and aluminium bottles that can be refilled with water at participating locations.[128] Another case example is a campaign led by Cambodia Airports (Phnom Penh, Siem Reap and Sihanoukville); in 2018, the group launched a joint public awareness campaign with schools and civil society organisations aimed at educating consumers about the impacts of plastic waste on the environment.[129]

Examples of civil society initiatives

Rehash Trash is a social enterprise affiliated with the NGO Green Gecko Project in Siem Reap that provides disadvantaged families with training on upcycling plastic bag waste into marketable products; it cites a recycling rate of approximately 4,000 bags per week.[130] Plastic Free Cambodia is an environmental conservation organisation and social impact company that provides training and consultancy services aimed at reducing the use of single-use plastics in Cambodia.[131]

Since 2018, the Cambodian Education and Waste Management Organisation (COMPED) has been collaborating with the German environmental NGO One Earth One Ocean (OEOO) on a plastic recycling initiative in Battambang Province; in addition to bimonthly awareness-raising campaigns, activities have included purchasing from informal waste collectors, aggregating plastic waste from the local landfill and designated waste separation sites across the city, as well as recovering plastic litter from the nearby Sangke River.[132] COMPED estimates that an average of 500 kilograms of plastic waste are collected per month; HDPE/LDPE plastics are dispatched to Germany each month as part of a wider effort to examine the feasibility of pelletising the waste for remanufacturing purposes.

Major gaps and opportunities for follow-up action

Tackling data challenges

Data on plastic waste generation and recycling volumes, number of recyclers and existing recycling operations in Cambodia remains limited;[133] moreover, existing sources of waste data are frequently inconsistent and unverifiable.[134] Accordingly, data on waste plastics should be better systematised and made more accessible for purposes of monitoring and reporting, including improving measurement of plastic waste at final disposal sites. Good practices and lessons learned from other countries should also be made more widely available for knowledge sharing purposes.

Strengthening institutional capacity and addressing coordination issues

District governments and municipal authorities remain unclear about their roles and responsibilities in terms of enforcing laws and regulations on waste.[135] Similarly, various sub-decrees on waste management have yet to be effectively implemented. Much of this challenge lies in the fact that many ministries have overlapping responsibilities concerning plastic waste management.

International donor assistance is critically needed for scaling up plastic recycling projects; funding could be better streamlined by amending contracting procedures associated with public-private partnerships, which at present are slow and cumbersome in Cambodia.[136] One potential entry point for coordinating actions on plastic waste may be Cambodia's National Council on Sustainable Development, (NCSD);[137] NCSD is comprised of high-level representatives (secretaries and under-secretaries of state) from more than 30 government ministries and agencies, as well as 25

127 Promchertchoo, P. Young Cambodian women on green mission to build roads with plastic waste. Channel News Asia (2019). Available at: www.channelnewsasia.com/news/asia/cambodian-women-on-green-mission-build-roads-with-plastic-waste-10396120/. (Accessed: 3 July 2019)

128 Refill Not Landfill. Available at: https://refillasia.com/. (Accessed: 10 April 2019)

129 Pawson, H. Cambodia Airports raises awareness of plastic waste; celebrates World Environment Day. The Moodie Davitt Report (2018). Available at: www.moodiedavittreport.com/cambodia-airports-raises-awareness-of-plastic-waste-celebrates-world-environment-day/. (Accessed: 3 July 2019)

130 Green Gecko Project. Available at: www.greengeckoproject.org/. (Accessed: 10 April 2019)

131 Plastic Free Cambodia. Available at: www.plasticfreecambodia.com/. (Accessed: 10 April 2019)

132 Interview with Cambodian Education and Waste Management Organisation, 19 April 2019.

133 Singh, R., Dickella, P., Yagasa, R. and Onogawa, K. (2018). State of Waste Management in Phnom Penh, Cambodia 2018. Available at: https://www.ccet.jp/sites/default/files/2018-07/State%20of%20Waste%20Management%20in%20Phnom%20Penh%2C%20Cambodia%20_web.pdf. (Accessed: 3 July 2019)

134 Ibid.

135 Ibid.

136 Interview with European Chamber of Commerce in Cambodia, (EuroCham) Green Business Executive Committee 19 April 2019.

137 Interview with UN-Habitat, Cambodia Office, 17 April 2019.

capital provincial governors, headed by the Prime Minister as its honorary chair and the Minister of Environment as its chair; further discussion with MoE on this point is needed as the solid waste management department is not currently represented in the council.[138]

Addressing multiple sources of plastic waste

Plastic waste in Cambodia is derived from a range of sources, such as local markets, retail stores, small vendors, and others, many of which are frequented by a specific consumer demographic.[139] Taking this into account, strategic communication campaigns should be developed with consideration of various methods for targeting different retailers and consumers in both urban and rural areas. One pilot initiative with high potential could be to design actions around the recent 2017 sub-decree on plastic bags, and replicated to address other plastic products in the future, with specific consideration of young people and early adopters. Other emerging plastic waste streams, such as industrial, construction and demolition (C&D), medical and hazardous waste, and e-waste also require attention. Taken together, incentives for plastic waste separation, and corresponding penalties for waste violations (such as open dumping and burning of plastic waste) should be immediately enforced, with reference made to relevant laws in order to encourage transparency and wider participation of the general public.

Promoting engagement with frontline stakeholders

Cambodia's plastic supply chain is primarily controlled by a small number of firms that wield major influence on the functioning of the country's import/export and recycling market;[140] central government should make efforts to break the monopolistic hold of these companies by instituting relevant market reforms, including strengthening regulations and providing financial incentives aimed at increasing competition. Private sector development should also be encouraged for new domestic recycling operations and activities; options include recovering plastic waste for refuse-derived fuel (RDF) and construction materials (roads, plastic timber, etc.). Additionally, informal waste collectors should be licensed by district and municipal authorities and contracted by private operators with a view towards legitimising their activities and improving overall waste services, including but not limited to plastics management.

138 Interview with JICA Cambodia Office, 19 April 2019.

139 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

140 Quicksand. Cambodia's Plastic Bag Ecosystem and Usage: Summary of Research Report. Foundazione ACRA (2015). Available at: https://www.switch-asia.eu/fileadmin/user_upload/Project%20news/Plastic_bags/Plastic_Bag_Ecosystem_and_Usage_Research_Summary.pdf. (Accessed: 3 July 2019)

COUNTRY BRIEF

INDONESIA

Indonesia is a marine-rich country, known as the "Amazon of the Ocean" due to its abundance of marine life forms. The country spans three bio-geographic regions and is home to wide range of coral species. However, these ecosystems are under threat from coastal deforestation, declining water quality, and pollution; damage to marine life has been caused by severe leakage of waste into the ocean.[141] The rapid urbanisation and growth in coastal populations have contributed to an increase of pollution, increasing the pressure on these ecosystems.[142] According to estimates, Indonesia is the world's second largest contributor of plastics to the oceans at 0.48-1.29 million t/year.[143] The Government of Indonesia recognises the urgency of marine plastics problems and calls for actions to drastically reduce plastic waste leakage into the ocean, particularly by addressing inadequate municipal waste management.

Key data

Plastics and municipal solid waste

- Population: 267 million (2018[144]) - Urban population accounts for 55.3% in 2018[145]
- Share of plastic in MSW: 14% (in 2013[146])
- Volume of plastic waste generated: 3.2 million t (2014[147])
- Plastic waste management: 10-15% is recycled; 60-70% is put on final disposal sites, 15-30% leaks into rivers, lakes and the sea[148]
- The City of Jakarta reports that out of 165t waste extracted from waterways, approximately 41t (25%) constitute plastics:[149]
- The composition of waste disposed in waterways is: 16% plastic bags, 5% plastic packaging, 1% plastic bottles, 9% other plastics, 4% glass & metal, 21% diapers, 44% organic waste[150]
- MSW collection coverage: 45-50% (2015) (40% in 2001):[151] Urban areas 56%; rural areas 5%
- Diversion from disposal 14%:[152] Recycled (and reused) 4.6%; composted 7.0%; and WtE/ biogas 2.4%
- Disposal 86%:[153] Landfilled 66.4%; unmanaged 19.6%

Packaging production, trade and consumption

141 Shuker, Iain G.; Cadman, Cary Anne. Indonesia - Marine debris hotspot rapid assessment: synthesis report (English). Marine Debris Hotspot Rapid Assessment (Synthesis Report). World Bank Group (2018). Available at: http://documents.worldbank.org/curated/en/983771527663689822/Indonesia-Marine-debris-hotspot-rapid-assessment-synthesis-report. (Accessed: 3 July 2019)

142 Ibit.

143 Ibid.

144 Indonesia Population 2019. Worldometers. Available at: http://www.worldometers.info/world-population/indonesia-population/. (Accessed: 3 July 2019)

145 ibid.

146 Regional Resource Center for Asia and the Pacific at the Asian Institute of Technology (AIT RRC.AP). Circular Economy Briefing Series: County Profile Indonesia: Management municipal solid waste and packaging waste. GIZ (2018). Available at: https://www.giz.de/de/downloads/giz2018_Indonesia-Country-Profile_web.pdf. (Accessed: 3 July 2019)

147 Taylor, L. Clean-up events shed light on Indonesia's waste crisis. Jakarta Post (2018). Available at: https://www.thejakartapost.com/life/2018/02/28/clean-up-events-shed-light-on-indonesias-waste-crisis.html. (Accessed: 3 July 2019)

148 PPID. Deklarasi Pengurangan Sampah Kantong Plastik (2018). Available at: http://ppid.menlhk.go.id/siaran_pers/browse/1276. (Accessed: 3 July 2019)

149 Shuker, Iain G.; Cadman, Cary Anne. Indonesia - Marine debris hotspot rapid assessment: synthesis report (English). Marine Debris Hotspot Rapid Assessment (Synthesis Report). World Bank Group (2018). Available at: http://documents.worldbank.org/curated/en/983771527663689822/Indonesia-Marine-debris-hotspot-rapid-assessment-synthesis-report. (Accessed: 3 July 2019)

150 ibid.

151 Regional Resource Center for Asia and the Pacific at the Asian Institute of Technology (AIT RRC.AP). Circular Economy Briefing Series: County Profile Indonesia: Management municipal solid waste and packaging waste. GIZ (2018). Available at: https://www.giz.de/de/downloads/giz2018_Indonesia-Country-Profile_web.pdf. (Accessed: 3 July 2019)

152 Ibid.

153 Ibid.

Plastic production and consumption have grown rapidly in ASEAN-6 (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam). In Indonesia, more than 40% of the plastics are imported from Malaysia, Thailand, Singapore, Europe and the US (GIZ, 2018). In addition, Indonesia and Thailand play host to the largest markets on flexible plastic packaging (sachets, pouches, bags and films).[154]

Packaging production

- Packaging industry value: IDR70 trillion (2014) (USD4.7 billion)
- Packaging industry growth rate (average): 10% (over the past decade) and expected 6-10% (2015-2018)
- Composition of packaging industry (by type): 60% plastic packaging industry (flexible and rigid); 25% paper and board, 15% others
- Flexible plastic packaging share: 45% of all packaging types; 42,538.6 million units in 2016. Indonesia constitutes the largest flexible packaging market in ASEAN
- Packaging consumption
- Market: 90% domestic, 10% export
- Sectoral consumption: 70% food and beverage industry, pharmaceuticals are second largest consumer
- Usage of packaging (by material type): 45% flexible packaging, 28% paper and board, 14% rigid plastic, 5% metal cans, 5% woven bags, 3% glass[155]
- Plastic industry and plastic products
- No. of plastic companies: 925 (2017)
- Plastic (products) raw material produced: 5.635 million t (2016)
- Plastic raw material used in packaging sector: 2.254 million t (40% of total plastic production)[156]

National legislation, policies and other initiatives

One key example of recent efforts to address plastics and plastic waste led by the Indonesian government includes its launch of the country's National Action Plan on Marine Debris (2017-2025) in June 2017. This action plan, which was developed by 13 government ministries, calls for efforts to reduce 70% of marine plastic debris (from 2017 baseline) by the end of 2025. It consists of five pillars: "Improve behavioural change", "Reduce land-based leakage", "Reduce sea-based leakage", "Reduce plastics production and use", and "Enhance funding mechanisms, policy reform and law enforcement".[157] This action plan should be regulated by the government at the sub national, national, international and regional level according to the proposed strategies for national action plan.[158]

The country's willingness to allocate finance for the issue can be also seen from the recent announcement that the government has pledged to spend up to USD1 billion for cleaning up its rivers and seas.[159] Other efforts to be noted include the recent application of plastic bag tax (IDR200/bag, USD0.01) for a trial period of three months in 2016 at retailers in 23 cities.

The main legal framework for management of municipal solid waste is the Waste Management Law of 2008 (No. 18/2008). It is a brief basic legislation, which provides key definitions regarding waste and waste categories, sets out general objectives to be met, clarifies roles and responsibilities, and provides a legal basis for penalising violations. It aims to protect human health as well as the environment while also promoting the use of waste as a resource. It includes a separate section on waste reduction, where it identifies the facilitating roles to be played by the national and regional governments. It also basically stipulates that waste should be segregated at source.

154 ASEAN Flexible Packaging Market Snapshot. Transparency Market Research (2017). Available at: https://www.transparencymarketresearch.com/asean-flexible-packaging-market.html. (Accessed: 3 July 2019)

155 Regional Resource Center for Asia and the Pacific at the Asian Institute of Technology (AIT RRC.AP). Circular Economy Briefing Series: County Profile Indonesia: Management municipal solid waste and packaging waste. GIZ (2018). Available at: https://www.giz.de/de/downloads/giz2018_Indonesia-Country-Profile_web.pdf. (Accessed: 3 July 2019)

156 Indonesia Plastic Recycling Association (ADUPI) (2016) Indonesia Plastic Lifecycle 2016. Bandung Institute of Technology (2016). Available at: https://www.coursehero.com/file/p7u62g4/ADUPI-and-APDUPI-is-Indonesia-Plastics-Recycling-Association-Indonesia-Plastics/. (Accessed: 3 July 2019)

157 Deputy for Human Resources, Science, Technology, and Maritime Culture. Indonesia's Plan of Action on Marine Plastic Debris 2017-2025. The Government of the Republic of Indonesia (2017). Available at: http://marinelitternetwork.com/wp-content/uploads/2018/04/NAP-Marine-Plastic-Debris-Indonesia_Summary.pdf. (Accessed: 3 July 2019)

158 Ibid.

159 Casey, T. Blockchain and the Ocean Plastic Pollution Fight: Perfect Together. TRIPLE Pundit (2018). Available at: https://www.triplepundit.com/story/2018/blockchain-and-ocean-plastic-pollution-fight-perfect-together/55506 (Accessed: 15 May 2019)

The Law No. 18/2008 is accompanied by the Government Regulation (GR) No. 81/2012, which provides more details on preferred treatment options, emphasises the importance of the 3Rs, and establishes the principle of extended producer responsibility (EPR).

In the 2000s, Indonesia went through a process of decentralisation of government functions. This devolution of responsibilities to local governments affected also the solid waste sector, where municipalities are now expected to play key roles in service provision and enforcement.

Status of implementation

The government recognises the plastics problem and has shown willingness to tackle the issue. The government demonstrates political leadership and commitment to set and to achieve ambitious marine litter/plastics targets; however, there is still a lack of capacities (e.g. skills and expertise) among the national and local government bodies responsible for waste management. This is particularly a severe issue for local governments as there is not enough support made from the central government to local governments.[160] Another factor hampering implementation is the fragmented responsibilities among different ministries, especially the Ministry of Environment and Forestry, Ministry of Infrastructure, Ministry of Public Works, and the Ministry of Internal Affairs.

At the local level, most governments face obstacles with carrying out responsibilities for waste management. Waste collection is primarily led by local communities, with a number of grass-roots initiatives (e.g. Waste Banks) picked-up/supported by local governments. However, there is a lack of collection service in some areas, as well as insufficient inter-municipal cooperation. Consequently, local governments are in critical need of developing an integrated waste system that extends from points of collection to recycling and final disposal, in addition to increasing related technical skills. The recent report argues that inadequate capacity in local governments contributes to lack of confidence and increases the risks to the private sector, limiting much-needed investment from credible businesses.[161] Moreover, as most recycling is conducted by the informal sector, local governments face difficulties with setting up a formal system for separate collection, due to the high number of informal collectors.

As mentioned, the country has established several key policies and strategies on waste management, recently also targeting plastics issues. However, research has revealed that policies are sufficiently translated into practice, mainly due to lack of skills and knowledge and the need to develop more evidence-based policymaking. However, a deficit of available data on waste generation and management (including marine litter data and recycling sectors/activities) and the poorly centralised information on waste generation and management greatly influence on the process.

Stakeholder initiatives

Local governments

Municipal bans on plastic bags have already been introduced in selected cities; Banjarmasin City and Bogor City for instance have established ban that have resulted in a notable reduction of disposable plastic bags (Banjarmasin city: introduced in 2016, resulting in a reduction of 80%; Bogor City: introduced in July 2018, resulting in a reduction of 41 tonnes of disposable plastic bags each month).[162] Bogor City has indicated that it intends to extend this regulation to traditional markets in the future.

Private sector

Private sector actors in Indonesia recognised the urgency of the issue and have started to take actions, particularly accelerating the technology improvement such as for product design and effective waste recycling and collection. However, there exists insufficient capacity with regard to plastics waste prevention, as well as less responsibilities for industrial and commercial waste. Some discussions have highlighted making EPR mandatory for producers including brand owners and manufacturers.

160 Action Fiche for reducing plastic waste and marine litter in East and South East Asia – supporting a transition to a circular economy in the region. European Commission (2018). Available at: https://www.gtai.de/GTAI/Content/DE/Trade/Fachdaten/PRO/2018/05/Anlagen/PRO201805295001.pdf?v=1. (Accessed: 3 July 2019)

161 Shuker, Iain G.; Cadman, Cary Anne. Indonesia - Marine debris hotspot rapid assessment: synthesis report (English). Marine Debris Hotspot Rapid Assessment (Synthesis Report). World Bank Group (2018). Available at: http://documents.worldbank.org/curated/en/983771527663689822/Indonesia-Marine-debris-hotspot-rapid-assessment-synthesis-report. (Accessed: 3 July 2019)

162 Bhwana, P.G. Bogor City Plastic Bag Ban Sued, Refuses to Back Down. TEMPO.CO (2017). Available at: https://en.tempo.co/read/1200541/bogor-city-plastic-bag-ban-sued-refuses-to-back-down (Accessed: 15 May 2019)

Many companies regard the plastics waste prevention and changing business models as an unnecessary business risk, citing associated tax burdens and the small market shares for the recycled or sustainably produced products in the country, low awareness among local consumers and limited financial support from the government.

In terms of sorting and recycling of packaging waste, the Packaging and Recycling Alliance for Indonesia (PRAISE) works for recycling, public education and awareness raising activities. Voluntary approaches have been taken by the private sector as part of their Corporate Social Responsibility activities.[163]

Multinational companies have also started to take actions. For example, Unilever and Veolia acknowledge the urgency of the issue and have signed a collaboration agreement on sustainable packaging, starting in Indonesia and India. The agreement will be implemented by developing and scaling up collection and reprocessing infrastructure, implementing used packaging collection solutions, adding recycling capacity and developing new circular business models.[164] SC Johnson has also initiated a pilot project to collect and recycle plastic in eight Indonesian communities in partnership with Canadian startup Plastic Bank, using blockchain technology. This initiative enabled people to sell plastics to local recycling centres in exchange for digital tokens.[165] Other companies, including Henkel and Marks and Spencer, have already introduced recycled social plastic in some products and packaging. SC Johnson plans to launch a 100 percent social plastic bottle by fall 2019.[166]

Major gaps and opportunities for follow-up action

In conclusion, the plastics challenge is high on the agenda in Indonesia; the country has recognised the urgency of the issue and showed a willingness to tackle the situation. However, so far, the policy priority has been placed on improving the existing waste management system, rather than developing circular economy business models. For further action, the following options could be considered:

- Reduce institutional fragmentation and establish clearer institutional responsibilities, among national government ministries as well as between the national and sub-national levels
- Strengthen technical skills and increase financial resources of local governments to implement and enforce national waste management laws and policies
- Increase the budget allocation and capacity building from central government to local government
- Encourage private sector investments for improving waste management systems and increase waste collection fees
- Develop upstream policies on product design, and plastic packaging and strengthen related legislation
- Establish strategies on Extended Producer Responsibility for the packaging sector to stimulate actions by the private sector
- Encourage dialogue among stakeholders along packaging value chains concerning design and recycling for a shift towards circular economy
- Take measures to integrate informal sector workers in collecting and sorting packaging waste
- Develop strategies for reducing plastic waste through sustainable consumption and production, including public awareness raising and regulations
- Developing metrics for monitoring and estimating the volume and flow of plastics waste leakage
- Customise recycling technology to local contexts
- Develop structured learning programs for students on good waste disposal practices
- Raise public awareness on the issues, including by encouraging wide public participation in regular community-led voluntary clean up campaigns at beaches, river and mangrove forests

163 Regional Resource Center for Asia and the Pacific at the Asian Institute of Technology (AIT RRC.AP). Circular Economy Briefing Series: County Profile Indonesia: Management municipal solid waste and packaging waste. GIZ (2018). Available at: https://www.giz.de/de/downloads/giz2018_Indonesia-Country-Profile_web.pdf. (Accessed: 3 July 2019)

164 Unilever and Veolia sign a collaboration agreement on sustainable packaging. Veolia (2018). Available at: https://www.veolia.com/en/newsroom/news/sustainable-plastic-packaging-partnership-unilever-veolia-india-indonesia (Accessed: 15 May 2019)

165 Mazzoni, M. SC Johnson Says It's Offering More Concentrate Products To Combat Plastic Waste. TRIPLE Pundit (2019). Available at: https://www.triplepundit.com/story/2019/sc-johnson-says-its-offering-more-concentrate-products-combat-plastic-waste/83476 (Accessed: 15 May 2019)

166 Ibid.

COUNTRY BRIEF

LAOS

The People's Democratic Republic of Laos is a mountainous multi-ethnic inland country traversed by the Mekong River. It has a population of 6.9 million (2017)[167] and although the urban share has grown rapidly in recent years, it is still predominantly a rural economy with an urbanisation rate of just 34 percent. Administratively, Lao PDR is divided into 18 provinces, 148 districts and 8,464 villages.

Key data

The country has had one of the strongest GDP growth rates in the region, averaging 7.7 percent over the last decade.[168] It is a lower-middle income country where per-capita GDP (PPP) reached USD 7,038 in 2017.[169] Waste generation per capita in the capital city of Vientiane is estimated at 0.65 kg per person per day.[170] Waste collection rates vary widely, reported to be between 32 and 77 percent.[171] In Vientiane, the current rate is around 50 percent.[172] The municipal waste stream has a high share of biodegradable materials. There is thus big potential for composting and waste reduction, which is currently utilised to a limited extent only.[173]

Based on 2012 data, municipal solid waste contains 12 percent plastics in the capital city of Vientiane and around 8 percent in secondary cities and small towns.[174] However, the reliability of data on waste composition can be questioned since sources contradict each other. Data presented in 2010 indicated that 6.1 percent of residential waste in Vientiane is composed of plastics.[175] The same source indicated that plastics constitute 11-15 percent of the waste stream in secondary cities. The overall recycling rate is assumed to be fairly low; a 2012 survey by JICA estimated that 8.7 percent of the waste in Vientiane is recycled.[176]

National legislation, policies and other initiatives

The basic law on environmental protection in Lao PDR is the Environmental Protection Law (EPL) No 29/NA, enacted in 2012,[177] which is a broad legislation of a general nature. It includes four paragraphs on waste management (37-40), which state that general waste should be separated to enable reuse and recycling and indicates landfill disposal as the main treatment method. However, the law provides few details on responsibilities and implementation arrangements but refers to forthcoming regulations for details. Reportedly, some such regulations have been issued, covering general municipal solid waste management, treatment, recycling, resource recovery, source reduction, segregation of waste at source, collection, transportation, landfills, incinerators, as well as management of industrial waste, healthcare waste, and other waste streams.[178] However, the details and current status of these regulations are currently not known. Additionally, Lao PDR has a Green Growth Strategy, which also tackles waste management and treatment.

Institutional arrangements

167 Lao PDR Country Profile. The World Bank (2019). Available at: https://databank.worldbank.org/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=LAO. (Accessed: 3 July 2019)

168 Ibid.

169 Ibid.

170 Solid Waste Management City Profile – Vientiane Capital, LAO People's Democratic Republic. Center for Clean Air Coalition (CCAC) (2015) Available at: https://www.waste.ccacoalition.org/sites/default/files/files/vientiane-_city_profile_vientiane_capital_lao.pdf. (Accessed: 3 July 2019)

171 Sato, N. et al. Current condition and issues of municipal solid waste management in Vientiane Capital, Luang Prabang District and Xayabouri District in Laos People's Democratic Republic. In The Asia-Pacific Landfill Symposium (2018).

172 Interview with VCOMS, 29 March 2019.

173 Solid Waste Management in Vientiane, Lao P.D.R: Situation assessment and opportunities for waste-to-resource. Global Green Growth Institute (2018). Available at: http://gggi.org/site/assets/uploads/2018/09/Solid-Waste-Management-in-Vientiane-Lao-P.D.R.pdf. (Accessed: 3 July 2019)

174 Sato, N. et al. Current condition and issues of municipal solid waste management in Vientiane Capital, Luang Prabang District and Xayabouri District in Laos People's Democratic Republic. In The Asia-Pacific Landfill Symposium (2018).

175 Phonekeo, T. & Inthavong, P. Solid Waste Management in Laos. Available at: https://www.iges.or.jp/en/archive/wmr/pdf/activity100728/5_Lao_Day1_Session2.pdf. (Accessed: 3 July 2019)

176 Solid Waste Management in Vientiane, Lao P.D.R: Situation assessment and opportunities for waste-to-resource. Global Green Growth Institute (2018). Available at: http://gggi.org/site/assets/uploads/2018/09/Solid-Waste-Management-in-Vientiane-Lao-P.D.R.pdf. (Accessed: 3 July 2019)

177 Environmental Protection Law (Revised Version). Lao People's Democratic Republic Peace Independence Democracy Unity Prosperity (2013). Available at: http://www.laolandissues.org/wp-content/uploads/2012/03/Environmental-Protection-Law-2013English.pdf. (Accessed: 3 July 2019)

178 Sato, N. et al. Current condition and issues of municipal solid waste management in Vientiane Capital, Luang Prabang District and Xayabouri District in Laos People's Democratic Republic. In The Asia-Pacific Landfill Symposium (2018).

The ministries most related with waste management and recycling are the Ministry of Natural Resources and Environment (MoNRE) and the Ministry of Public Works and Transport (MPWT), with the Ministry of Planning and Investment (MPI) playing a complementary role. It should be noted that MoNRE is a relatively new ministry, established in 2011, which is mainly in charge of preparing laws and issuing general guidance. For plastics production and use the Ministry of Industry and Commerce (MOIC) is also relevant.

At the provincial level, Urban Development Administrative Authorities (UDDAs) play the main role for solid waste management issues.[179] Decrees issued at the provincial level indicate responsibilities for waste management at the local level and provide the main legal mandate for these activities, including the collection of fees.

At the local level in the capital city, the Vientiane City Office for Management and Service (VCOMS) is responsible for waste management. VCOMS operates its own fleet of waste collection vehicles but it also contracts eight private collection companies.[180]

Status of implementation

The local government in Vientiane is currently focused on expanding waste collection services, with a target to achieve full coverage by 2020.[181] However, progress is slow, partly due to the comparatively high collection fees; households are charged around USD 5 per month for weekly waste collection.[182] The city's vision for 2020 also includes promotion of the 3Rs but no clear target has been established.

Recyclable materials are recovered to a limited extent, through activities of both informal and formal actors. For plastics, PET bottles reportedly have the highest recovery rate but also some PE containers are collected. Informal players include door-to-door waste buyers, waste pickers in public areas, and landfill scavengers. Waste collection company employees are also allowed to collect and sell recyclables for additional income. Collected items are sold to buying centres, which can be either informal operations or registered businesses. Waste plastics are then often sold on to recycling workshops that clean, sort and compact the materials, or directly to processing companies. In some cases, workshops also shred the plastics into smaller pieces. Reportedly, very little of the recovered recyclable materials are processed in Lao PDR; most of it is sold to facilities in neighbouring countries, especially China and Vietnam.[183] Figure 5: provides an overview of the flow of recyclables, based on the situation in Vientiane.

Figure 5: Flow of recyclables in Vientiane

Source: Global Green Growth Institute[184]

179 Solid Waste Management in Vientiane, Lao P.D.R: Situation assessment and opportunities for waste-to-resource. Global Green Growth Institute (2018). Available at: http://gggi.org/site/assets/uploads/2018/09/Solid-Waste-Management-in-Vientiane-Lao-P.D.R.pdf. (Accessed: 3 July 2019)

180 Interview with VCOMS, 29 March 2019.

181 Solid Waste Management in Vientiane, Lao P.D.R: Situation assessment and opportunities for waste-to-resource. Global Green Growth Institute (2018). Available at: http://gggi.org/site/assets/uploads/2018/09/Solid-Waste-Management-in-Vientiane-Lao-P.D.R.pdf. (Accessed: 3 July 2019)

182 Ibid.

183 Ibid.

184 Solid Waste Management in Vientiane, Lao P.D.R: Situation assessment and opportunities for waste-to-resource. Global Green Growth Institute (2018). Available at: http://gggi.org/site/assets/uploads/2018/09/Solid-Waste-Management-in-Vientiane-Lao-P.D.R.pdf. (Accessed: 3 July 2019)

Between 2010 and 2015, JICA and the ASEAN Secretariat implemented the Laos Pilot Program for Narrowing the Development Gap towards ASEAN Integration (LPP), which included one component on Environmentally Sustainable Cities (ESC), focusing mainly on improved waste collection and management. The ESC component involved pilot projects on reducing the use of plastic shopping bags by distributing eco-baskets. It also involved organising regular waste buying fairs in some neighbourhoods in Vientiane. However, the current status of these activities is unclear.

Emerging initiatives

The MoNRE is planning to develop a masterplan for solid waste management.[185] The city of Vientiane is interested in regulating the free distribution of single-use plastic shopping bags, but the mandate for doing so seems unclear.[186]

Major gaps and opportunities for follow-up action

- Address the institutional fragmentation and the unclear mandates and role sharing. In particular, clarify roles and responsibilities related to reduction of plastics use, source segregation, and of expansion and improvement of plastics recycling
- Expand waste separation at source for plastics. This can be done through establishing community bins for plastics and through waste banks
- Assess the demand for plastics in Laos and explore whether a domestic recycling industry could become viable. Provide policy support for domestic recycling companies
- Support waste pickers by providing protective gear and regular health checks. Try to organise waste pickers into cooperatives and seek ways to stabilise buying prices for waste plastics

185 Solid Waste Management in Vientiane, Lao P.D.R: Situation assessment and opportunities for waste-to-resource. Global Green Growth Institute (2018). Available at: http://gggi.org/site/assets/uploads/2018/09/Solid-Waste-Management-in-Vientiane-Lao-P.D.R.pdf. (Accessed: 3 July 2019)

186 Interview with VCOMS, 29 March 2019.

COUNTRY BRIEF

MALAYSIA

Malaysia has a population of 32 million, 70 percent of which live in urban areas. The country is comprised of two regions separated by the South China Sea: peninsular Malaysia and the states of Sabah and Sarawak on the island of Borneo. The country's GDP has grown rapidly over many decades; between 1957 and 2005 it increased by 6.5 percent annually. The per-capita GDP (PPP) amounts to USD 32,501. A constitutional monarchy, Malaysia is made up of a federation of 13 states and three federal territories. Each state maintains elected assemblies as well as their own written constitutions, with nine (collectively known as the Malay States) also represented by traditional Malay rulers. At the lower administrative level, the country is divided into 154 local authorities.

Key data

Malaysia hosts a sizeable plastics industry, consisting of around 1,300 manufacturers employing a workforce of some 74,000 (2012).[187] Forty-two percent of the country's plastics production is used for packaging, followed 25 percent for electrical and electronic goods, 11 percent for household goods, 10 percent for the automotive industry, 7 percent for construction, and 2 percent for agriculture.[188] The annual consumption of plastics is estimated to 63kg/capita.[189] Apart from domestic demand, in 2016 the Malaysian plastics industry also exported 2.26 million tonnes of resin equivalent to a value of RM30 billion (USD7.15 billion).[190]

According to 2014 data (the latest figures available), Malaysians generated 1.2 kg of municipal solid waste per person each day. Plastics constituted 13.2 percent of this waste, amounting to 53 kg of plastic waste per person per year or 1.59 million tons/year for the country as a whole.[191]

Solid waste treatment

Landfill disposal is currently the most common waste management method in Malaysia. Most landfills are small facilities where environmental protection standards and maintenance quality vary considerably. Open dumpsites, where waste is illegally disposed of, are still used in many areas.[192] Around 165 landfill sites are currently in operation, but only eight of those facilities are sanitary landfills.[193] The main sanitary landfill in Malaysia is Bukit Tagar Sanitary Landfill (BTSL) serving Kuala Lumpur and Selangor, and supervised by the Ministry of Urban Wellbeing, Housing, & Local Government.[194]

A waste-to-energy plant for municipal solid waste was in operation in Kajang (near Kuala Lumpur) between 2009 and 2015, but has been demolished.[195] A new waste-to-energy facility is reportedly under construction in Kuala Lumpur; with operations set to start in 2019, the site will have the capacity to treat 1,000 tonnes of waste/day.[196]

187 Sha'aban, E. Plastics and the environment. (2019). Available at: http://mpma.org.my/Documents/Plastics%20and%20the%20Environment.pdf. (Accessed: 3 July 2019)

188 Ibid.

189 Ibid.

190 Malaysia's Roadmap Towards Zero Single-use Plastics 2018-2030. Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC) (2018). Available at: https://www.mestecc.gov.my/web/wp-content/uploads/2019/03/Malaysia-Roadmap-Towards-Zero-Single-Use-Plastics-2018-20302.pdf. (Accessed: 3 July 2019)

191 Agamuthu, P. Malaysia Country Chapter: State of the 3Rs in Asia and the Pacific. UNCRD & IGES (2017). Available at: http://www.uncrd.or.jp/content/documents/5691[Nov%20 2017]%20Malaysia.pdf. (Accessed: 3 July 2019)

192 Moh, Y. C., & Abd Manaf, L. Overview of household solid waste recycling policy status and challenges in Malaysia. Resources, Conservation and Recycling (2014). Available at: http://doi.org/10.1016/j.resconrec.2013.11.004. (Accessed: 3 July 2019)

193 Agamuthu, P. Malaysia Country Chapter: State of the 3Rs in Asia and the Pacific. UNCRD & IGES (2017). Available at: http://www.uncrd.or.jp/content/documents/5691[Nov%20 2017]%20Malaysia.pdf. (Accessed: 3 July 2019)

194 KUB Berjaya Enviro website. Available at: https://www.kbenviro.com.my/about-btsl/ (Accessed: 17 July 2019)

195 Kajang Incineration Plant (Shutdown). Industry About. Available at: https://www.industryabout.com/country-territories-3/2221-malaysia/waste-to-energy/34769-kajang-incineration-plant-shutdown. (Accessed: 3 July 2019)

196 Malaysia: Toward A Sustainable Waste Management. Global Recycling. Available at: https://global-recycling.info/archives/1451. (Accessed: 3 July 2019)

Priority sustainability issues related to plastics

Following China's import ban on most types of waste plastics in early 2018, Malaysia became one of the key export destinations for shipments from the EU, Japan and the US. In the first half of 2017, Malaysia imported 128,000 tonnes of plastic waste from G7 countries; one year later this figure had increased to 461,000 tonnes.[197] Some of these imports are conducted by formally licensed recycling businesses, however a significant share is handled illegally and treated in ways that violate national environmental regulations. Several media reports and NGO studies have documented ways open burning and inappropriate waste dumping in the country is contributing to air and water pollution, with negative impacts on public health.[198]

Malaysia is also facing issues with establishing source segregation systems for municipal solid waste. Due in part to poor segregation, a high share of domestic plastic waste is currently buried in dumpsites and landfills. The country is thus confronted by a unique challenge: despite maintaining a large plastic recycling industry, with significant levels of associated expertise, Malaysia primarily treats imported waste – yet growing volumes of domestic post-consumer plastic continue to constrain the country's existing waste management system.

National legislation, policies and other initiatives

Malaysia's Solid Waste Management and Public Cleansing Act (Act 672) were approved in the year 2007 after a decade of deliberation in the country's parliament. The Act effectively transferred responsibility for solid waste management from local authorities to the federal government in order to ensure a consistent system and service level across the whole country. Enforcement began in 2011 within eight states as well as the country's federal territories. Act 672 also supports privatisation in the solid waste management sector. To support implementation, an institutional framework was established, with the Department of National Solid Waste Management and the Solid Waste Management and Public Cleansing Corporation (the operational arm with satellite offices located across the country) designated as lead agencies.[199] In peninsular Malaysia, three private companies have been contracted for waste collection.

Act 672 provides a strong legal basis for the government to take action both with regard to promoting recycling activities and shifting towards a circular economy. For example, the act requires segregation at source of recyclable waste and authorises responsible ministries to issue decrees on types of waste considered recyclable. Households that fail to comply with the legislation can be charged with a fine.

In addition, the act allows for the establishment of producer take-back (extended producer responsibility) systems and deposit-refund schemes and vests the government with powers to mandate the use recycled materials as well as to restrict the use of certain materials among manufacturers.[200]

Before Act 672 was enacted, Malaysia had developed a number of national plans and policies related to waste management, including its 2005 National Strategic Plan on Solid Waste Management, which provided a roadmap for implementation; this was complemented by the country's Master Plan for National Waste Minimisation, which set a target to achieve 14 percent recycling of municipal solid waste by the year 2020.[201] A number of awareness-raising campaigns have also been conducted to encourage public cooperation on source separation of waste, with only limited success.[202]

In 2011, the federal government launched a nationwide "No Plastic Bag Day Campaign" scheduled for every Saturday. Wet markets, restaurants and night markets were exempted from this initiative. Consumers were advised to bring their own bags or to purchase alternative bags, such as paper bags or reusable bags made of synthetic fibres; those

197 Hook, L. & Reed, J. Why the world's recycling system stopped working. Financial Times (2018). Available at: https://www.ft.com/content/360e2524-d71a-11e8-a854-33d6f82e62f8. (Accessed: 3 July 2019)

198 The Recycling Myth: Malaysia and the Broken Global Recycling System. Greenpeace Malaysia (2018). Available at: https://www.greenpeace.org/southeastasia/publication/549/the-recycling-myth/. (Accessed: 3 July 2019)

199 Abas, M.A. & Wee, S.T. Municipal Solid Waste Management in Malaysia: An Insight Towards Sustainability. In 4th International Conference on Human Habitat & Environment 2014. Available at: https://www.academia.edu/6977132/Municipal_Solid_Waste_Management_in_Malaysia_an_Insight_Towards_Sustainability. (Accessed: 3 July 2019)

200 Bin Yahaya, N. & Larsen, I. Federalising Solid Waste Management In Peninsular Malaysia. Available at: http://www.ecoideal.com.my/danidaurban/swmc/download/SWMC_TEC_03-123-Federalising%20SWM%20Peninsular%20M%27sia.pdf. (Accessed: 3 July 2019)

201 Abas, M.A. & Wee, S.T. Municipal Solid Waste Management in Malaysia: An Insight Towards Sustainability. In 4th International Conference on Human Habitat & Environment 2014. Available at: https://www.academia.edu/6977132/Municipal_Solid_Waste_Management_in_Malaysia_an_Insight_Towards_Sustainability. (Accessed: 3 July 2019)

202 Moh, Y. C., & Abd Manaf, L. Overview of household solid waste recycling policy status and challenges in Malaysia. Resources, Conservation and Recycling (2014). Available at: http://doi.org/10.1016/j.resconrec.2013.11.004. (Accessed: 3 July 2019)

who opted for single-use plastic bags were charged MR0.20 (USD0.06). A 2013 evaluation of this effort found that around half of the consumers paid the bag fee while the other half either used reusable bags or no bag at all.[203]

The Malaysian Investment Development Authority (MIDA) provides tax incentives for green industry activities in the area of energy, transportation, building, waste management and supporting services activities projects.[204] MIDA also provides tax incentive for manufacturers of bio-based or biodegradable plastics, biomass products and recycling products.[205]

The Malaysian Investment Development Authority (MIDA) provides tax incentives for green industry activities in the area of energy, transportation, building, waste management and supporting services activities projects.[206] MIDA also provides tax incentive for manufacturers of biobased or biodegradable plastics, biomass products and recycling products.[207]

Malaysia also has in place a set of ecolabelling criteria (technical standards) for biodegradable and compostable plastic packaging materials (ECO001) as well as similar standards related to biomass-based products for food-contact applications (ECO009). These ecolabelling standards also include criteria for products constructed of recycled plastics (ECO018) as well as those made of recycled rubber (ECO014). The standards were developed by SIRIM, an industrial research and technology organisation under the Ministry of International Trade and Industry (MITI).

Malaysia's current development plan (11th Malaysia plan) for 2016-2020 outlines a number of objectives and initiatives related to sustainable plastics management. The plan envisages an increase in source separation activities and sets a 22 percent target for recycling of household waste by 2020. In addition, the plan also includes a proposal for establishing a national waste management platform tasked with coordinating actions led by related government agencies.

Implementation challenges:[208]

- Low awareness among citizens and low willingness to separate recyclables at source
- Lack of consistent, sufficiently detailed and reliable data on waste generation, composition, collection routes and treatment
- The need for coordination of a large number of actors, both governmental and private, at various administrative levels
- Lack of detailed policies on implementation of Act 672

Emerging national government initiatives

National roadmap

Malaysia recently drafted its Roadmap Towards Zero Single-Use Plastics 2018-2030. This national plan, adopted in October 2018, was developed by the Ministry for Energy, Science and Technology, Environment, and Climate Change (MESTECC), in consultation with various stakeholders.

The main features of the roadmap include:

- Establishment of a Joint Ministerial Committee for implementation, co-chaired by the ministers of MESTECC and the Ministry of Housing and Local Government (KPKT)
- MESTECC tasked with setting up a permanent secretariat to coordinate, monitor and facilitate implementation
- Sequenced activities in three stages: 2018-2021, 2022-2025, and 2026-2030

203 Asmuni, S., Hussin, N.B., Khalili, J.M., & Zain, Z.M. Public Participation and Effectiveness of the no Plastic Bag Day Program in Malaysia. Procedia - Social and Behavioral Sciences 168, 328-340 (2015)

204 Forms and Guidelines. Malaysia Investment Development Authority (MIDA). Available at: http://www.mida.gov.my/home/tax-incentives-for-green-industry/posts/. (Accessed: 3 July 2019)

205 Manufacturing Sector. Malaysia Investment Development Authority (MIDA). Available at: http://www.mida.gov.my/home/incentives-in-manufacturing-sector/posts/. (Accessed: 3 July 2019)

206 MIDA website, http://www.mida.gov.my/home/tax-incentives-for-green-industry/posts/

207 MIDA website, http://www.mida.gov.my/home/incentives-in-manufacturing-sector/posts/

208 Moh, Y. C., & Abd Manaf, L. Overview of household solid waste recycling policy status and challenges in Malaysia. Resources, Conservation and Recycling (2014). Available at: http://doi.org/10.1016/j.resconrec.2013.11.004. (Accessed: 3 July 2019)

- Emphasised need for R&D with the aim of providing opportunities for the local industries to embrace new eco-friendly alternatives that could facilitate penetration to a wider global market"
- Focusing on the reduction of single-use plastic via 4 approaches: Refuse, Reduce, Reuse and Recycle
- Concentration initially on shopping bags, food trays and straws
- Envisaged complementary Circular Economy roadmap for bottles and other single-use plastics, to be drafted in 2020
- Subsequent drafting of new legislation and technical guidelines
- Outlines leading a Global Environment Facility (GEF) proposal targeting regional marine debris

The roadmap was developed with the participation of different stakeholders, including the private sector and state governments. It was also presented and discussed in high-level meetings involving all ministries. The roadmap is a "living" document and MESTECC is engaging more stakeholders to further enhance the document and review the current situation and technological advancements.

The planned Circular Economy roadmap for bottles and other single-use plastics is expected to emphasise extended producer responsibility (EPR) in some form.[209]

Import of plastic waste

The Malaysian government has responded to the rapidly increasing import of plastic waste on multiple fronts. Malaysia stands as a strong proponent of strengthening binding rules on the international waste trade. The government maintains that wealthy countries should assume more responsibility on preventing shipments of waste that is mixed, contaminated or otherwise without economic value likely to be recycled.

Domestically, the government of Malaysia is making efforts to stem the inflow of unwanted waste shipments through import regulations and enhanced customs inspections. In October 2018 the government temporarily banned the import of most types of waste plastic. The government has declared its intention to permanently ban import of waste plastics and in May 2019 announced that it would send back 3,000 tonnes of illegally traded plastic waste to the countries of origin.

According to media reports, the Malaysian government is also clamping down on illegal plastics recycling facilities, including by shutting down 139 such plants between July 2018 and February 2019.[210] Several people complicit in these activities have also been prosecuted yet critics argue that existing penalties are too weak to deter violations.

Waste-to-energy

The Local Government and Housing Ministry has reaffirmed plans to build a waste-to-energy plant in every state by 2020 to resolve the country's mounting rubbish problem. Malaysia has plans to construct one waste-to-energy plant in each state, but the timeline for this is not yet decided.[211]

Targets and initiatives

The Green Technology Master Plan, which is an outcome of the Eleventh Malaysia Plan (2016-2020), lists a number of objectives for waste management and resource circulation, including an increase of recycling rate from 17.5% in 2016 to 22% in 2020 and 28% in 2030, an increase from 14 sanitary landfill facilities to 23 by 2020, and the construction of 3 waste-to-energy plants by 2030.[212]

Source reduction initiatives at sub-national levels

State governments have taken the lead on reducing the use of plastic shopping bags. In 2009, local authorities in Penang banned plastic bags in retail outlets every Monday. The following year, Selangor state introduced a similar ban on Saturdays. The Penang state government has since extended its ban to all days of the week.

209 Ibid.

210 The Star Online, 25 February, 2019. https://www.thestar.com.my/news/nation/2019/02/25/yeo-139-illegal-plastic-recycling-premises-shut-down-nationwide/

211 The Malaysian Insight, 22 May 2019. https://www.themalaysianinsight.com/s/156391

212 Malaysian Green Technology Corporation website. Available at: https://www.greentechmalaysia.my/about/green-technology-master-plan/ (Accessed: 18 July 2019)

In 2017, two of the Federal Territories - Kuala Lumpur and Putrajaya - introduced a ban on conventional plastic bags and food containers. Biodegradable and compostable options are encouraged as alternatives.[213]

Shopping premises in Malacca introduced a "No Plastic Bag Day" on Fridays and Saturdays, which in January 2016 were extended to a total ban on plastic bags made from petroleum products at all supermarkets and shopping malls.[214]

Major gaps and opportunities for follow-up

Malaysia's new National Roadmap Towards Zero Single-use Plastics provides a useful entry-point for development partners to assist the country with its efforts to tackle plastic waste challenges. The announced development of a Circular Economy Roadmap for plastics also offers additional opportunities. The following set out some of the areas where collaboration with other countries may prove fruitful.

- Sharing of experiences on cross-ministerial policymaking; models for how to effectively coordinate and align the work of separate ministries and government agencies
- Awareness raising and capacity strengthening of plastics and packaging manufacturers, especially SMEs
- Support to the drafting of a packaging law, drawing from the experiences of countries that already have such legislation in place
- Guidance on how to implement EPR for selected types of plastic packaging
- Guidance on how to include plastics in the system for green public procurement
- Guidance on how the government can stimulate a dynamic national innovation system around bio-based plastics, involving also private financial lenders and other non-government funding sources

213 How are Asian countries tackling plastic pollution? Asian Correspondent (2018). Available at: https://asiancorrespondent.com/2018/03/how-are-asian-countries-tackling-plastic-pollution/. (Accessed: 3 July 2019)

214 Malacca bans plastic bags. The Star Online, 30 December 2015. Available at: https://www.thestar.com.my/news/nation/2015/12/30/malacca-bans-plastic-bags-ruling-to-take-effect-on-jan-1-in-move-to-become-a-green-state/#DWKWXt8eGGGl077P.99 (Accessed: 17 July 2019)

COUNTRY BRIEF

MYANMAR

Myanmar has a rich, diverse culture and is the largest county in mainland Southeast Asia. The country has a 19 million coastal population (2015) and is ranked 17th in the world as a contributor to plastics ocean pollution, based on the amount of inadequately managed waste and an estimated 2 percent littering rate.[215] In general, Myanmar does not have any national level policies or initiatives specific to plastics. However, a few municipalities have banned plastics bags, such as Yangon and Mandalay. Some voluntary actions by business aiming to reduce the use of single-use plastics also exist. These initiatives have contributed to raising public awareness on plastics issues. The plastic recycling industry is growing in some cities, for example 1,000 tonnes of plastic per month are recycled in Yangon and 700 tonnes/month in Mandalay. In this sense, it can be said that some initial actions have been taken for plastic reduction at the local level; however, national level legislation is not yet well established.

Key data

The country has been facing rapid population growth particularly in urban areas, and the total population reached 51 million in 2014. Economic growth and accompanying consumer behaviour changes have contributed to an increasing amount of waste plastics. The average plastic bag use per person rose to five a day in 2018, from three per week in 1993.[216] The use of plastic bottles also increased to 6.3 per person per month in 2018, up from 0.7 per person per month in 1993.[217] The total volume of mismanaged plastic waste is estimated to 0.46 million tonnes per year and about 0.1 million tonnes reach oceans as plastic marine debris.[218] The annual MSW generation is comparatively low at 2.04 million tonnes in 2012.[219]

Around 3,000 tons of plastic are exported annually, from Myanmar to mainly Japan and European countries.[220] Also the domestic demand for plastic products has rapidly increased and almost exceeded the supply of the country's plastic manufacturing industry. Currently 4,000 Myanmar plastic manufacturers are producing plastic and related products, with raw material imported from Thailand, Singapore, Japan, Taiwan, and Saudi Arabia.[221]

Data from Yangon City shows that 86 tonnes of recyclable materials are collected and transferred to waste dealers per day by the informal sector.[222] This is an illustration that the country's recycling still heavily depends on the informal sector.

National legislation, policies and other initiatives

Myanmar recognises the urgency of the plastics issue. However, existing laws, policies and initiatives are not sufficiently established to effectively address plastics at present. Inadequate waste management policies and regulations are compounded by a lack of financial schemes for improving technology, including central government financial support, as well as private investment.

In terms of waste management, there are several policy frameworks in place. With regard to municipal solid waste management (MSWM), the national government has established the National Environmental Policy of 2019 (supported by UNDP and the Ministry of Foreign Affairs of Finland); and a draft National Waste Management Strategy and Master Plan (2018-2030) will soon be launched (developed with technical support by UN Environment and IGES/CCET). The main contents of the National Waste Management Strategy and Master Plan include emphasis on the importance of holistic waste management promotion, actions to maximise proper collection and disposal of industrial, medical, and other hazardous waste, proper disposal and treatment of liquid waste, as well as supportive financial mechanisms, sound

215 Jambeck, J. et al. Plastic waste inputs from land into the ocean. Science 347, 768-771 (2015).

216 Plastic Industry in Myanmar. Myanmar Plastic Industries Association (MPIA) (2017). Available at: http://www.thaibizmyanmar.com/docs/Non-Paper-22-March-2017-PlasticIndustryinMyanmar.pdf. (Accessed: 3 July 2019)

217 Ibid.

218 Jambeck, J. et al. Plastic waste inputs from land into the ocean. Science 347, 768-771 (2015).

219 Premakumara, D.G.J & Hengesbaugh, M. Quick Study on Waste Management in Myanmar: Current Situation and Key Challenges. IGES (2016).

220 Plastic Industry in Myanmar. Myanmar Plastic Industries Association (MPIA) (2017). Available at: http://www.thaibizmyanmar.com/docs/Non-Paper-22-March-2017-PlasticIndustryinMyanmar.pdf. (Accessed: 3 July 2019)

221 Ibid.

222 Premakumara, D.G.J & Hengesbaugh, M. Quick Study on Waste Management in Myanmar: Current Situation and Key Challenges. IGES (2016).

policies and monitoring framework.[223] Myanmar is also drafting a Master Plan for Hazardous Waste Management in Myanmar, Procedures on Transboundary Movement of Hazardous Waste and Other Wastes, Rules on Hazardous Waste Management, Notification on Specifying Types of Hazardous Wastes. Myanmar adopted the Bangkok Declaration on Combating Marine Debris and the ASEAN Framework of Action on Marine Debris.

The Ministry of Industry issued a law on the prevention of hazard from chemical and related substances in August 2013 and rules on 12 January 2016. Businesses are required to secure licenses and registration for storing and treating chemicals, including for commercial purposes associated with producing, using, importing, exporting, transporting, possessing, distributing, purchasing, selling or discharging chemicals and related substances, which also concerns PVC, HDPE, LDPE, etc. related to plastics production.

Stakeholder/other initiatives

Local governments

Mandalay city officially introduced a ban on businesses manufacturing, importing, trading and distribution of high-density polyethylene (HDPE) plastic bags in 2009. A similar ban on polyethylene bags was also introduced in Yangon city in 2011.[224]

Private sector

The private sector is making efforts to raise public awareness about the importance of recycling. Especially some foreign firms, like Conyat Create (consulting company) and Green Lotus (French think tank), educate the public about the importance of reducing plastic pollution and addressing climate change.[225] Awareness raising activities also include art-based campaigns such as an installation created by collected plastic bags and bottles by the collectives "Wired 39" and "Beat Plastic Pollution in Myanmar". Similar activity has been placed on some roads with signs announcing 'Plastic Bag Free Zone'[226][227].

Another example of private sector action includes a group of companies, including Doh Eain, Zero Plastic, ChuChu and Thant Myanmar, which periodically host events focused on reducing the use of plastics. Some local businesses, such as Alala Myanmar, promote alternative products to plastics that are ethical, sustainable, environmentally friendly, and chemical-free.[228]

The plastic recycling sector contributes to reducing the disposal of plastic wastes and fostering more circular systems. There are three relatively large plastic factories and some small facilities in Yangon, with an estimated 1,000 tonnes/month production of chopped plastic bottles. Mandalay city also reports the existence of recycling factories, with an estimated production of 700 tonnes/month.[229] RecyGlo, a local recycling company, provides recyclables collection services for commercial waste generators in Yangon by scheduling and arranging pick up and delivering the recyclables to recycling plants.

Plastics and related sustainability priority issues

Due to a range of social, economic, institutional, and technical factors, Myanmar is facing challenges related to plastics and waste management. The following are some of the key priority issues for the country.

223 Premakumara, D.G.J & May Tin, H, O. Results of Quick Survey on Solid Waste Management in Mandalay Region. in the Regional Workshop for Improving Municipal Solid Waste Management in Mandalay (2019).

224 Phyu, A.S. & Gaung, J.S. Plastic bags get the toss from Yangon. Myanmar Times (2011). Available at: https://www.mmtimes.com/national-news/2950-plastic-bags-get-the-toss-from-yangon.html. (Accessed: 15 April 2019)

225 Here's why and how to reduce plastic. Myanmar Times (2019). Available at: https://www.mmtimes.com/news/heres-why-and-how-reduce-plastic.html. (Accessed: 15 April 2019)

226 Myanmar targets plastic waste in growing green movement. MYANMORE (2018). Available at: https://www.myanmore.com/2018/06/myanmar-targets-plastic-waste-in-growing-green-movement/. (Accessed: 15 April 2019)

227 Mar, W. W. The 2018 World Environmental Day – Steps to beat plastic pollution. The Global New light of Myanmar (2018). Available at: http://www.globalnewlightofmyanmar.com/2018-world-environment-day-steps-beat-plastic-pollution/. (Accessed: 15 April 2019)

228 Alala Myanmar. Available at: https://alalamyanmar.wordpress.com/. (Accessed: 15 April 2019)

229 Premakumara, D.G.J & May Tin, H, O. Results of Quick Survey on Solid Waste Management in Mandalay Region. in the Regional Workshop for Improving Municipal Solid Waste Management in Mandalay (2019).

Lack of government financial support for the operation of MSWM systems and lack of skilled human resources

At the national level, growing waste generation and pollution, particularly of industrial, medical, plastic, e-waste, and other hazardous wastes have been caused by increasing private consumption. However, the MSWM system is not well operated due to the lack of financial support, particularly from central government to local government. In addition, low capacity and knowledge on proper treatment technologies and infrastructure and the misuse of existing resources remain key obstacles.[230] A similar case can be seen at the city level, where a lack of appropriate technical skills among local authorities contribute to gaps waste management service provision. This is largely perceived as a risk by the private sector and hampers business investment in waste management systems.

Fragmented responsibilities

Fragmented governance and lack of coordination across ministries/departments and levels of government (central, regional, and townships) are leading to mismanagement of wastes, inadequate monitoring and evaluation, and weak enforcement of existing legislation. This is also seen as a factor impeding city-to-city cooperation.

Lack of available/reliable data

Due to the lack of available/reliable data on waste generation and management (including marine litter data and recycling sectors/activities), it is difficult for policy makers to develop evidence-based policies to tackle marine litter/plastics issues. Lack of centralised information on waste generation and management are also an issue in terms of the availability of data among policy makers or relevant stakeholders.

Major gaps and opportunities for follow-up action

Myanmar has recognised the urgency of taking action on plastics issues, but formal legislation and policies on plastics are not well developed. The existing regulations/policies on waste management are also only partly implemented. To tackle this situation, the following actions could be suggested as some areas where collaboration with other countries may be beneficial.

- Strengthen technical skills and increase financial resources of local governments to implement and enforce national waste management laws and policies
- Guidance on how the government can increase the private investment for MSWM and technology development, particularly for improving plastic product design and capacity building from central government to local government
- Guidance on how to develop holistic policies and strategies on plastics use and production at a national level (e.g. upstream policies on product design, and plastics packaging and strengthen legislation, public awareness raising and regulations).
- Guidance on how the government can take effective measures to integrate informal recycling sector in collecting and sorting packaging waste to have a more integrated waste management system particularly for packaging waste
- Developing capacity for monitoring and estimating the volume and flow of plastics waste leakage
- Sharing of experiences on how the government and private sector can customise technology for MSWM for local contexts
- Sharing of experiences on how to reduce institutional fragmentation and establish a clear institutional responsibility for plastic waste management as well as product design
- Encouraging dialogue among stakeholders along packaging value chains concerning design and recycling for a shift towards a circular economy
- Raise public awareness on issues such as by encouraging public engagement in regular community-led voluntary clean up campaigns at beaches, rivers and mangrove forests

230 Ibid.

COUNTRY BRIEF

PHILIPPINES

The Philippines is a low middle-income country in Southeast Asia with a per-capita GDP (PPP) of USD 8,360[231] (2017) and a growth rate of 6.7 percent[232] (2017). The country has a population of 105 million[233] (2017), which is growing by 1.5 percent per year.[234] Around 47 percent[235] of the population is classified as urban and approximately one eighth of the population resides in Metro Manila, the capital region.[236] Administratively, the country is divided into 18 regions, 81 provinces, 1,489 municipalities, 145 cities, and 42,036 barangays (the smallest government unit in the Philippines). The Philippines is an archipelagic nation consisting of over 7,000 islands, some 2,000 of which are inhabited. The country's fragmented geography contributes to high domestic transport costs.

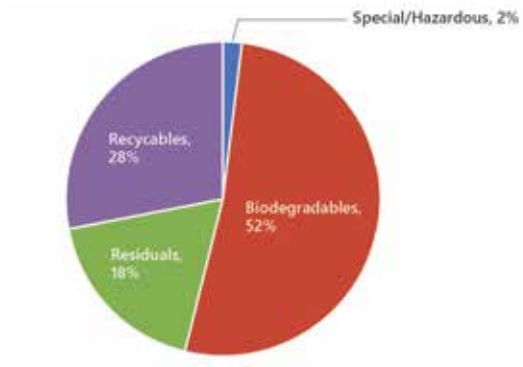
Key data

Waste generation and composition

The Philippines generates moderate amounts of solid waste - an estimated 40,087 tonnes/day,[237] or around 0.4 kg/person, yet this amount is trending upwards. Of this figure there exist large geographical differences, with urban areas generating much greater waste volumes than smaller towns and rural areas. For example, residents in Metro Manila produce almost twice the national average while some communities (often with low income and/or active waste reduction initiatives) generate as little as 0.1 kg/person/day.[238]

As in other middle-income countries with tropical climates, municipal waste has a high share of compostable/biodegradable material - 52 percent (See Figure 6: Waste composition in the Philippines in 2015). Recyclable materials (paper, glass, metals, textiles, leather and certain types of plastics – mainly bottles made of PET or HDPE) constitute around 27 percent of overall waste, with plastics making up 11 percent.[239] Some 18 percent of the waste stream is "residual", neither biodegradable nor easily recyclable, yet official statistics do not indicate how much of this is plastic. A small share of municipal waste stream – around 2 percent – is classified as hazardous or special waste.

Figure 6: Waste composition in the Philippines in 2015



Source: Data from the National Solid Waste Management Commission. Figure from Senate of the Philippines 2017. Philippine solid wastes at a glance.

231 Philippines Data. The World Bank (2019). Available at: https://data.worldbank.org/country/philippines. (Accessed: 3 July 2019)

232 Ibid.

233 Ibid.

234 Ibid.

235 Ibid.

236 Ibid.

237 Philippine solid wastes at a glance. Senate of the Philippines (2017). Available at: https://www.senate.gov.ph/publications/SEPO/AAG_Philippine%20Solid%20Wastes_Nov2017.pdf. (Accessed: 3 July 2019)

238 National Solid Waste Management Status Report (2008 – 2014). National Solid Waste Management Commission (2015). Available at: https://nswmc.emb.gov.ph/wp-content/uploads/2016/06/Solid-Wastefinaldraft-12.29.15.pdf. (Accessed: 3 July 2019)

239 Ibid.

Waste collection rate varies considerably among municipalities, from around 40 percent up to 85 percent in Metro Manila. Within cities, low-income neighbourhoods are often under-served or lack waste collection services. The law encourages sorting of waste at source and local governments are required to provide segregated collection services. Despite this, source separation of waste is not widely practiced.

Plastic consumption and waste generation

According to a 2015 study,[240] the Philippines is considered the third largest source of plastics marine pollution, following China and Indonesia. The country was estimated to generate 2.7 million tonnes of plastic waste per year, of which 20 percent (0.5 million tonnes) is assumed to leak into the oceans.[241] This generation estimate is much higher than the official statistics; the officially reported 11 percent share for plastics mentioned above corresponds to only 1.75 million tonnes per year. This suggests that a high share of the residual fraction of the municipal waste stream consists of plastics.

There is a lack of comprehensive data on the production, consumption, and disposal of single-use plastics and plastic packaging. Under the current law, local governments are required to conduct waste characterisation surveys on a regular basis, but the implementation of this mandate is weak.[242] In addition, such conventional surveys do not distinguish between different types of plastics – focusing only on recyclable waste and residual waste – and therefore provide limited information on recycling potentials.

In the absence of comprehensive official data on plastics, environmental groups have recently carried out detailed waste audits in several locations and produced findings of the annual national consumption. In line with these studies, Philippine consumers are estimated to use upwards of 17.5 billion single-use plastic shopping bags each year.[243] The use of plastic bags is low in most rural areas, and bag use is also reported to be much lower in cities where plastic bag regulations are in place and strictly implemented.[244] According to the government, around 300 local regulations of single-use plastic items exist, but the effectiveness of these initiatives varies considerably.[245]

A relatively high share of single-use plastic packaging is in the form of so-called sachets – small, often laminated, plastic pouches used for a range of daily goods. These small packages are targeted towards low-income households that cannot afford to purchase large quantities of goods at a single time.[246] In addition to the small sachets, laminated single-use plastic packages are widely used for snacks and other products consumed by middle- and high-income groups. Based on waste surveys, it is estimated that almost 164 million sachets are utilised and disposed of each day. On a per capita basis, the average consumption is estimated to be around 600 pieces of sachets per year (1.64 pieces a day),[247] while the consumption in some urban areas approaches upwards of six pieces per person, per day. There are currently no regulations on the design or use of sachets. Their small size – together with the fact that they are typically comprised of multiple materials, and remain unclean after use – make satchels unattractive for recycling purposes. As such, there is a limited market for these items.

Plastic bottles are widely collected for recycling, especially in urban areas where informal collection[248] (mainly of PET but also to some extent of HDPE) is reported to be fairly well established.[249] An existing market demand for these types of plastics, together with the high concentration of used bottles in cities, make these activities economically attractive. The bottles enter an informal network of junkshops, waste dealers and processors.

While some of these materials are domestically recycled, a significant share is exported to other countries.[250] The Philippines is a net exporter of plastic waste; in 2018, exports amounted to around 65,000 tonnes,[251] while imports reached 11,800 tonnes. Most export shipments are sent to China and other neighbouring countries in Asia;[252] imports

240 Jambeck, J. et al. Plastic waste inputs from land into the ocean. Science 347, 768-771 (2015).

241 Ibid.

242 Interview with the Department of Environment and Natural Resources (DENR), 26 April 2019.

243 Plastics Exposed: How Waste Assessments and Brand Audits are Helping Philippine Cities Fight Plastic Pollution. GAIA (2019). Available at: https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf. (Accessed: 3 July 2019)

244 Ibid.

245 Interview with the Department of Environment and Natural Resources (DENR), 26 April 2019.

246 Sarmiento, B. Philippines central government on solving plastic trash problem: 'We've done all we can'. Eco-Business (2018). Available at: https://www.eco-business.com/news/philippines-central-government-on-solving-plastic-trash-problem-weve-done-all-we-can/. (Accessed: 3 July 2019)

247 Plastics Exposed: How Waste Assessments and Brand Audits are Helping Philippine Cities Fight Plastic Pollution. GAIA (2019). Available at: https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf. (Accessed: 3 July 2019)

248 In this report, "informal" collection refers to activities that are not initiated or authorised by the government

249 Interview with the Philippine Alliance for Recycling and Materials Sustainability (PARMS), 26 April 2019.

250 Ibid.

251 UN COMTRADE Database. Available at: https://comtrade.un.org/db/ce/ceSearch aspx?it=waste+plastic&rg=2&r=608&p=156&y=2018&px=HS. (Accessed: 3 July 2019)

252 The top countries receiving plastic waste from the Philippines in 2018 were: China, Other Asian countries, South Korea, Vietnam, and the US.

are also mainly from the Asian region and from the US.[253] The 2018 export volume corresponds to around 2.5 percent of the estimated plastic waste generation. In rural areas, especially on remote islands, high transport costs make bottle collection for recycling less economically attractive. As a result, in these areas, plastic bottles often end up in dumpsites or are burned together with other wastes that lack market or local use value.[254]

Diapers are a growing waste stream containing plastics. An estimated three million diapers are used each day, or around 1.1 billion pieces a year.[255] No policies currently exist for proper disposal of used diapers; similarly, no mandatory standards exist related to composting of diapers at present.[256]

Overall, there exists a shortage of data on plastic consumption, post-use collection, and treatment, as well as on recycling operations.

National legislation, policies and other initiatives

Already in 2001, the Philippines had enacted a comprehensive law on integrated solid waste management. This law, the Ecological Solid Waste Management Act (Republic Act 9003), has often been seen as a model piece of legislation by other countries. It is still the main legal basis for waste management, waste prevention, and recycling in the country. Some of its main features are:

- Responsibility for waste collection and treatment is delegated to the local level – local government units (LGUs) and neighbourhoods/villages (barangays)
- Establishment of a National Solid Waste Management Commission (NSWMC) with broad membership to oversee implementation and to provide guidance as well as financial and technical support to the local level
- Universal waste collection services
- Source separation, with an initial target of 25 percent waste diversion
- Establishment of material recovery facilities (MRFs) in each barangay or cluster of barangays, for further sorting, resource recovery, and storage
- Regular classification of waste to be carried out for each LGU
- Local 10-year plans for collection and treatment, to be updated regularly and approved by the national regulating authority
- A time-set target to close all open dumpsites and to shift to controlled landfill disposal as the main treatment method for residual waste

Governance and institutional settings

Figure 7: Institutional arrangements and main responsibilities according to the Ecological Solid Waste Management Actshows the institutional arrangement for the implementation of the Ecological Solid Waste Management Act, including intended role sharing between national, provincial, and local levels of government. A detailed overview of the RA 9003 and the institutional arrangements for its implementation can be found in the National Solid Waste Management Strategy 2012-2016.[257]

Incineration of municipal solid waste (also for waste-to-energy) was in practice banned with the enactment of the 1999 Clean Air Act (Republic Act 8749). However, the government's stance on incineration is shifting and feasibility studies for waste-to-energy facilities are now ongoing in a number of locations, including Davao,[258] the country's most populous city outside of Metro Manila.

253 The top countries exporting plastic waste to the Philippines in 2018 were: Japan, Hong Kong, Indonesia, and the US.

254 Interview with the Department of Environment and Natural Resources (DENR), 26 April 2019.

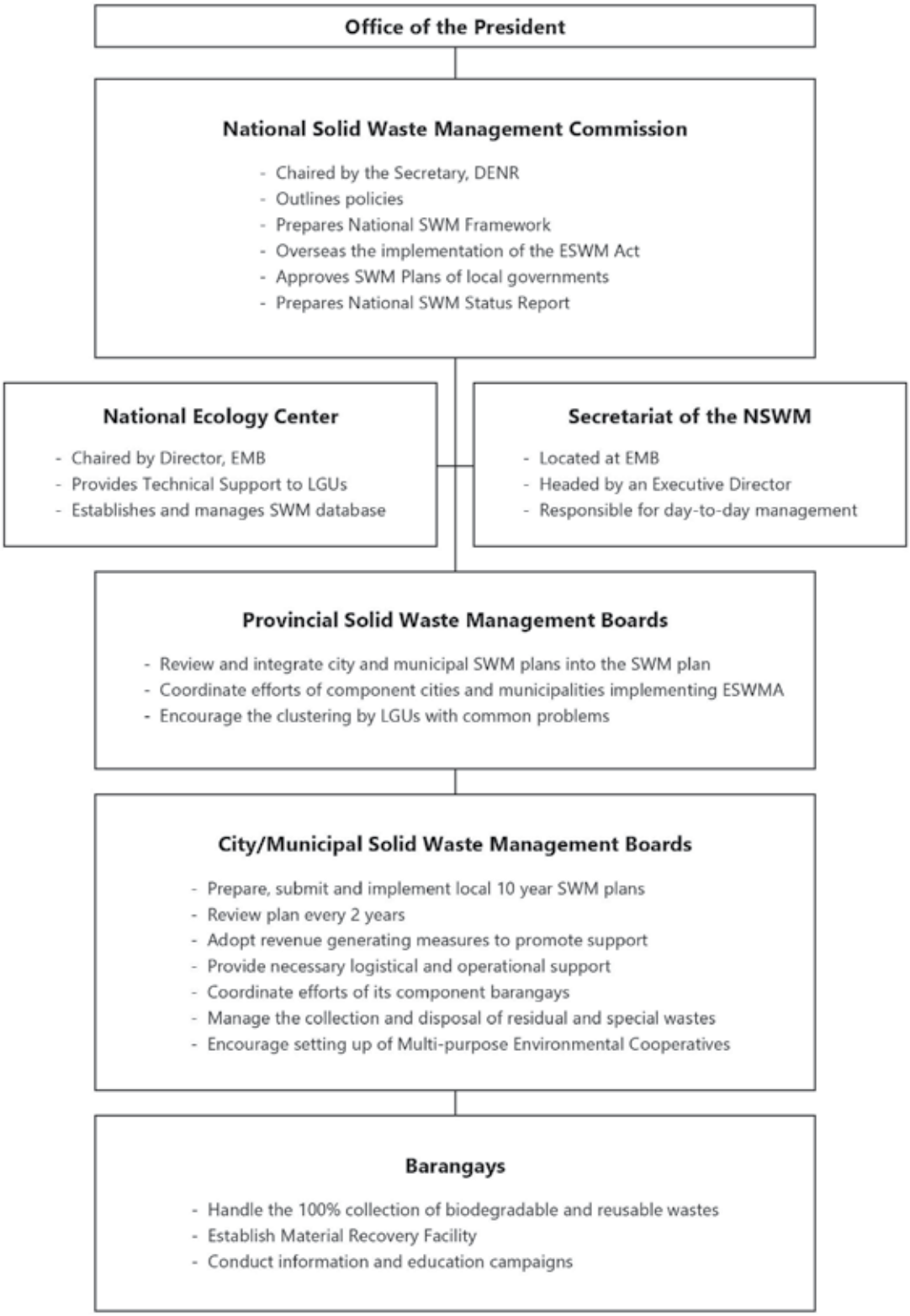
255 Ibid.

256 Ibid.

257 National Solid Waste Management Status Report (2008 – 2014). National Solid Waste Management Commission (2015). Available at: https://nswmc.emb.gov.ph/wp-content/uploads/2016/06/Solid-Wastefinaldraft-12.29.15.pdf. (Accessed: 3 July 2019)

258 Waste-to-energy project in Davao to generate 12 megawatts. Department of Energy (2018). Available at: https://www.doe.gov.ph/energist/waste-energy-project-davao-generate-12-megawatts. (Accessed: 3 July 2019)

Figure 7: Institutional arrangements and main responsibilities according to the Ecological Solid Waste Management Act



Source: Atienza, V. The Republic of the Philippines: Country Chapter - State of the 3Rs in Asia and the Pacific, UNCRD & IGES (2017). Based on World Bank 2001.[259]

259 The World Bank (2001). Philippines environment monitor 2001. Available at: http://documents.worldbank.org/curated/en/756271468776393945/Philippines-environment-monitor-2001. (Accessed: 3 July 2019)

Progress and challenges

Soon after the enactment of the comprehensive Ecological Solid Waste Management Act it became clear that many local governments faced difficulties with implementation of the new law.[260] As of 2016, only 36 percent of local government units had complied with all aspects of the law, and the national government has even taken legal action against a number of local leaders for not complying.[261] The National Ombudsman has thus far lodged complaints against 600 mayors, vice mayors and councillors, and is currently preparing charges against 100 additional local governments, including barangay officials.[262]

Some of the reasons why implementation has been slow include:

- Insufficient capacity of local authorities (technical knowledge, financial resources, managerial skills, staff)
- Difficulties in securing land to build material recovery facilities (MRFs) and sanitary landfills
- Coordination challenges for small local government units to make joint decisions and to share facilities
- Inadequate support from the national level to local levels. Some of the planned supporting institutions, such as the National Ecology Center, have not been fully operationalised
- Generally low awareness among citizens on the impacts of poor waste management
- Political challenges related to charging waste collection fees from residents and to penalizing offenses
- Fragmented geography and high transport costs

Plastic waste reduction

The Ecological Waste Management Act includes a provision for prohibiting "non-environmentally acceptable products". It provides the National Solid Waste Management Commission a mandate to prohibit such products when there is a scientific basis for doing so and as long as the additional cost of alternatives do not exceed 10 percent. A Technical Working Committee (TWC) has been established to facilitate the phasing out of environmentally unacceptable products and packaging materials, with plastics included among the four product categories that will be subjected for evaluation. So far, no product has been listed but the TWC has commissioned a life-cycle assessment (LCA) of plastic carrier bags and alternatives; the study concluded that reusable bags of non-woven polypropylene have the least environmental impact.[263] According to DENR, the TWC has been inactive for a while but has recently started operating again.

At the municipal and city levels, many governments have taken steps to reduce the use of single-use plastic items. To date, more than 300 local governments have issued such regulations,[264] including some large cities like Quezon and Pasig. However, according to surveys conducted by NGOs, the status of implementation/enforcement varies widely.[265]

Since 2004, the Philippines have enacted a Green Procurement Programme (Executive Order No. 301). However, implementation has been slow and plastic products are currently not included. Moreover, there can be a conflict between sustainability ambitions and public procurement rules that require selection at lowest cost.[266] Some local governments have stopped using single-use plastics on their own premises, for example Cebu City and Dipolog City.

The Philippines hosts a formal recycling industry for plastics, but the scale of operations remains difficult to assess. The National Solid Waste Management Commission lists 23 companies working to address plastics in its database of recycling enterprises,[267] yet this is a far greater number than for other recyclable materials. At the same time, it is unclear whether all the plastics handled by these companies are recycled domestically, as a certain percentage may simply be sorted and shipped abroad for processing.

260 Atienza, V. 2011. Review of the Waste Management System in the Philippines: Initiatives to Promote Waste Segregation and Recycling through Good Governance. in Economic Integration and Recycling in Asia: An Interim Report (ed. Kojima and Michida) 65-97 (Institute of Developing Economies, 2011).

261 Bonquin, C. 50 LGUs face probe for violating Waste Management Act. ABS-CBN News (2016). Available at: https://news.abs-cbn.com/nation/02/10/16/50-lgus-face-probe-for-violating-waste-management-act. (Accessed: 3 July 2019)

262 Sarmiento, B. Philippines central government on solving plastic trash problem: 'We've done all we can'. Eco-Business (2018). Available at: https://www.eco-business.com/news/philippines-central-government-on-solving-plastic-trash-problem-weve-done-all-we-can/. (Accessed: 3 July 2019)

263 Department of Environment and Natural Resources, Environmental Management Bureau, and National Solid Waste Management Commission (2015). National Solid Waste Management Status Report (2008 – 2014) Available at: https://nswmc.emb.gov.ph/wp-content/uploads/2016/06/Solid-Wastefinaldraft-12.29.15.pdf. (Accessed: 3 July 2019)

264 Interview with DENR, 26 April 2019.

265 Plastics Exposed: How Waste Assessments and Brand Audits are Helping Philippine Cities Fight Plastic Pollution. GAIA (2019). Available at: https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf. (Accessed: 3 July 2019)

266 Interview with DENR, 26 April 2019.

267 Directory of recycling companies. National Solid Waste Management Commission (2016). Available at: http://nswmc.emb.gov.ph/wp-content/uploads/2016/06/LIST_OF_RECYCLERS__REVISED_.pdf (Accessed: 18 July 2019)

The cement industry reportedly receives some plastic waste and uses it as substitute for conventional fossil fuels.[268]

The Philippine government, with support from Japan, carried out a comprehensive study of the country's recycling industry – including collection channels and markets for recyclable – spanning the years of 2006 and 2008.[269] It is uncertain whether the data collected in this study remains valid, but some of the main findings appear to remain relevant:

- High-quality domestic recycling is challenging since source separation is not commonly practiced
- The export of plastic waste is considerable
- The Philippines imports considerable volumes of new plastic resin for manufacturing of plastic items, while the demand for recycled plastics remains very limited
- The domestic market for recyclables (in general, not only for plastics) works poorly with low access to information, making it hard for potential sellers and buyers to find each other

Stakeholder initiatives

Local governments

Although only a minority of local authorities has been found to fully comply with existing waste management legislation, there are numerous examples where local initiatives have resulted in tangible improvements.

The city of San Fernando in the Pampanga province, with a population of just over 300,000, has managed to reach a waste diversion rate of around 80 percent.[270] This has been achieved through collaboration with a charity called the Mother Earth Foundation, which started working with city schools in the year 2012. When these activities were first initiated, the waste diversion rate was estimated at around 12 percent. Over time, the city has successfully mobilised many citizens to participate in waste management activities; San Fernando is one of the few local governments that have an active local waste management board, involving stakeholders including both waste workers and youth.[271]

In 2014, San Fernando issued a Plastic Free Ordinance (a ban on plastic single-use bags), which has been implemented through a phased approach. The first three months were dedicated to conducting education campaigns; a plastic-free day was launched on a once-a-week basis in the six months following. After this initial period, a pilot project ran for half a year until full implementation of the ban.[272]

Private sector and multi-stakeholder initiatives

The private sector is involved in a great number of initiatives to collect and recycle post-consumer plastics, often as partnerships with non-profit organisations. The following serve as instructive examples of these efforts.

The Philippine Alliance for Recycling and Materials Sustainability (PARMS), a partnership of businesses and government agencies, runs a pilot project on collecting and recycling laminated plastics. Empty sachets are collected through elementary schools and recycled plastics are used for making construction materials, speed bumps, and similar items. The recycling facility is run in collaboration with a barangay in Metro Manila.[273] As of 2017, representatives from major corporate groups including Coca-Cola, Pepsi, Nestle, Procter&Gamble, and Unilever among others joined PARMS and committed to invest PHP25 million (around USD 482,000) to upscale activities.

268 Interview with DENR, 26 April 2019.

269 The study on recycling industry development in the Republic of the Philippines. JICA EX Corporation (2008). Available at: http://open_jicareport.jica.go.jp/pdf/11882396.pdf. (Accessed: 3 July 2019)

270 Plastics Exposed: How Waste Assessments and Brand Audits are Helping Philippine Cities Fight Plastic Pollution. GAIA (2019). Available at: https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf. (Accessed: 3 July 2019)

271 Sarmiento, B.S. Plastic trash from the 'sachet economy' chokes the Philippines' seas. Mongabay (2018). Available at: https://news.mongabay.com/2018/10/plastic-trash-from-the-sachet-economy-chokes-the-philippines-seas/. (Accessed: 3 July 2019)

272 Plastics Exposed: How Waste Assessments and Brand Audits are Helping Philippine Cities Fight Plastic Pollution. GAIA (2019). Available at: https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf. (Accessed: 3 July 2019)

273 Interview with PARMS, 26 April 2019.

GreenAntz is a social enterprise that collects used sachets and mixes them with concrete to make construction bricks. It is a member of PARMS and collaborates with Nestle and the Philippine Plastic Industry Association (PPIA) and currently operates 7-8 facilities around the country. One reported advantage of this process is the ability to recover and use unclean sachets. However, marketing has turned out to be somewhat challenging as the construction industry is often unwilling to change suppliers and utilise untested materials.[274]

A number of major shopping malls, including Ayala, Shoemart, and Robinson's promote reusable shopping bags and organise waste markets on a regular basis, where customers can bring recyclables and sell to traders.[275]

Some shops selling unpackaged food products reportedly exist in Metro Manila but these outlets mainly target a small segment of wealthy consumers.[276] Similarly, an increasing number of shops offer products in traditional packaging, such as banana leaves.[277]

Since 1997, the Polystyrene Packaging Council of the Philippines has collaborated with schools and shopping malls in Metro Manila to collect post-consumer expanded polystyrene. They also operate a facility where this waste is melted into lumps, which are exported to other Asian countries for recycling.[278]

The Philippine Plastics Industry Association (PPIA) has partnered with the Roman Catholic Church of Manila and developed a programme where parishes accept plastics from households, offer small gifts in return and pass on collected materials to recyclers.[279]

Current debates and recent movements

Plastics pollution has been on the political agenda in the Philippines for several years and the will to address this issue at its source appears to be increasing. Already in 2011, a senate bill proposed a ban on plastics both in groceries and restaurants. Since that time, a number of national legislative proposals on single-use plastics have been announced, ranging from a call for bans of single-use plastics in certain applications or for the promotion of biodegradable plastics.[280]

In 2017, the Senate Committee on Environment and Natural Resources requested an enquiry aimed at informing the design of new policies focused on reducing and ultimately preventing plastic ocean leakage. As follow-up, the Climate Change Commission led a discussion with stakeholders on plastic waste management, resulting in the conclusions that actions need to be undertaken at both demand and supply levels. More specifically, the recommendations included an emphasis on consumer education programmes with a view to shift away from a disposable/one use mentality, and move towards the development of plastic recovery programmes, introduction of extended producer responsibility systems, and expansion of market for goods made from recycled plastics.[281]

The Single-Use Plastics Regulation and Management Act, aimed at phasing out single-use plastics, was proposed in the senate in 2018.[282] The act gives mention to introducing strong economic incentives to encourage plastic reduction and stresses the importance of R&D on alternatives.

The federal government is currently developing a National Plan of Action on Plastics and Marine Litter, expected to be finalised by the end of 2019. This process is led by DENR's Environmental Management Bureau and involves consultations with various stakeholders, although details on the drafting process are not available. The plan is projected to provide an overall direction, as well as identify indicators and set targets; a national policy is expected to follow, which will provide more detailed guidance on implementation.[283]

274 Interview with the Philippine Alliance for Recycling and Materials Sustainability (PARMS), 26 April 2019.

275 Available at: https://nswmc.emb.gov.ph/wp-content/uploads/2016/06/Solid-Wastefinaldraft-12.29.15.pdf. (Accessed: 3 July 2019)

276 Interview with PARMS, 26 April 2019.

277 Interview with WWF Philippines, 25 April 2019.

278 Recycling. PPCP. Available at: http://www.ppcp.org.ph/recycling/. (Accessed: 3 July 2019)

279 Environment - Industry Initiatives. PPIA (Philippine Plastics Industry Association). Available at: http://www.philippineplastic.com/environment.html. (Accessed: 3 July 2019)

280 Regional Resource Center for Asia and the Pacific at the Asian Institute of Technology (AIT RRC.AP). Circular Economy Briefing Series: County Profile Philippines: Management municipal solid waste and packaging waste. GIZ (2018). Available at: https://www.giz.de/de/downloads/giz2018_Philippines-Country-Profile_web.pdf. (Accessed: 3 July 2019)

281 Action Fiche for reducing plastic waste and marine litter in East and South East Asia – supporting a transition to a circular economy in the region. European Commission (2018). Available at: https://www.gtai.de/GTAI/Content/DE/Trade/Fachdaten/PRO/2018/05/Anlagen/PRO201805295001.pdf?v=1. (Accessed: 3 July 2019)

282 Casayuran, M. Legarda files bill on phase out of single-use plastics. Manila Bulletin (2018). Available at: https://news.mb.com.ph/2018/11/22/legarda-files-bill-on-phase-out-of-single-use-plastics/. (Accessed: 3 July 2019)

283 Interview with DENR, 26 April 2019.

The country's current National Development Plan targets a national waste diversion rate of 80 percent by 2022,[284] a dramatic increase from the previous target of 50 percent in 2015. Experiences of cities that actively seek to reduce residual waste (including by providing segregated door to door collection, establishing proper materials recovery facilities, composting biodegradable waste, and maximising recycling) suggest that waste diversion rates of 70-80 percent are achievable. The remaining 20-30 percent of waste that requires disposal consists mainly of inert materials and plastics. The share of sachets and other single use plastics also tends to be high.[285]

Major gaps and opportunities for follow-up

- Technical advice to the drafting of a National Policy on Plastics and Marine Litter, to be developed in 2020 following the finalisation of a National Plan of Action on Plastics and Marine Litter
- Capacity building on plastics issues, including also climate impacts and chemical risks, for government officials from several related federal departments – including at least all the departments that are members of the National Solid Waste Management Commission
- Support to the piloting of EPR for one type of single-use plastics, reflecting past experiences of applying different EPR models (such as financial vs. physical responsibility, individual vs. joint responsibility) for various products and settings
- Training of government officials on how to effectively commission and interpret life-cycle assessments, especially for comparing waste treatment options, recycling scenarios and the evaluation of alternatives to single-use plastics
- Advise on circular economy options for small islands and communities in other remote locations where high transport costs result in shipping post-consumer plastic to recycling facilities prohibitively expensive
- Pilot study on biodegradable/compostable diapers and sanitary pads to explore consumer/public acceptance, suitable composting methods and potential needs to revise the existing guidelines on the use of compost in agriculture
- Evaluate experiences carrying out numerous existing local regulations of single-use plastics (bans and charges)
- Support updating existing procurement systems to enable more sustainable sourcing, focusing the minimisation of plastics, including reducing the consumption of single-use and stimulating demand for products manufactured from recycled plastics

284 Philippine Development Plan 2017–2022. National Economic and Development Authority (2017). Available at: http://www.neda.gov.ph/wp-content/uploads/2018/01/Abridged-PDP-2017-2022_Updated-as-of-01052018.pdf. (Accessed: 3 July 2019)

285 Plastics Exposed: How Waste Assessments and Brand Audits are Helping Philippine Cities Fight Plastic Pollution. GAIA (2019). Available at: https://www.no-burn.org/wp-content/uploads/PlasticsExposed-3.pdf. (Accessed: 3 July 2019)

COUNTRY BRIEF

SINGAPORE

As of June 2018, the wealthy city-state of Singapore hosted a population of 5.6 million.[286] The country today is a thriving global financial hub and described as one of Asia's economic tigers. It geographically faces the Singapore Strait and the Straits of Johor. The country's GDP has grown rapidly for a long time; increasing from USD 11,860 in 1990 to USD 57,700 in 2017. Singapore's per-capita GDP (PPP) amounted to USD 79,700 in 2017.[287] While there are no local governments in Singapore, the country is comprised of five community development councils (CDCs) that conduct local administration. Various community and social assistance services are provided by the CDCs.[288]

Key data

According to the National Environment Agency (NEA), approximately 900 million kg of plastic waste were disposed of in 2018 in Singapore, but the recycling rate of plastics is still less than 10%.[289] Consumer habits, over-packaging, and use of plastic bags have significantly contributed to this situation. According to a study commissioned by the Singapore Environment Council (SEC) in 2018, supermarket consumers in Singapore use upwards of 820 million plastic bags every year, which averages to be 146 plastic bags per person and 13 plastic bags per day.[290]

In most countries in the region, plastic bag waste is disposed of in landfills without incineration; non-biodegradable waste remains in landfills for an extended period and may leak into oceans and waterways. Singapore, on the other hand, incinerates plastic bag waste prior to final disposal.[291]

Another source of plastic waste in the country is the polyethylene terephthalate (PET) bottles and polypropylene (PP) plastic disposables – in the same SEC study, an estimated 467 million PET and 473 million PP plastic disposables are used each year.[292]

Between 1970 and 2018, the country saw a sevenfold increase in its solid waste generation to 8,669 tonnes a day. In 2000, Singapore opened one of the world's largest incineration plants, with a capacity of 3,000 tonnes per day. Some overseas companies see this as an important business opportunity; an example includes Mitsubishi Heavy Industries, which constructed a facility in as little as 38 months since opening its regional base in Singapore.

National legislation, policies and other initiatives

Strict anti-littering laws have been adopted and enforced in the country; such measures have been accompanied by the integrated waste management practices including proper waste disposal and 3R initiatives to minimise waste at source. Relevant legislation includes the "Prevention of Pollution of the Sea (Garbage) Regulations" (1999);[293] "Environmental Public Health Act" (1987);[294] and Singapore's "National Environment Agency Act" (2002).[295] Moreover, interest in circular economy approaches has rapidly grown, and the government is currently working to develop a suite of policies aimed at encouraging sustainable consumption, sustainable production and sustainable waste and resource management. This includes initiating an Extended Producer Responsibility (EPR) programme, starting with electronic-waste, set for implementation by 2021.[296]

286 Population and Population Structure: Statistics on Singapore's population are compiled by the Singapore Department of Statistics. Department of Statistics, Singapore (2018). Available at: https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-structure/latest-data. (Accessed: 3 July 2019)

287 GDP per capita data. The World Bank (2019). Available at: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2017&locations=MY-SG-Z4&start=1960. (Accessed: 3 July 2019)

288 Singapore Country Profile 2017-18. CLGF. Available at: http://www.clgf.org.uk/default/assets/File/Country_profiles/Singapore.pdf. (Accessed: 3 July 2019)

289 Waste Statistics and Overall Recycling. Singapore National Environment Agency. Available at: https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling. (Accessed: 3 July 2019)

290 Mahmud, A.H. Singapore shoppers take 820 million plastic bags from supermarkets each year. CNA (2018). Available at: https://www.channelnewsasia.com/news/singapore/plastic-bags-supermarkets-singapore-tax-sec-10576660. (Accessed: 3 July 2019)

291 Qi, L. J. Plastic bag charge could have 'unintended consequences': Amy Khor. CNA (2016). Available at: https://www.channelnewsasia.com/news/singapore/plastic-bag-charge-could-have-unintended-consequences-amy-khor-7719760?cid=h3_referral_inarticlelinks_24082018_cna. (Accessed: 3 July 2019)

292 Mahmud, A.H. Singapore shoppers take 820 million plastic bags from supermarkets each year. CNA (2018). Available at: https://www.channelnewsasia.com/news/singapore/plastic-bags-supermarkets-singapore-tax-sec-10576660. (Accessed: 3 July 2019)

293 Update On The Implementation Of The Ballast Water Management Convention (Bwmc), 2004. Maritime and Port Authority of Singapore (2017). Available at: https://www.mpa.gov.sg/web/wcm/connect/www/a3bfa977-034c-43d4-b799-970ab702f0aa/pn17-120.pdf?MOD=AJPERES. (Accessed: 3 July 2019)

294 ENVIRONMENTAL PUBLIC HEALTH ACT (CHAPTER 95): An Act to consolidate the law relating to environmental public health and to provide for matters connected therewith. Government of Singapore. Available at: https://sso.agc.gov.sg/Act/EPHA1987. (Accessed: 3 July 2019)

295 NATIONAL ENVIRONMENT AGENCY ACT (CHAPTER 195): An Act to establish and incorporate the National Environment Agency, to provide for its functions and powers, and for matters connected therewith. Government of Singapore. Available at: https://sso.agc.gov.sg/Act/NEAA2002. (Accessed: 3 July 2019)

296 Circular Economy. Ministry of the Environment and Water Resources (MEWR). Available at: https://www.towardszerowaste.sg/circular-economy/. (Accessed: 3 July 2019)

The country's key priority areas include waste minimisation and recycling, also referred to as the 3Rs (Reduce, Re-use, Recycle). In land-scarce Singapore, the NEA considered waste-to-energy (WTE) incineration plants as an effective tool and the most optimal technical solution for reducing waste volumes and conserving landfill space. The country's sustainability roadmap, launched in 2014, has set an overall goal of moving "towards a Zero Waste Nation" including by reducing consumption and reusing and recycling all materials.[297] This blueprint defines ambitious 2030 targets: 70% overall recycling rate, 30% domestic recycling rate, and 81% non-domestic recycling rate.[298] 2019 has been designated as the "Year Towards Zero Waste", whereby Singapore aspires to achieve zero waste by way of reducing consumption of materials, as well as promoting reuse and recycling. Singapore will also release the inaugural Zero Waste Masterplan in the later part of 2019, which will outline Singapore's efforts to work towards the common vision of a Zero Waste Nation.

Other key initiatives by the government and other stakeholders

In order to advance waste reduction and recycling efforts, the Towards Zero Waste Grant (TZWG) was established and initiated in February 2019. TZWG specifies that waste reduction and recycling should focus on any of three key waste streams (packaging waste, food waste and e-waste); as well as make efforts to encourage household recycling in an effective manner. The grant is open to individuals, interest groups, non-governmental organisations (NGOs), grassroots organisations and corporations. Awarded projects are expected to be completed by 31 March 2020.[299]

Another key government priority is consumer education and awareness-raising on waste including plastic waste. For example, ZeroWasteSG, an NGO, launched a Bring Your Own (BYO) campaign that is supported by the NEA. The campaign also marketed eco-friendly eateries conducting sustainable practices, in order to raise public awareness about these initiatives. Other NGOs, such as SEC, introduced the One Less Plastic campaign, launched in 2018 and planned to continue through the end of 2019. The campaign aims to encourage consumers to use one fewer item in each category of disposable plastic, ranging from cutlery to water bottles.[300]

Irrespective of the country's well-established waste management and recycling system, the circular economy approach has not yet gained much traction with regard to plastic waste. As highlighted above, a majority of Singapore's waste is incinerated such that the current rate of plastic recycling remains low (under 10%). With a view to accelerate supply-side circular economy practices, the government launched the Singapore Packaging Agreement (SPA) together with the industry and non-governmental organisations in 2007. The SPA is voluntary-based, and aims to provide flexibility in order to enable industrial actors to adopt cost-effective solutions to reduce waste. As of June 2018, the SPA has amassed a total of 238 signatories. Reports indicated that the SPA has cumulatively reduced as much as 46,000 tonnes of packaging waste, saving over S$100 million in the process. In 2018, Nestlé Singapore (Pte) Ltd, Resorts World Sentosa for MNCs and Large Local Enterprise (LLE), and Australian Fruit Juice (S) Pte Ltd for SME were bestowed Top Achievement Award for their efforts to reduce packaging waste.[301]

Although this voluntary agreement has encouraged industry to reduce plastic waste, more can be done to reduce the amount of packaging, including plastic packaging. In order to reduce packaging, Singapore will introduce mandatory packaging reporting in 2020. Obligated companies must also submit their plans to reduce, reuse or recycle packaging waste. This will lay the foundation for an EPR framework for managing packing waste including plastics, which the NEA is currently studying and targeting to have in place by 2025.

In order to encourage greater recycling of private sector, biennial 3R Awards for hotels and 3R Awards for shopping malls have been launched, together with associated 3R Guidebooks. These initiatives are designed to recognise business actors that demonstrate high levels of performance with regard to solid waste management, and also collaborate with partner industries on the planning and implementing of 3R programmes.[302] In addition, Singapore's private sector has also led efforts to impose bans on the use of plastics. For instance, from 20 June 2018, the country's fast food chain industry prohibited the use of plastics (e.g. plastic lids and straws) for dine-in customers.[303]

297 Sustainable Singapore Blueprint. Government of Singapore. Available at: https://www.mewr.gov.sg/docs/default-source/module/ssb-publications/41f1d882-73f6-4a4a-964b-6c67091a0fe2.pdf. (Accessed: 3 July 2019)

298 Ibid.

299 Towards Zero Waste Grant. Singapore National Environment Agency. Available at: https://www.nea.gov.sg/programmes-grants/grants-and-awards/towards-zero-waste-grant. (Accessed: 3 July 2019)

300 Mahmud, A.H. Singapore shoppers take 820 million plastic bags from supermarkets each year. CNA (2018). Available at: https://www.channelnewsasia.com/news/singapore/plastic-bags-supermarkets-singapore-tax-sec-10576660. (Accessed: 3 July 2019)

301 Singapore Packaging Agreement. Singapore National Environment Agency. Available at: https://www.nea.gov.sg/programmes-grants/schemes/singapore-packaging-agreement. (Accessed: 3 July 2019)

302 Soo, J. Plastic Waste Management in Singapore. Singapore National Environment Agency (2018). Available at: https://www.nea.gov.sg/docs/default-source/envision/plastic-waste-management-in-singapore.pdf. (Accessed: 3 July 2019)

303 ASEAN joins movement to beat plastic pollution. The ASEAN Secretariat (2018). Available at: https://asean.org/asean-joins-movement-beat-plastic-pollution/. (Accessed: 3 July 2019)

Further, some actions have also been undertaken to address microplastics. Individual companies and trade organisations are leading the phase-out of microbeads on a voluntary basis. For example, in 2016, Guardian Singapore (a health and beauty chain), banned microbeads from its new rinse-off cosmetics and personal care products; the company indicates that its entire line of brand products will be free of microbeads by the end of 2017.[304]

Implementation challenges:

- Low awareness and low willingness of both consumers and producers for the issue-based measures due to issues of convenience, protection of products, and prevention of cross contamination of food items, which is resulting in excessive packaging (e.g. for some types of packaged products)
- Need for more R&D to enable use of plastic in a more sustainable manner and facilitate a reuse culture
- Low capacity / lack of technology for processing contaminated plastics as well as multi-material packaging (e.g. composite packaging of which plastic is a component)
- Low value of recycled plastics depending on its market demand and supply

Major gaps and opportunities for follow-up action

Singapore's effective waste management system, active private sector participation and growing number of initiatives on waste plastics present key opportunities for moving towards a more circular economy. Taking this into account, there are several areas where collaboration with other countries in the region may prove fruitful:

- Taking the lead in promoting cross-country cooperation and regional cooperation
- Awareness raising and strengthening of capacity with regard to plastic issue among packaging manufacturers, especially SMEs
- Guidance on how to increase industry collaboration toward more sustainable product designs for enhanced recycling
- Recommendations on ways to implement EPR for selected types of plastic packaging
- Technical support for encouraging R&D for improving plastic recyclability especially contaminated plastics and multi-material packaging, as well as developing technology for bio-based plastics
- Guidance on ways to leverage private investment and as well as mobilising other funding sources

304 Legal Limits on Single-Use Plastics and Microplastics: A Global Review of National Laws and Regulations. UNEP (2018). Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/27113/plastics_limits.pdf. (Accessed: 3 July 2019)

COUNTRY BRIEF

THAILAND

The Kingdom of Thailand is located in the centre of mainland Southeast Asia. The country's population is estimated to 66.4 million, growing at 0.29 percent per year (2018).[305] Urbanisation is progressing rapidly and the share of urban residents reached 49.9 percent in the year 2018.[306] Thailand is a constitutional monarchy consisting of 77 provinces and 2 and two special administrative areas, which are further divided into districts and sub-districts. Thailand has the second largest economy in ASEAN, with exports accounting for about two-thirds of its GDP. Key economic sectors include automotive, financial services, electronics and tourism. The country's economy grew by 4.1 percent in 2018 and its per-capita GDP (PPP) reached USD 19,018.[307]

Key data

Along with urbanisation, population growth and increasing tourist inflows, the amount of solid waste is on an increasing trend in Thailand, with 27.8 million tonnes of municipal solid waste generated in 2018.[308] This means that Thailand already exceeds a 1kg/person/day threshold for municipal solid waste generation. Among the total municipal solid waste generated, 39% has been found to be properly disposed in sanitary or engineered landfill sites or controlled dumpsites, whereas 27% is disposed in an improper manner.[309] Other sources of information indicate that the country's overall recycling rate – defined as the amount of total waste utilised divided by annual waste generation – amounted to 25.79% in 2010.[310]

The production capacity of Thailand for plastic pellets and resins comprised roughly 8.5 million tonnes in 2017. The export of plastic beads has been measured at 5.2 million tonnes whereas imports equal approximately 1.875 million tonnes. The country's production of plastic packaging is estimated to amount to 1.96 million tonnes. Thailand annually consumes 40kg per capita of plastics and remains the highest consumer of plastics in all of Asia.[311] According to DEQP, retail stores such as shopping malls and convenience stores consume 30% of plastic bags, 30% for grocery stores, and 40% for markets and street vendors.[312]

According to Chavalaparit,[313] plastic production in Thailand comprised 8 million tonnes in 2013, with plastic production approximating 40 kg/year/person.[314] Figure 8: Material Flow of Plastics in Thailand captures the country's plastic material flow in 2019. According to this figure, around 0.7% of collected plastic wastes are disposed in the open environment with about 20.8% sent for recycling; 78.5% is sent to landfill. Approximately 2.0 million tonnes of waste plastics were disposed at various landfill sites in 2017.

305 Thailand Board of Investment 2019. Thailand in Brief - Demographic. Available at: https://www.boi.go.th/index.php?page=demographic (Accessed 12 August 2019)

306 World Bank 2019. World Urbanization Prospects: 2018 Revision. Available at: https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=TH (Accessed 12 August 2019)

307 World Bank 2019. International Comparison Program database. Available at: https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=TH (Accessed 12 August 2019)

308 UNCRD & IGES. State of the 3Rs in Asia and the Pacific: Experts' Assessment of Progress in Ha Noi 3R Goals. (2018).

309 Pollution Control Department. Booklet on Thailand State of Pollution 2019. (2019).

310 UNCRD & IGES. State of the 3Rs in Asia and the Pacific: Experts' Assessment of Progress in Ha Noi 3R Goals. (2018).

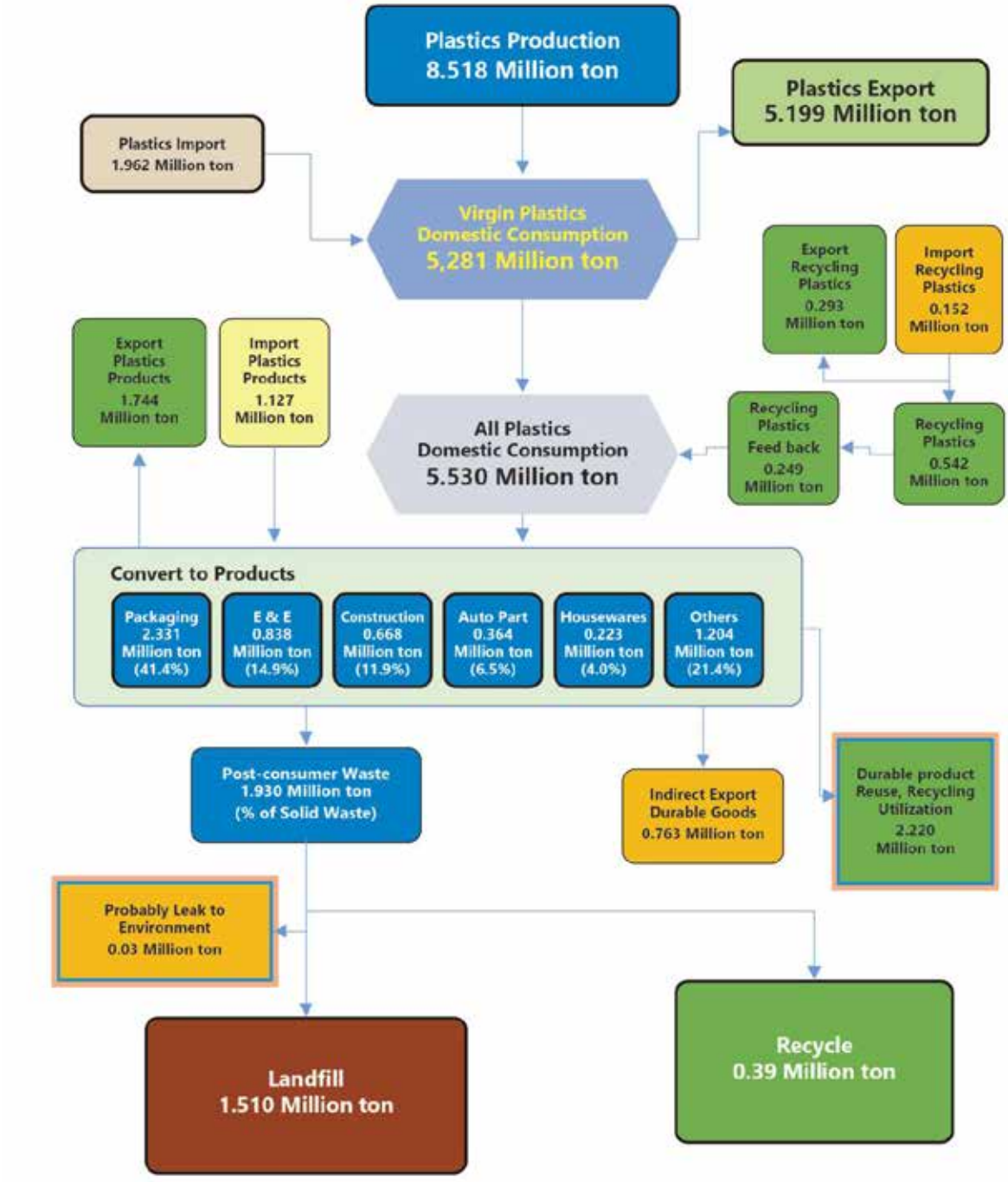
311 Corben, R. Asia's Booming Plastics Industry Prompts Ocean Pollution Fears. VOA (2017).

312 Department of Environmental Quality Protection. A Guide to Reduce Plastic Bag Consumption. (2018).

313 Chavalparit, O. 3Rs Policy and Plastic Waste Management in Thailand. in The 5th 3RINCs 2019 (3RINCs, 2019).

314 Department of Environmental Quality Protection. A Guide to Reduce Plastic Bag Consumption. (2018).

Figure 8: Material Flow of Plastics in Thailand



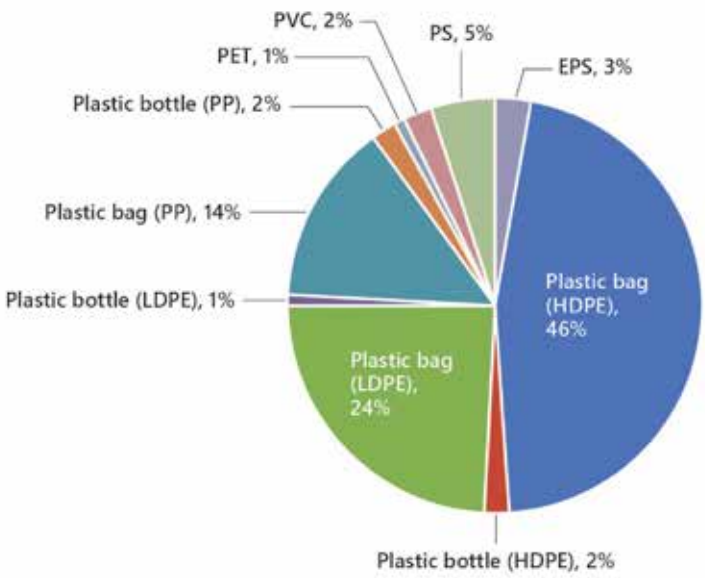
Source: Modified version based on PCD 2019 Plastic Waste Management in Thailand: Implications of Policy Plan and Practices[315]

According to Thailand's Pollution Control Department (PCD), the largest proportion of plastic in municipal solid waste is derived from plastic bags (roughly 80%), out of the 2 million tons of municipal plastic waste generated in 2018.[316] In broad terms plastic bags are usually not collected by waste pickers and sent for recycling due to contamination.

315 Chavalparit, O. 3Rs Policy and Plastic Waste Management in Thailand. in The 5th 3RINCs 2019 (3RINCs, 2019). Figures updated based on email communication with PCD, 2 July 2019.

316 Chavalparit, O. 3Rs Policy and Plastic Waste Management in Thailand. in The 5th 3RINCs 2019 (3RINCs, 2019).

Figure 9: Plastic Wastes in Municipal Solid Wastes



Source: PCD 2016, adopted from Wichai-utcha, N. & Chavalparit, O. (2019)[317]

Beach clean-up activities conducted in 2017 have identified that the country's top 10 marine debris include: plastic bags (18%), drinking bottles (17%), glass drinking bottles (11%), foam, food containers (9%), plastic straws (5%), nylon ropes (4%), soda cans (4%), fishing nets (3%), plastic caps (3%), plastic shopping bags (3%), cigarette butts (3%), plastic plates or bowls (2%), and others (18%).[318]

Priority sustainability issues related to plastics

According to PCD, most plastic wastes mixed in MSW do not have high potential to be recycled given that 80% of these materials are contaminated.[319]

In Thailand, waste collection and disposal of municipal solid waste are mainly conducted by municipalities. As seen in Figure 10: Material flow of collected waste plastics below, collection, recovery and disposal of waste plastics are primarily managed through a market-based network. In other words, if plastic wastes are not mixed with municipal solid waste at source, waste emitters such as households and offices typically sort and sell recyclable plastics to junk shops and associated collectors. These junk shops and collectors are either registered businesses or operate informally. In addition, waste plastics mixed with municipal solid waste are typically collected at curbside, waste transfer stations or final disposal sites by informal waste pickers.

Taken together, two major challenges for improving recovery waste plastics in Thailand are the lack of systematic sorting and collection systems[320] and resulting contamination from the mixing of plastics with other solid wastes.[321] One study examining waste management in Bangkok highlights that additional obstacles for carrying out source separation include a lack of proper facilities and overall mistrust of collection system operations, which in turn negatively affect the willingness of citizens to participate in recycling activities.

317 Wichai-utcha, N. & Chavalparit, O. 3Rs Policy and plastic waste management in Thailand. J. Mater. Cycles Waste Manag. 21, 10–22 (2019).

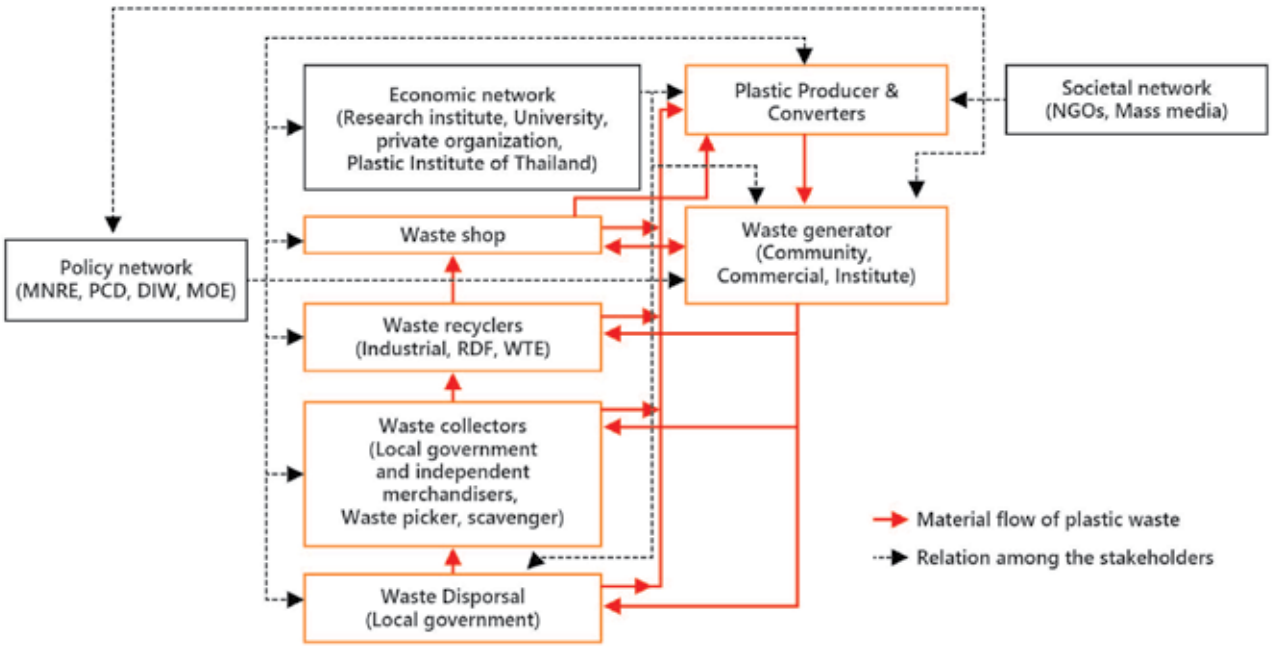
318 Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment, nd.

319 Wichai-utcha, N. & Chavalparit, O. 3Rs Policy and plastic waste management in Thailand. J. Mater. Cycles Waste Manag. 21, 10–22 (2019).

320 Vassanadumrongdee, S. & Kittipongvises, S. Factors influencing source separation intention and willingness to pay for improving waste management in Bangkok, Thailand. Sustain. Environ. Res. (2018). doi:10.1016/j.serj.2017.11.00

321 Wichai-utcha, N. & Chavalparit, O. 3Rs Policy and plastic waste management in Thailand. J. Mater. Cycles Waste Manag. 21, 10–22 (2019).

Figure 10: Material flow of collected waste plastics



Source: Wichai-utcha, N. & Chavalparit, O. (2019)[322]

Measures to improve collection coverage and service provision for environmentally sound waste treatment in Thailand are still under development. Consequently, improper waste management is currently contributing to the leakage of plastic waste in the open environment. This not only results in the blockage of sewerage and water draining systems, causing flooding during heavy rainfall, but also further contributes to polluting the country's water bodies including its rivers and ocean.

National legislation, policies and other initiatives

Key governmental bodies in Thailand's Central Government responsible for enforcing circular economy policies on waste plastics include the country's Pollution Control Department (PCD) located in the Ministry of Natural Resources and Environment (MONRE), which is tasked with developing strategies, action plans and technical guidance on waste management and the 3Rs; MONRE's Department of Environmental Quality Promotion, which carries out awareness raising and oversees voluntary actions led by various stakeholders; the Department of Industrial Works (DIW) housed in Thailand's Ministry of Industry, which focuses on addressing industrial sources of waste, as well as the country's Ministry of Interior for administrating municipal solid waste management.

322 Ibid.

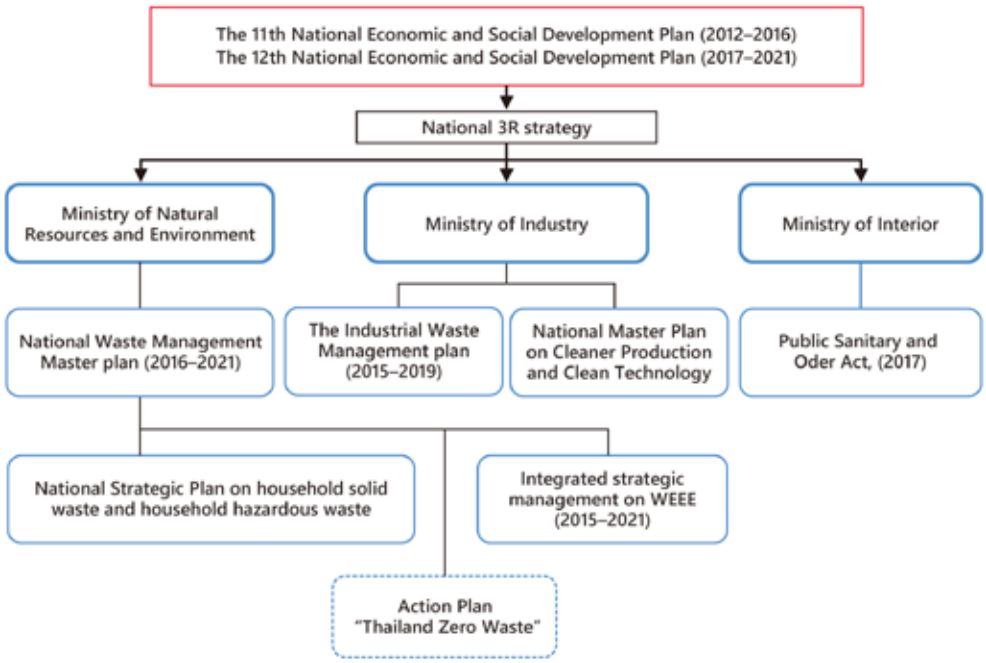
Table 6: Role sharing between central and local authorities for waste management in Thailand

Authority	Responsibility
Central government • Pollution Control Department (PCD) • Department of Environmental Quality Promotion (DEQP) • Office of Natural Resources and Environmental Policy and Planning (ONEP) • Department of Local Administration (DOLA) • Public Health Department	• Provide recommendations on the technical preparation of MSW management policy • Develop guidance/guidelines and processes for MSW management • Promote and disseminate information pertaining to MSW management • Prepare policies and prospective plans • Administer the Environmental Fund • Administer the finance of local government organisation • Provide support for the preparation of local department plans • Issue ministerial regulations to stipulate service charges
Regional government • Provincial offices of the Ministry of Natural Resources and Environment	• Coordinate related work between central and local government
Local government • Local/District Municipality • Sub-district Administrative Organizations (SAOs) • Provincial Administrative Organizations (PAOs) • Special Administrative Areas (i.e., Bangkok and Pattaya)	• Handle and manage waste in their own area

Source: Vassanadumrongdee, S. (2019)[323]

Figure 11: Structure of Waste Management Policies and Plastic Management Policies in Thailand shows the overall structure of waste management policy as well as plastics-related policies and regulations.

Figure 11: Structure of Waste Management Policies and Plastic Management Policies in Thailand



Source: Wichai-utcha, N. & Chavalparit, O. (2018)[324]

323 Vassanadumrongdee, S. Overview of plastic waste issue in Thailand & Bangkok. (2019).

324 Wichai-utcha, N. & Chavalparit, O. 3Rs Policy and plastic waste management in Thailand. J. Mater. Cycles Waste Manag. 21, 10–22 (2019).

In May 2016, the Thai Cabinet approved the country's Master Plan on Solid Waste Management. According to the Master Plan, MONRE and the Ministry of Interior are designated as the two leading ministries responsible for implementing the plan.

The Master Plan includes the following targets:[325]

- More than 75% of total MSW amount properly managed by 2021
- 100% of accumulated MSW generated in 2015 properly managed by 2019
- More than 30% of total household hazardous waste collected and properly disposed by 2021
- 100% of infectious medical waste properly managed by 2020
- 100% of hazardous industrial waste properly managed by 2020
- More than 50% of total local authorities ensure waste segregation at source conducted by 2021

Following enactment of this Master Plan, the Department of Local Administration under the Ministry of Interior formulated the 2018 Municipal Solid Waste Management Action Plan which sets targets for 2018 including 40% of waste generation to be properly disposed; 20% of improper disposal sites to be upgraded, 30% of MSW to be utilised and recycled, and 100% of communities to have in place household hazardous waste collection sites.

In order to guide the development of plastics management policies, especially with regard to reducing unnecessary packaging and products, the Thai government established three committees under the National Environment Board: one focused on the development of mechanisms to address plastic wastes, one tasked with carrying out relevant public campaigns and promotions, and one responsible for carrying out R&D on technologies for plastic waste recovery. In addition, the country has formulated a 10-Year Plan for Plastic and Plastic Wastes Management which aims to reduce plastic products and packages, promote the use of environmentally-friendly alternative products, increase the effectiveness of plastic wastes recovery and utilisation systems, and reduce the generation of marine debris. The plan provides a clear direction for plastic and plastic wastes management activities for all associated organisations involved in the effort.

In 2017, two key policies associated with plastics were developed:

- Plastic Waste Management Plan (2017-2021). This plan aims to develop relevant plastic waste management tools, promote and encourage environmental-conscious design for packaging and substitutes for plastic, and implement 3R (reduce, reuse, recycle) actions including through educational activities.
- National Roadmap for Development of Bioplastic industry

Thailand's Plastic Waste Management Plan (2017-2021) includes the following items 1) Framework for Plastic Waste Management, 2) Guidelines on integrated plastic waste management through cooperation between public and private sectors, 3) Goals for plastic wastes including recycling at least 60% before final treatment by the end of 2021, and 4) Promotion of design for the environment and increased manufacture of related products.

In 2017, the Thai Government established its National Reform Committee, which comprises 11 sub-committees, including one responsible for natural resources and the environment. Under this sub-committee, the government also created a steering group that concentrates on addressing marine debris.

Recent ministerial decrees have been issued and are now in the process of being enforced to ban plastic bags and foam containers in national marine parks. Moreover, the Department of Marine and Coastal Resources announced Command No. 1064/2560, entitled Marine and Coastal Protection Measures at the Beach, which bans cigarette smoking on 24 popular beaches in line with the 2015 Marine and Coastal Resource Management Act.

The Department of Medical Services found in the Ministry of Public Health also announced that effective 1 October 2018, the use of plastic bags would be completely phased out in the 30 hospitals under its supervision.

Similarly, MONRE's Department of Environmental Quality Promotion and the Ministry of Interior together are conducting participatory public awareness and education campaigns in 7000 locations nationwide including schools, government offices, department stores, convenience stores and open markets.

325 Vassanadumrongdee, S. Overview of plastic waste issue in Thailand & Bangkok. (2019).

The government has indicated that it is also considering a plan to apply tax incentives for discouraging the circulation of single-use plastics. As of 2019, this plan remains under discussion, but other market mechanisms, such as green taxes, fees, and levies are being explored for purposes of targeting specific plastic packages and products causing waste management problems or those otherwise deemed unnecessary.

With regard to international activities, the Thai government hosted the ASEAN Conference on Reducing Marine Debris in ASEAN Region on 22-23 November 2017 in Phuket, Thailand. Moreover, the Thai government has sought to emphasise plastic waste as an international priority. For example, on 5 March 2019, the government organised a Special ASEAN Ministerial Meeting on Marine Debris aiming to generate political commitment for reducing marine debris by at least 50% by 2027 via circular economy actions. Participating Ministers agreed to propose the outcome document, entitled the Bangkok Declaration on Combating Marine Debris in ASEAN Region, for adoption by ASEAN Leaders at the 34th ASEAN Summit held in June 2019, Thailand. The resulting ASEAN Framework of Action on Marine Debris emphasises four (4) priority areas: (i) Policy Support and Planning; (ii) Research, Innovation, and Capacity Building; (iii) Public Awareness, Education, and Outreach; and (iv) Private Sector Engagement.

Stakeholder and other initiatives

MONRE-PCD cooperated with the Thai business community in the development and signing of a Memorandum of Understanding (MOU) entitled “No Plastic Bottle Cap Seal” on February 13, 2018. PCD estimates that this agreement will help in reducing the consumption of 2600 million plastic products contributing to 520 tons of waste plastic per year.

As of June 2018, the Thailand Plastic and Debris Coalition (TPDC) led by the Plastic Industry under FTI established the “Thailand Public-Private Partnership for Sustainable Plastic and Waste Management”, also known as the “PPP Plastic”

In addition, PCD and the Federal Thai Industry and Plastic Industry Association initiated a working group to examine the material flow of plastics and develop appropriate data aimed at assessing the life-cycle impacts of production and consumption, waste generation and management of plastics.

Currently, PCD and Plastic Industry Association are working on developing initiatives to reduce the manufacture of single-use plastic products.

Thailand’s Sustainable University Network (SUN), with its 27 universities nationwide, has also organised a campaign to reduce single-use plastic on all campuses by 80-90 % over the year 2018.

Major gaps and opportunities for follow-up action

Thailand is one of the largest consumers of plastics in ASEAN with highest per capita consumption. As such, plastic waste is considered a high priority issue. Although the Ministry of Interior has led efforts to promote source separation of waste at the community level, a major obstacle is the continued contamination of low-quality waste plastics such as plastic bags. Even if future recycling activities are promoted, the relatively low value of these materials, coupled with Thailand’s lack of an existing market to absorb increasing volumes of collected waste will continue to pose challenges. Recycling channels in Thailand are still predominantly market-based and largely informal. In this regard, two key prerequisites for enhancing the country’s absorption capacity of plastic waste include strengthening collection and treatment systems and establishing appropriate cost-sharing mechanisms to better formalise recycling practices. Reduced use of plastics in consumer products, development of new service provision models and promotion of alternatives to plastics may hold some reward for Thailand, given its image as a tourist destination. However, doing so will require governmental support for guiding new business and service models in line with explicit policy directives aimed at discouraging single use products and establishing effective waste management systems.

Accordingly, several pieces of draft legislation pertaining to waste management have already started to be developed in Thailand. Prioritisation of waste management can contribute to the expedited preparation of strategies and roadmaps for plastic waste management and single-use plastic bans in collaboration with different stakeholders. However, at present there exists no specific legislation specifically focused on plastic waste management. In addition, although a plan initially started to take shape in the early 2000s, the introduction of an extended producer responsibility (EPR) scheme related to e-waste has yet to be finalised. In this context, most policies remain contingent on voluntary actions led by local governments, businesses, communities and citizens and are not thoroughly enforced.

Accordingly, the country's limited waste management capacity has led to a greater focus on voluntary commitments to address single-use products and conduct relevant pilot projects to support such efforts. Nevertheless, Thailand's tourism industry, including hotels, bars, and restaurants in larger cities such as Bangkok are more responsive to increasing concern over single use plastics.

Taking this into consideration, the general lack of enforcement regarding waste management may pose an obstacle to those actors interested in promoting circular business models as well as alternative products and services. In view of the Thai public's increasing attention on plastic pollution issues, public-private agreements focused on regulating single-use plastics may present one viable solution. To do so, however, the Thai government must be prepared to lead a multi-stakeholder consultation process involving industrial and business sectors as well as undertake a covenant/contract approach: one which sets out baseline environmental stewardship principles and defines target-based regulations in agreement with government. Introducing stronger regulations with set standards for compliance may provide another option. Nevertheless, stronger policy measures, such as new taxes on plastic consumption, and additional financing for collection, recycling, treatment and disposal facilitates, will also require enhancing collaboration between central and local governments as well as key business actors in order to improve general capacity and governance on waste management issues.

It is also important to note that Thailand is responsive to international pressure and regional policy trends; one promising development is that the country is starting to take a leading role combatting marine plastic pollution in ASEAN.

Following the above, the EU may consider supporting public private initiatives in Thailand such as those related to sustainable public procurement, standards for secondary plastic materials, and SCP-related networks including the Thai SCP Network.

Acknowledgement

This chapter is mainly based on three source of information: 1) Note shared by the Thai Pollution Control Department titled "Plastic and Plastic Waste Management in Thailand" prepared by PCD, Ministry of Natural Resources and Environment, 2) Interview with PCD officials on 4 and 5 March 2019 during the Regional 3R Forum in Asia and the Pacific, 3) Vaasanadunrongdee 2019, and 4) Wichai-utcha & Chavalparit, 2019.

COUNTRY BRIEF

VIET NAM

The Socialist Republic of Vietnam is located along the east side of the Indochina Peninsula; it has a long coast line facing the South China Sea. It is a mountainous and hilly country with only 20 percent level land.[326] The population amounts to 93.7 million (2017)[327] with an urbanisation ratio of 36 percent (2018).[328] Vietnam is a one-party socialist republic, which over the last three decades has launched extensive free-market economic reforms. The country has industrialised rapidly with electronics and textiles as major export goods and experienced one of the highest economic growth rates in the world; the current GDP per capita (PPP) stands at UDS 7,435.[329] Administratively, Vietnam is divided into 58 provinces and 5 municipalities (major cities), at equal level, and the country also has two lower tiers of governance.

Key data

Although Viet Nam is reported to be one of Asia's top five polluters of ocean plastic waste, according to international organisations,[330] the country does not collect official statistics of plastic waste. There is only estimated data about the proportion of plastic waste contained in urban solid waste taken to the landfills; the proportion is about 8-16%. The amount of domestic solid waste generated in the period of 2007-2017 shows an increasing trend; MSW per capita is also increasing and now accounts for about 1.2 kg/person/day.

In terms of waste composition, organic waste accounts for around 60-70% and plastics are around 10-15% in major cities across Viet Nam. For example, according to a survey conducted by IGES and supported by JICA in the city of Da Nang, plastic waste made up between 6-10% of total waste volumes; in contrast, 70-75% was composed of organic materials. Thus, plastics are a relatively small portion, in terms of weight, of existing waste flow. In Viet Nam, plastics, particularly PET bottles, along with other recyclables from households are collected by or sold to junkshops. Plastics are thereafter reported to be sent to small-scale recycling facilities located near Ho Chi Minh or Hanoi. For example, from Da Nang, junkshop owners explained to IGES researchers in May 2019 that most recyclables collected by junkshops are accumulated in compacting facilities near the port and shipped to Ho Chi Minh for further material recycling. These small-scale recycling facilities are often operated in so-called craft villages near agricultural areas located in close proximity to Hanoi and Ho Chi Minh City; because recycling is undertaken by farmers for supplemental income it tends to be seasonal recycling activities during off-seasons for agriculture. However, according to interviews by IGES with junkshop owners in Da Nang in May 2019, plastics other than PET, especially plastic bags, are no longer targeted for collection and sale due to their low quality and relatively inexpensive price. In other words, waste-picking of relatively high-value recyclable plastics is prominent in the recycling market of Viet Nam, due to lack of formal recycling routes.

Plastics and related priority issues

Although there are no official statistics on the amount and varieties of plastic in the Vietnamese sea and islands, plastic waste is easy to observe in Vietnamese waters, with the country's 112 estuaries the main gateways of plastic to the ocean. Since key cities in Viet Nam are experiencing rapid urbanisation and have increasingly developed as tourist destinations, public concerns over plastics are more visible than what are shown by statistics. For example, Da Nang, a well-known beach resort and the rapidly developing third largest city in Viet Nam, is increasingly experiencing plastic pollution in the beach especially after storms or high tides. Many residents organise beach clean-up campaigns during early mornings in the weekends.

326 Fröhlich, H.L., Schreinemachers, P., Stahr, K. and Clemens, G. 2013. Sustainable Land Use and Rural Development in Southeast Asia: Innovations and Policies for Mountainous Areas. Springer Science & Business Media. ISBN 978-3-642-33377-4.

327 General Statistics Office of Viet Nam 2019. Population and Employment. Available at: https://www.gso.gov.vn/default_en.aspx?tabid=774 (Accessed 2 August 2019)

328 United Nations Population Division 2018. World Urbanization Prospects: 2018 Revision. Available at: https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=VN (Accessed 2 August 2019)

329 World Bank 2019. International Comparison Program database. Available at: https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=VN (Accessed 2 August 2019)

330 Improving Plastics Management: Trends, policy responses, and the role of international co-operation and trade. OECD (2018). Available at: http://www.oecd.org/environment/waste/policy-highlights-improving-plastics-management.pdf. (Accessed: 4 July 2019)

Viet Nam's Ministry of Natural Resources and Environment (MONRE) has estimated the number of plastic bags used in the country total over 30 billion bags per year. Only a small proportion, or roughly 17% of the bags are regularly reused, with rest disposed after single-use. Numbers from Viet Nam's Association of Plastic illustrate the scale of the problem. In 1990, Vietnamese citizens on average consumed 3.8kg of plastic per year; 25 years later, the figure has reached 41kg.[331] In addition, plastic scrap import have increased rapidly in recent years (18,548 tonnes in 2016; 90,839 in 2017 and 175,000 in 2018).[332]

After China's ban on plastic scrap and waste imports, a substantial amount of plastic waste import shifted to Viet Nam. For example, Viet Nam imported almost 75,000 tonnes of scrap plastic from the U.S. in 2018, making it the sixth-largest importer of U.S. plastic throughout the year.[333] On May 21, 2018, Saigon Newport Corporation, the largest port management company in Viet Nam, notified their partner shipping companies of the temporary suspension of the acceptance of plastic scrap for the period of June 25 to October 15, 2018.[334] Due to the sudden increase in the volume of accepted plastic scrap, the port soon reached over capacity. The Office of the Government issued Dispatch 2227/VPCP-KTTH, dated 21 March 2019, which states that "plastic scraps are only imported as raw materials to produce intermediary products by the end of 31 December, 2024" and the government will work through the backlog of scrap plastic containers that remain stuck at the country's ports. Furthermore, the government instructed MONRE to issue environmental safety certificates to eligible containers with a view to encourage importers to use them in the manufacture of products.

On a positive note, Viet Nam has taken efforts to manage imported plastic scrap and monitor plastic production and consumption. According to Viet Nam news,[335] a campaign launched by MONRE in 2018 delivers the message that single actions are not enough to address plastic pollution but a series of actions ranging from plastic recycling, rejecting single use plastics, and seeking alternative solutions can help. According to the news, the Viet Nam Administration of Seas and Islands emphasised its first priority was to review legal documents on risks posed by plastic waste as part of its efforts to revise the country's legal framework concerning ocean plastic waste in line with its larger ocean-based economic growth strategy. Viet Nam is working to make changes, starting with changing public behaviour. In addition, MONRE's Viet Nam Environmental Administration aims to reduce 65 per cent of non-biodegradable plastic bags used at supermarkets and shopping malls by 2020 compared to 2010. By 2026, Viet Nam seeks to fully phase out non-biodegradable plastic bags.

National legislation, policies and other initiatives

Plastic waste is generally managed according to solid waste regulations. Vietnam has a relatively complete system of legal documents on waste management. The Law on Environmental Protection 2014 has a separate chapter on waste management (Chapter IX). Decree No. 38/2015/ND-CP on waste management and scraps requires sorting of plastic waste in domestic solid waste and industrial solid waste for recycling; such waste must be managed from generation to collection, transportation and handling. In particular, Vietnam has specific legal documents for plastic bags. The Law on Environmental Protection Tax in 2010 stipulates that non-biodegradable plastic bags are one of the product categories subjected to tax. This includes bags or thin plastic-bag shaped packaging (with bag mouth, bag bottom, bag wall and can contain products in it) made from HDPE (high density polyethylene resin), LDPE (Low density polyethylene) or LLDPE (Linear low density polyethylene resin) plastic film. From 1/1/2019, the applicable tax rate is 50,000 VND/kg,[336] raised from the previous tax rate of VND 40,000/kg. Plastic bags meeting environmental-friendly packaging criteria do not have to pay this environmental protection tax. Following implementation of the Law on Environmental Protection Tax, MONRE issued criteria and announced procedures for environmentally friendly plastic bags in 2012.[337] As of May 2018, there are 43 products of 38 companies that have been certified by the MONRE as environmentally friendly plastic bags.[338] Manufacturers of environmentally friendly products including environmentally friendly plastic bags, are entitled to incentives and support (in terms of capital, taxes, infrastructure and land, etc.) of the state according to Decree No. 19/2015/ND-CP.[339]

331 Viet Nam takes action to reduce plastic waste. Viet Nam News (2019). Available at: https://vietnamnews.vn/environment/505164/viet-nam-takes-action-to-reduce-plastic-waste.html#eHuAcsvaREvGPJpb.97. (Accessed: 4 July 2019)

332 The official Electronic newspaper of the Communist Party of Vietnam http://www.dangcongsan.vn/khoa-giao/rac-thai-nhua-tham-hoa-cua-o-nhiem-moi-truong-va-suc-khoe-cong-dong-502538.html. (Accessed: 4 July 2019)

333 Officials say Vietnam to end plastic imports in 2025. Resource Recycling (2019). Available at: https://resource-recycling.com/recycling/2019/04/02/officials-say-vietnam-to-end-plastic-imports-in-2025/. (Accessed: 4 July 2019)

334 Staub, C. Vietnamese terminals will suspend scrap plastic imports. Plastics Recycling Update (2018). Available at: https://resource-recycling.com/plastics/2018/05/23/vietnamese-terminals-will-suspend-scrap-plastic-imports/. (Accessed: 14 October 2018).

335 Viet Nam takes action to reduce plastic waste. Viet Nam News (2019). Available at: https://vietnamnews.vn/environment/505164/viet-nam-takes-action-to-reduce-plastic-waste.html#eHuAcsvaREvGPJpb.97. (Accessed: 4 July 2019)

336 Resolution No. 579/2018/UBTVQH14 dated September 26, 2018 on Environmental Taxes. (2018).

337 Circular No. 07/2012/TT-BTNMT dated 4 July, 2012 regulating criteria, procedures for recognizing environmentally friendly plastic bags. (2012)

338 Vietnam Environment Administration (2018). Available at: http://vea.gov.vn/en/Pages/trangchu.aspx. (Accessed: 4 July 2019)

339 Decree No. 19/2015/ND-CP dated 14 February, 2015 of the Government detailing the implementation of a number of articles of the Law on Environmental Protection (2015).

Moreover Viet Nam's Prime Minister launched a programme in 2013 aimed at strengthening regulations on environmental pollution caused by the use of non-biodegradable plastic bags,[340] setting targets for 2020 including: non-biodegradable plastic bags used in supermarkets and commercial centres are reduced by 65% compared to 2010; 50% reduction in the volume of non-biodegradable plastic bags at residential markets compared to 2010; and the aim to collect and reuse 50% of the total amount of non-biodegradable plastic bags generated from domestic sources. In 2017, the rate of using non-biodegradable plastic bags in supermarkets has basically decreased by 50% compared to 2010. In special and grade 1 cities such as Ho Chi Minh City, Hanoi, Da Nang, Can Tho, Hai Phong, Quang Ninh, Thanh Hoa, Ba Ria - Vung Tau, Dong Nai, Binh Duong, 90% of supermarkets and commercial centres in the area (such as Big C, Maxi Mart, Vinmart, Fivimart, Coopmart, etc.) were found to use environmentally-0friendly plastic bags to replace non-biodegradable plastic bags. However, in cities of grade 2 or less, where the number of supermarkets and commercial centres are smaller, the use of non-biodegradable[341] plastic bags are still relatively common.[342]

Most recently, the Prime Minister has approved the adjustment of the "National Strategy on Integrated Solid Waste Management to 2025, vision to 2050"[343] with specific objectives aimed at minimising the use of non-biodegradable plastic bags, including the target of using 100% environmentally-friendly plastic bags at trade centres, supermarkets, markets, retail stores, and grocery stores by 2025. To achieve this goal, the strategy has mandated "Restricting and moving towards ending the import, production and supply of non-environmentally friendly plastic bags from 2026 at the trade centres, supermarkets, markets, retail stores, grocery stores, and consumer goods for domestic use".

Stakeholder and other initiatives

At the expanded G7 Summit hosted by Canada in 2018 and at the 6th General Meeting of the Global Environment Fund, the Prime Minister of Viet Nam proposed an initiative to establish a Global Cooperation Mechanism – the East Asia Sea Partnership – aimed at addressing the problem of marine plastic waste pollution. To implement the initiative, in 2018 MONRE launched an initiative to combat plastic waste with the aim of reducing the use of single-use plastic products and further develop a national action plan to manage ocean plastic waste; this has been supported by a by a number of agencies, organisations and communities across the country.[344]

Many localities have carried out communication campaigns aimed at raising community awareness on the harmful effects of non-biodegradable plastic bags. A number of localities have also issued documents to enhance the local management and use of plastic bags, which are difficult to decompose, such as Ho Chi Minh City, Hai Phong, Bac Giang, Bac Ninh, Thanh Hoa, Thai Nguyen, Soc Trang etc.

Ho Chi Minh City has established regulations focused on the sorting of domestic solid waste at source in order to promote recycling waste, including plastic waste. According to this regulation, waste collectors are allowed to refuse collecting waste from households and other generators when wastes are unsorted and are in contravention of regulations. Households that do not sort waste at source, violating regulations on environmental protection will be fined VND15-20 million.[345] In addition, Ho Chi Minh City also provides financial support for environmentally-friendly plastic bag production through the Ho Chi Minh City Environmental Protection Fund (having supported Mot Buoc Tien Company with VND1.8 billion from 2012).

An Giang carries out the collection of non-biodegradable plastic bags through a plastic bag exchange programme for other products or biodegradable plastic bags. Binh Duong piloted waste sorting at source, collecting plastic bags for recycling into plastic granules, and converting into waste oil (600 tons of bags/month) at Binh Duong Water Environment Joint Stock Company. Lam Dong province has invested in sorting and recycling plastic and plastic bags into oils with a volume of 700-1000 tonnes/year at two solid waste treatment plants (Da Lat and Bao Loc).[346] Quang Nam province has successfully implemented the program "Say no to nylon bags" in Cu Lao Cham Biosphere Reserve, Tan Hiep commune, Hoi An city. Items used to replace nylon bags include ecological bags, plastic baskets, cloth bags, moulds, and leaves,

340 Decision No. 582/QD-TTg dated 11 April, 2013 of the Prime Minister approving Program on strengthening control of environmental pollution caused by the use of non-biodegradable plastic bags by 2020 (2013).

341 Of note is that there is no clear definition of bio-degradable plastic, and little evidence that the substitutes for non-biodegradable plastics are actually managed in a manner as to have lower social and environmental impacts.

342 Control of environmental pollution due to the use of hard plastic bags. Vietnam Environment Administration (2018). Available at: http://vea.gov.vn/en/news/news/Pages/Control-of-environmental-pollution-due-to-the-use-of-hard-plastic-bags.aspx. (Accessed: 4 July 2019)

343 Revision of the National strategy on integrated management of solid waste. Vietnam Environment Administration (2018). Available at: http://vea.gov.vn/en/laws/LegalDocument/Pages/Revision-of-the-National-strategy-on-integrated-management-of-solid-waste.aspx. (Accessed: 4 July 2019)

344 Công bố 10 sự kiện ngành Tài nguyên và Môi trường năm 2018. Tainguyen & Moi Truong (2019). Available at: https://baotainguyenmoitruong.vn/thoi-su/10-su-kien-nganh-tai-nguyen-moi-truong-nam-2018-1264068.html. (Accessed: 4 July 2019)

345 Decision No. 44/2018/QD-UBND dated November 14, 2018 of Ho Chi Minh City People's Committee promulgating the Regulation on classification of domestic solid waste at source in Ho Chi Minh City (2018).

346 Revision of the National strategy on integrated management of solid waste. Vietnam Environment Administration (2018). Available at: http://vea.gov.vn/en/laws/LegalDocument/Pages/Revision-of-the-National-strategy-on-integrated-management-of-solid-waste.aspx. (Accessed: 4 July 2019)

among others. The programme began in 2009, and after five years it had achieved notable results, achieving a reduction in use of about 85%-90%. The local island environment has also benefitted from these efforts, contributing to the effective promotion of tourism activities. Based on the success of the programme, on November 12, 2010, Tan Hiep was awarded the Certificate of Merit for Environmental Care by the Minister of Natural Resources and Environment.[347]

Major gaps and opportunities for follow-up action

Currently, the management of waste including plastic waste is in line with established regulations on the management of non-hazardous waste and hazardous waste in accordance with existing environmental protection legislation. However, plastic waste, which accounts for a large amount of the total amount of waste generated in terms of volume, is not addressed and managed appropriately, as there are no specific regulations on managing this particular type of waste. In addition, plastics account for relatively small portion of the weight in municipal solid waste flow, which may explain why there is less attention given to plastics by municipalities.

In addition, solid waste recycling technologies, including plastic waste, have not been fully documented and evaluated to provide guidance on the selection of recycling technologies in accordance with local waste characteristics. Recycling routes are often organized through informal route/junk shops and waste picking, to the small-scale material recovery facilities in craft villages. Low quality plastics are increasingly not attractive for market-based material recovery activities. Even in Da Nang, the third largest city in Viet Nam, plastics, especially PET bottles, are collected by junkshops and compacted and shipped to larger cities for further material recovery. This illustrates the lack of intermediate treatment as well as material recycling capacity in the country other than in areas surrounding Ha Noi and Ho Chi-Minh. Even in Ha Noi and Ho Chi-Minh, where such facilities exist, they usually have small capacity and recycling is dominated by ineffective and inefficient methods. National standards and national technical regulations for raw materials and recycled products have not yet been developed and issued.

Selective picking of relatively high valuable plastics such as PET remains prominent in Viet Nam. At the same time, this also drives concern among local governmental officials who are wary of a potential downturn in the market of recyclables as one unintended effect of governmental regulation.

One promising character in urban areas in Viet Nam is the relatively active engagement of communities such as women's unions and retired people in community-based activities. This has led to collaborative initiatives with the public in general as well as with municipalities and businesses. For example, through support from JICA, a pilot community in Da Nang has facilitated source separation of recyclables from household and is making efforts to increase the amount of recyclables going to junkshops. IGES and Yokohama city have been supporting model projects on source separation of recyclables with market-value from household wastes in Hai Chau district, the administrative, financial, and commercial center of Da Nang, and in Thanh Keh district, the neighbouring downtown district. In collaboration with the People's Committees and women's unions in the two districts, the project developed a guideline for source separation of recyclables including bottles, aluminium cans, paper, PET, and plastics, prepared bags and containers for collection and storage of recyclables from households, and encouraged participation of citizens in the model districts. As a result of these model projects, the public participation rate in source separation activities now exceeds 80%. Another model area in Hai Chau district conducted collection activities over 199 times during a period of six months and collected two tonnes of wastepaper, 1.3 tonnes of waste plastics, and 26,000 aluminium cans. This success led Da Nang city to approve and implement the "Household Solid Waste Source Separation Plan in Da Nang by 2025" and to expand the source separation activities to the whole city. The plan sets out an increase in recycling rate targets from the current 2% to 12% in 2020 and 15% in 2025. Another unique feature of the project coordinated by IGES in Da Nang is that it focuses on enhancing the flow of valuable recyclables from households to junkshops (which collect and further sort valuable recyclables) and in the process, aims to increase diversion from final disposal. Under this project, IGES was able to also identify informal recycling routes in the city; it was found that earnings from selling recyclables are typically allocated to a common community fund such as to support schooling for children from poor households.

Effective policies and measures to mitigate plastic waste in Viet Nam should start by strengthening monitoring systems, with a view to better understand issues regarding quantity, components of waste, movement, distribution, major sources and impacts. However, Viet Nam has not yet undertaken a comprehensive survey and assessment on plastic waste, so there are no statistics on the actual status of plastics at present. However, Viet Nam is currently implementing a number of projects aimed at assessing the status of plastic waste, looking at areas to identify potential policy solutions, raise awareness, and establish standards/national technical regulations and technologies (i.e., plastic recycling technology, production technology for environmentally-friendly bags to replace non-biodegradable plastic bags, etc.). In this context, Viet Nam has expressed an interest to cooperate with other countries on efforts to more effectively manage plastic waste.

347 Ministry of Natural Resources and Environment. Available at: http://www.monre.gov.vn/English. (Accessed: 4 July 2019)

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