TOWARDS REDUCING SINGLE-USE PLASTICS IN LAO PDR

Options for a National Policy Strategy and Action Plan

In collaboration with:
Ministry of Natural Resources and Environment, Lao PDR

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SWITCH-Asia Programme: The European Commission (EC) launched the SWITCH-Asia programme on Sustainable Consumption and Production (SCP) in 2007 as a grant programme to help governments, businesses, consumers and supporting associations switch to a more sustainable archetype that promotes economic prosperity and reduce poverty in Asia by encouraging economic growth with low environmental impact.

The EC established the SWITCH-Asia SCP Facility (SCPF) in 2017 to better facilitate country activities, following a country demand-driven approach, and closely collaborating with EU Delegations, National Focal Points and grants. As a backbone for the SWITCH Asia Programme, the SCPF provides a single platform for all of the SWITCH-Asia projects to maximize their results, to further promote SCP policies and principles, to further support the delivery of SDGs and fulfil its policy and advocacy support to countries that are covered under the SWITCH Asia Programme as the following:

- Strengthening SCP policies in the region through policy support and advocacy
- Raising awareness among all stakeholders via outreach efforts
- Promoting best practices to ensure future sustained improvements in SCP patterns
- Building capacity of government officials and other key stakeholders
- Enhancing dialogue on local and regional SCP priorities
- Enabling adoption of cleaner technologies and practices – particularly SMEs

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ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
DoNRE	District Department of Natural Resources and Environment
DRS	Deposit Return Scheme
EMF	Ellen MacArthur Foundation
EPR	Extended Producer Responsibility
EPS	Expanded Polystyrene
EU	European Union
HDPE	High Density Polyethylene
Lao PDR	Lao People's Democratic Republic
LLDPE	Linear Low Density Polyethylene
LDPE	Low Density Polyethylene
MoNRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
NGO	Non-Governmental Organisation
NSEDP	National Socio-Economic Development Plan
PE	Polyethylene
PET	Polyethylene Terephthalate
PRO	Producer Responsibility Organisation
PS	Polystyrene
PVC	Polyvinyl chloride
R&D	Research and Development
SUP	Single-Use Plastics
UDAA	Urban Development and Administrative Agency
UNDP	United National Development Programme
UNEP	United National Environment Programme
USD	United States Dollar

EXECUTIVE SUMMARY

Background and Purpose

The Lao People's Democratic Republic (Lao PDR) is facing new challenges as a result of changing patterns in consumption and production, which are resulting in higher volumes of waste and an increasingly complex waste stream. Plastics are a large and increasing component in waste streams, particularly those used in packaging.

Many plastic items are single-use products such as bottles, food packaging and carrier bags, which are designed for a short life span. Lao PDR does not currently possess comprehensive policies around sustainable production and waste management, has limited public awareness over issues with inappropriate use and waste disposal, and lacks services and infrastructure to collect, sort, and safely process post-consumer wastes.

A large amount of waste plastic is inappropriately disposed of, mismanaged or leaked out of supply chains, resulting in environmental, social, and economic impacts. Many households and businesses burn plastics, resulting in human health hazards. Plastics are also dumped on land and in river environments, damaging natural beauty, causing pollution and leading to negative impacts on wildlife. Waste and litter can result in significant disposal costs to society, including the need to construct and operate landfills, health costs, impacts on business and tourism, and the need to clean up urban and rural environments.

Based on current trends in consumer habits and business practices, unless action is taken, these challenges are set to worsen. By contrast, addressing the use of plastics through a circular economy approach will help align Lao PDR with regional and global initiatives to combat pollution, and reduce the reliance on natural resources and the amount of material that is leaked out of the economy.

Against this background, the Lao Ministry of Natural Resources and Environment (MoNRE) requested assistance from the European Union, through the SWITCH-Asia programme, to assess the current situation with regards to single-use plastics (SUPs) and to identify suitable policy options. Responding to this request, a study was conducted, consisting of a literature review, an assessment of policy experiences from other countries, and a series of interviews with stakeholders and experts in Lao PDR. These interviews explored participants' experience, knowledge and viewpoints on plastics in Lao PDR. Consultations were held with various stakeholders, including government, non-governmental organisations (NGOs), research institutions, and the public, to achieve a representative view from a range of perspectives.

This report presents the findings of that study and is expected to serve as an input to a multi-stakeholder process to develop a National Action Plan on plastics.

Situation analysis – Strengths and Weaknesses, Threats and Opportunities

Lao PDR has both strengths and weaknesses that need to be considered when developing an effective policy response to SUPs. By examining trends and possible future events, several threats and opportunities have been identified, which need to be considered in efforts to tackle SUP-related issues.

In terms of **strengths**, Lao PDR is characterised by a culture with strong traditions that embrace respect for the environment. The country promotes itself as a green destination for tourism. Despite the country's businesses being predominantly comprised of medium, small, and micro-sized enterprises, there are well-established business associations that can provide platforms to help initiate and drive change. There are also well-informed NGOs that already have experience in establishing initiatives around sustainable consumption and production, reducing litter, and improving waste management. Although Lao PDR lacks significant investment in infrastructure and services, labour costs are low and this gives the country a competitive advantage. Lao PDR is surrounded by countries with experience in managing wastes and reprocessing materials such as plastics, and this could provide good opportunities for partnerships.

Lao PDR's inherent **weaknesses** predominantly concern governance, the legal framework for sustainable consumption and production, as well as waste management, and the capacity, capability and coordination of relevant government institutions. Although progress has been made in recent years, Laos has both a fragmented legislative framework and limited experience in this field. A particular weakness is the available capacity for the enforcement of regulations. A key challenge, although not unique to Laos, is insufficient data on plastics flows, including information on plastics placed on the market and disposal routes.

Infrastructure is largely lacking in the waste management and reprocessing sectors, and services have limited coverage. Domestic recycling capacity and capability is still developing. Traditionally, many wastes were organic and would have been returned to the land or river environments. However, new materials require proper disposal at the end of life, and there is low awareness amongst the general public about the impacts of inappropriate waste disposal.

Changing consumer habits and lifestyles combined with new retail channels pose the biggest **threat** concerning SUPs. Traditional lifestyles that were predominantly focused on fresh foodstuffs appear to be changing. Whilst wet markets still have an important role in Lao culture, there is an increase in supermarkets, home deliveries, and food takeaways. Although these changes do bring a greater diversity of products, they have serious implications on the volume and type of SUPs. Increased amounts of packaging could compound issues around plastic pollution, particularly when coupled with the current low public awareness about the impacts of resource use and poor disposal of wastes.

The COVID-19 pandemic is having an impact on the volume and types of SUPs in Lao PDR and also affecting plastics recycling. The use of personal protective equipment and food delivery containers, which are often hard to recycle, has increased in particular. Meanwhile, informal waste workers are facing difficulties collecting recyclables and have seen their livelihoods diminished. In addition, the low oil price in 2020 dealt a blow to the plastics recycling industry, which was struggling to compete with cheaper virgin plastics.

Changes in waste management must take account of the informal sector currently engaged in the collection, sorting, and processing of recyclable materials. Recognising that people in this sector are often from the poorest parts of society, when waste management systems are upgraded it must be ensured that their livelihoods are protected.

Whilst an increase in recycling would benefit the economy, it will be important to ensure that Lao

PDR does not become the dumping ground for the processing of poor-quality post-consumer waste plastics from other countries.

There are significant **opportunities** for promoting sustainable consumption and production of plastics in Lao PDR, yet this is not without its challenges. Becoming an early adopter of circular economy principles will ensure that the linear approaches of take-make-dispose do not become fully engrained within the national culture. This will require awareness-raising activities, which target the hearts and minds of all people and businesses in Lao PDR.

Achieving cultural, social, economic and environmental change will require contributions from all parts of society, not only the government. This calls for improved coordination and enhanced communications across the public and private sectors. Regulations alone are not the solution, and such measures bring with them the challenges of passing laws within required timeframes and the difficulties of their enforcement. Prohibitive rules may have a place at certain times, but voluntary initiatives, partnerships and negotiated covenants as well as economic/social incentives may achieve more rapid change in the short term. This could help build momentum before mandatory approaches are considered.

Policy Aims, Objectives and Principles

To identify suitable policy options for Lao PDR in minimising SUPs, three broad aims, two objectives and four sets of guiding principles have been developed, as set out below.

AIMS	• Decouple economic growth • Contribute to health and prosperity • Avoid negative externalities
OBJECTIVES	• Eliminate single-use plastics where feasible by promoting alternative packaging and product solutions • Where plastics are necessary, shift to reusable options or materials and products that can be recycled domestically
GUIDING PRINCIPLES	**Approaches and Timeframes** • Polices across short, medium and long timeframes • Mix of incentives and prohibitive tools • Combines behavious change with infrastructure & services • Changing consumer awareness and behaviour change is central, noting changing consumer habits and lifestyles **Links to Systems and Frameworks** • Whole lifecycle considered • Based on circular economy principles • Incorporates the waste hierarchy **Economic, Environmental and Social Safeguards** • No negative impacts on the overall economy • No unreasonable costs to business or households • No undue impacts on poorer members of society • No loss of employment or livelihood opportunities • Protect the natural environment and public health, including food safety **Domestic and International Linkages** • Encourage domestic businesses • Contribute to environmental solutions across ASEAN region and beyond

Elements of a Comprehensive Policy Response

The study reviewed a range of policy approaches and tools that could in principle be applied to SUPs, while identifying policies that appear to have the potential to be the most effective in Lao PDR, considering the country's specific circumstances.

There is no single solution to the complex challenge of single-use plastic. Multiple interventions will be needed, targeting different stages of the value chains. In addition to determining individual policies, the right mix of policies need to be implemented in a logical sequence over the short, medium and long term. This approach will require active engagement from multiple stakeholders in joint problem-solving, experimentation and learning.

This strategy paper presents a proposal for how a suite of complementary policies can be introduced through a staged approach over a 10-year period. The suggestion here is to focus on well-coordinated participatory approaches in the short term, which can be implemented relatively easily, to build momentum before considering the need for mandatory, legislative instruments in the medium to long term.

Recommended Polices

Education and awareness-raising are essential for wider initiatives to succeed. Sustainable consumption and production should be formally incorporated into educational curricula. Whilst national awareness-raising campaigns can be costly, social media can offer more cost-effective ways of spreading messages. Lao PDR has a number of passionate and experienced NGOs who can play a key role in the education and awareness-raising of both the general public and the private sector. The establishment of the SEA PLASTIC EDU project[1] at the National University of Laos will be a valuable institution for furthering higher education, research, and data collection efforts, providing a strong impetus to the government's approach to plastics.

A National Plastics Platform could provide a key forum for regular exchange and dialogue between the government and key stakeholders, leading to better coordinated actions. After a national action plan on plastics and plastic waste has been developed, the platform could review progress and challenges on an annual basis. Based on the findings of such reviews, the platform could then serve as a launching pad for initiatives to accelerate change, including new government policies and stakeholder projects. It could also help identify where assistance from the country's development partners would be most beneficial.

Initiatives that could be established under a National Plastics Platform include:

- a gradual phase-in of **product stewardship / extended producer responsibility**, initially as **voluntary take-back schemes**;
- pilot projects on **deposit-return schemes** and **refill systems** to replace SUP packaging;
- voluntary **sector-specific guidelines** for businesses and **labelling schemes**;
- formats and routines for **data generation and reporting**; and
- an annual **plastic-free Laos award** to recognise good practices and new initiatives.

Given the challenges of regulation and enforcement, the government could initially encourage **voluntary phase-out commitments** for problematic SUP items, particularly where realistic alternatives exist or can be provided. If such measures prove successful, they could later be made mandatory if required.

1 http://plastic-edu.com/en/en-home/

Alternative materials to plastics, including both traditional materials and modern products, will be part of the solution to SUP issues. Easily compostable materials, which can degrade rapidly in backyard composts, would be particularly relevant in Lao PDR, given the high organic content in waste streams. By Lao PDR working closely with neighbouring countries in research and development (R&D) further alternatives could be enabled. In order to process new products, it will be important for Lao PDR's waste management sector to have a high degree of flexibility, so that the system can accommodate new materials in end-of-life processing.

The government, in collaboration with stakeholders, can make products made of alternative materials more widely available and raise awareness of their availability as well as how they should be treated at end-of-life. Moreover, they can facilitate their uptake through financial support, and ensure that new materials can be accommodated within new and future waste collections and reprocessing infrastructure. This is also an area where R&D is likely to be needed as well as technical standards and capacity for testing and accreditation.

The government can also reduce the use of SUPs while promoting alternatives, by incorporating relevant criteria in the **sustainable public procurement** system, currently under development. As an interim initiative, basic guidelines for government bodies could be developed to provide advice on sustainable product options.

Voluntary removal of certain plastic items, such as carrier bags, at specific locations should continue to be trialled. Local governments should encourage businesses to start such trials on a non-binding basis. These trials would provide useful information for later assessments on potential mandatory schemes, including administrative and enforcement requirements.

Noting Lao PDR's position in regional supply chains, the use of **import taxes** should also be considered in the future, with revenues utilised to provide domestic **subsidies** for scaling up alternatives to plastics.

Even if efforts to reduce the use of single-use plastics are successful, there will still be a need to expand and upgrade **waste collection** services, including the collection of source-segregated recyclables. Any such investment calls for due consideration of the next steps in the value chain and the requirements of high-quality recycling, such as improving the capacity for pre-processing of recyclables by sorting and cleaning.

1. INTRODUCTION

1.1 Background and Purpose

The Lao People's Democratic Republic (Lao PDR) is facing new challenges due to changing patterns in consumption and production, which are resulting in higher volumes of waste and an increasingly complex waste stream. Plastics are a large and increasing component in waste streams, particularly those used in packaging. Many plastic items are single-use, products such as bottles, food packaging and carrier bags, which are designed for a short life span. Currently, Lao PDR does not have comprehensive policies around sustainable production and waste management, has limited public awareness over issues with inappropriate use and waste disposal, and lacks the services and infrastructure to collect, sort, and safely process post-consumer wastes. Consequently, a large amount of waste plastic is inappropriately disposed of, mismanaged, or leaked out of supply chains, resulting in environmental, social, and economic impacts.

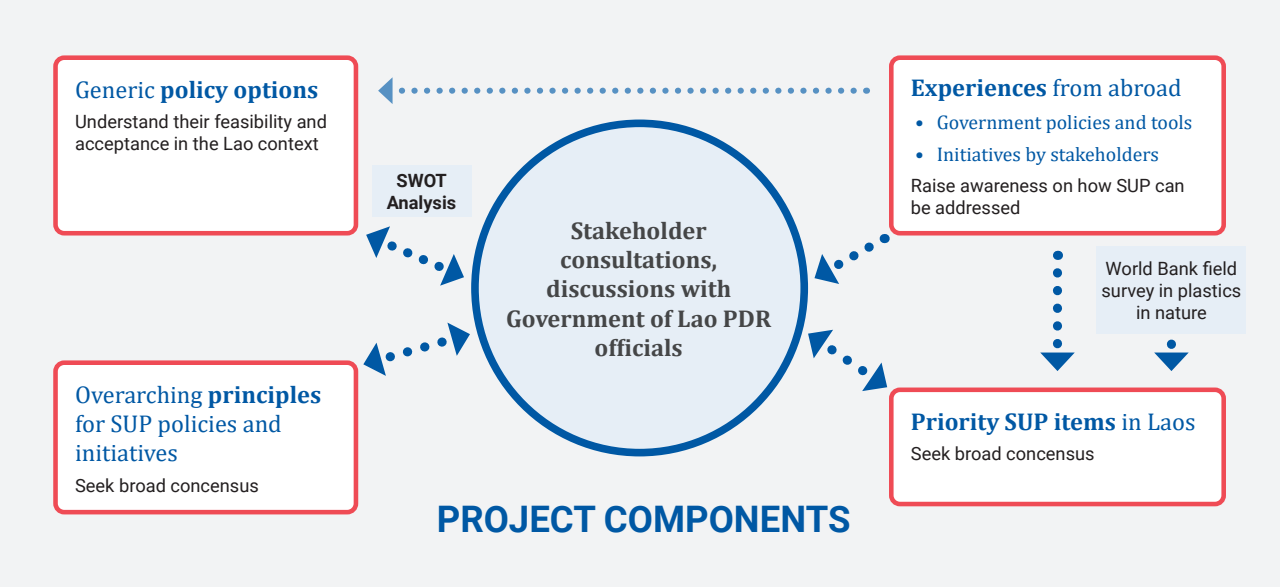
Many households and businesses burn plastics, resulting in human health hazards. Plastics are also dumped on land and in river environments, damaging natural beauty, causing pollution and leading to negative impacts on wildlife. Waste and litter results in significant disposal costs to society, including the need to construct and operate landfills, health costs, impacts on business and tourism, and the need to clean up urban and rural environments. Based on the current trends of changing consumer habits and business practices, these challenges are only set to worsen. By contrast, addressing the use of plastics through a circular economy approach will help align Lao PDR with regional and global initiatives to combat pollution, and reduce the reliance on natural resources and the amount of material that is leaked out of the economy.

Against this background, the Lao Ministry of Natural Resources and Environment (MoNRE) sent a letter on 16 December 2019 requesting assistance from the European Union, through the SWITCH-Asia programme, to assess the current situation with regards to single-use plastics (SUPs) and to identify suitable policy options. Responding to this request, this study was conducted, from October 2020 to October 2021, and consisted of a literature review, an assessment of policy experiences from other countries, and a series of interviews with stakeholders and experts in Lao PDR.

1.2 Approach to Research and Analysis

Figure 1 sets out the overall approach used in this research and analysis. Secondary data were obtained from in-country reports and legal documents, along with regional and global reports, studies, strategies and media articles. This initial desk-based research helped identify potential gaps and potential solutions. Secondary data were utilised to help formulate questions for subsequent interviews, in which participants' views were sought on the current situation regarding plastics in Lao PDR, and feedback was received on potential solutions.

Figure 1 Approach to Primary and Secondary Data Collection and Analysis



Primary data were obtained predominantly through face-to-face interviews with a range of key stakeholders in Lao PDR, using semi-structured interviews in order to obtain information based on participants' experiences, knowledge and viewpoints (Collis and Hussey 2014). In such semi-structured interviews, only a few predetermined questions are used, leaving room for spontaneous follow-up questions and for exploring significant points raised by the interviewees. Prior to undertaking these interviews, the extensive desk-based research was drawn upon to help inform the interviews and ensure that all questions were highly relevant. Areas explored in each of the interviews were: major sources of single-use plastics waste; status of current efforts to address single-use plastics and resulting waste; and, ideas on improvement options. In addition to these general areas, specific questions were included related to each interviewee's experience. Open-ended, neutral questions were utilised in order to limit influence from the interviewer and to allow participants to contribute as much detailed information as they desired (Gall et al. 1996).

This element of the research resulted in a large volume of qualitative primary data, which then required analysis to understand the different viewpoints and to formulate patterns and integrated concepts. This analysis followed a general procedure of reducing and displaying data through transcribing, organising and coding, before drawing conclusions (Miles and Huberman 1994). These conclusions were subsequently tested through workshops and further consultations with relevant stakeholders. The main limitation of this specific approach was the capacity to conduct extensive semi-formal interviews with a large number and range of stakeholders in a limited timeframe and within the context of the COVID-19 pandemic. Consequently, there was limited access to stakeholders, and an inability to have all consultants on-the-ground in Lao PDR. However, it was possible to compensate for this somewhat by initiating a number of further, less formal discussions while attending related workshops and conferences.

Stakeholders were selected using purposive sampling, to achieve representativeness and reach the views of government, private sector, NGOs, and the wider public (Teddlie and Yu 2007). Further referrals and contacts were subsequently obtained through interviews. All interviews were conducted in Vientiane. Prior to, or at the commencement of the interview, participants were fully briefed on the purpose of the project, format of the interview, and subsequent process. Participants broadly included the following organisations and groups (a complete list can be found in Annex 1):

- Government Departments.
- Non-Governmental Organisations.
- Business Networks and Industry Bodies.
- National University of Laos.

- Small Retailers.
- Food Delivery Companies.
- Recyclers.
- Manufacturers of alternative materials.
- Waste Collectors.
- General Public.

The development of this project has also been undertaken in parallel to a project conducted by the World Bank, in conjunction with the Government of Lao PDR, to analyse plastic sources, undertake surveys to determine commonly littered plastic items, develop a plastic action plan and examine investment opportunities. The World Bank project and this SWITCH-Asia project have contributed complementary pieces of work, which will help accelerate Lao PDR towards sustainable consumption and production with single-use plastics.

1.3 Report Outline

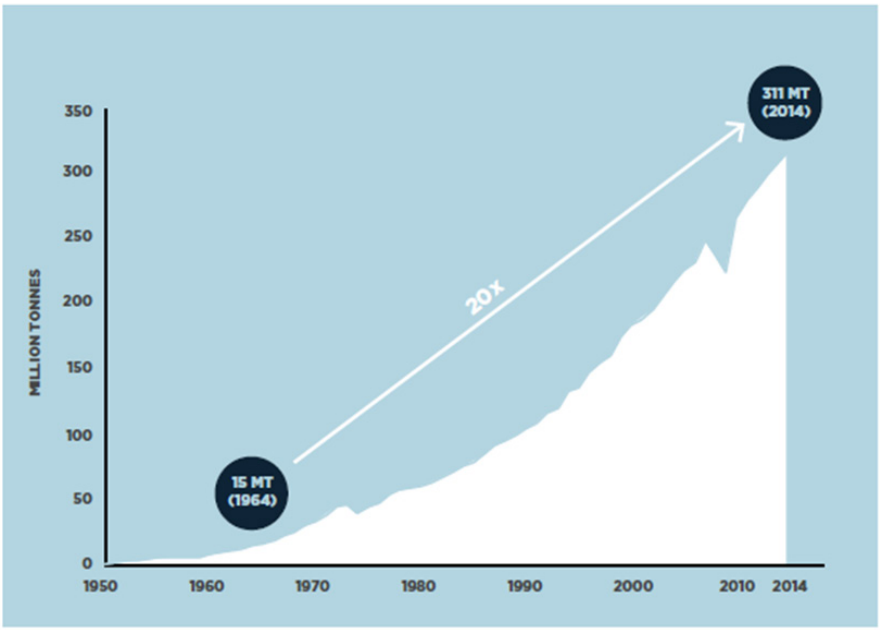
The report begins with a brief introduction to plastics, describing global trends and associated issues, particularly those related to waste management (Chapter 2). It then describes the current situation in Lao PDR with regards to plastics trade, manufacturing, use, and disposal (Chapter 3). Chapter 4 identifies the main government bodies, laws, and policies related to plastics and associated issues. Chapter 5 reviews major trends in retailing and consumer behaviour in Lao PDR (including trends resulting from the COVID-19 pandemic), and their likely impact on the future use of plastics. Chapter 6 introduces the circular economy concept as applied to plastics, and demonstrates the need for holistic policies that engage a wide range of stakeholders and address all stages of the value chain. Chapter 7 presents policy experiences of other countries, especially in Southeast Asia, and general lessons regarding policies on single-use plastics. Chapter 8 analyses the major strengths, weaknesses, threats and opportunities for Lao PDR related to single-use plastics. Chapter 9 presents a problem statement as well as aims, objectives, and principles for the policy assessment. It also offers a general assessment of the four main categories of policy tools, discussing their relevance and feasibility in Lao PDR. Chapter 10 sets out a more in-depth assessment of ten policy approaches relevant to single-use plastics, examining the advantages and challenges for each policy option in the context of Lao PDR. This chapter also presents a tentative suggestion for how a number of policy approaches could be phased-in over a ten-year timeframe. Finally, Chapter 11 provides concluding remarks, and sets out suggested next steps in the development of a National Plastics Action Plan.

2. INTRODUCTION TO PLASTICS

2.1 Global Growth in Use of Plastics

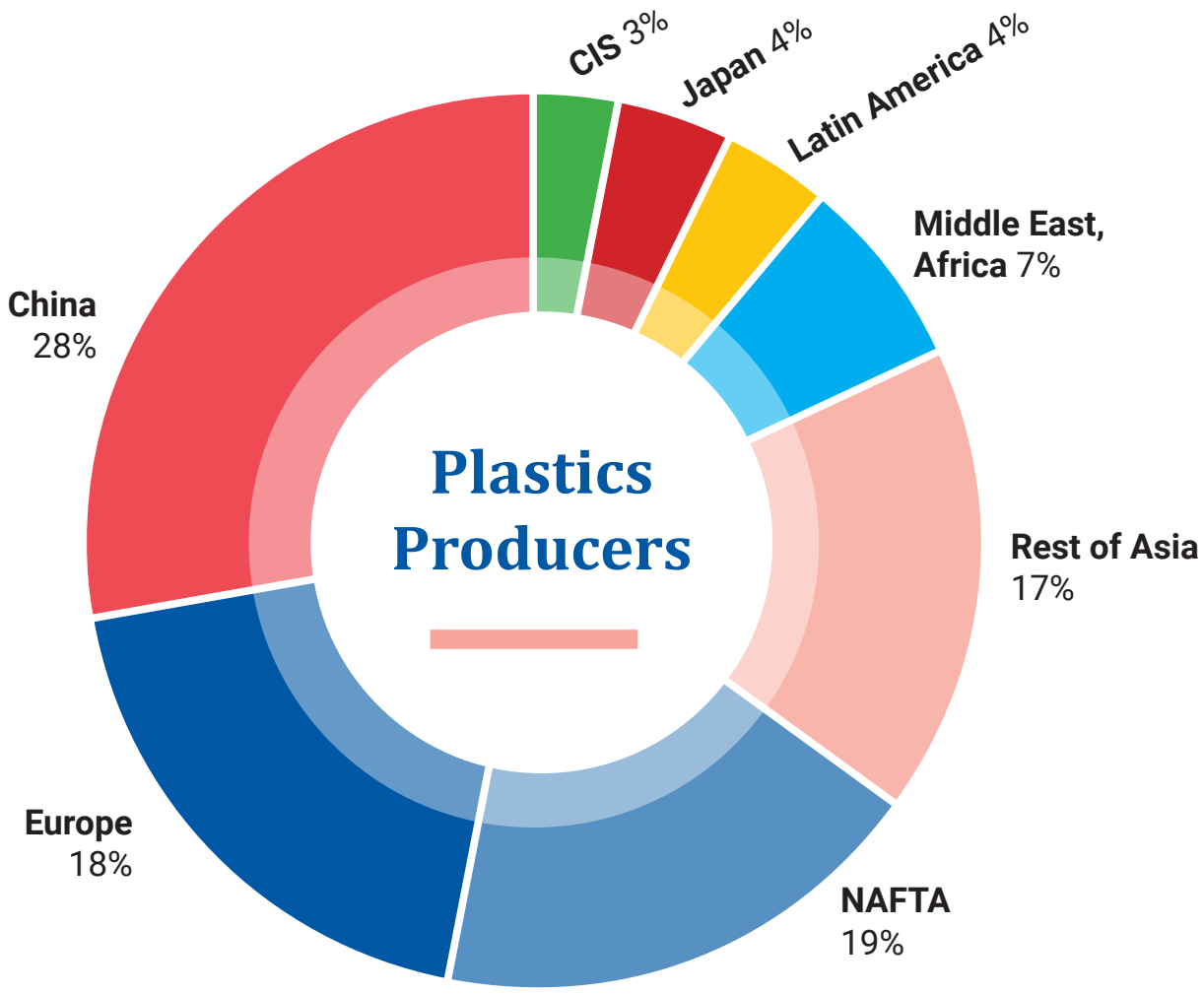
Plastics are one of the most universally used materials across the world, with applications in a wide range of sectors from packaging, transportation, construction, electronics, textiles, consumer products and healthcare. The functionality, versatility and cost-effectiveness of plastics have helped inspire innovations and the development of products and solutions that could not exist without them. As shown in Figure 2, following initial mass production in the mid-twentieth century, global plastics use has increased twenty-fold in the past fifty years and their use is expected to double again in the next twenty years (EMF 2016). The average annual growth rate is 5%, with 335 million tonnes of plastics being produced globally in 2016 (Plastics Europe 2017).

Figure 2 Global Plastics Growth [Source: EMF 2016]



The main primary producers of plastics are China and North America, as shown in Figure 3, with production dominated by a small number of multinational corporations. In 2017, the global market had a value of USD 318 billion, and is predicted to grow to USD 400 billion by 2022 (Market Watch 2018). The largest market is packaging, representing approximately 25% of the total volume, at 87 million tonnes.

Figure 3 Plastics Producers [Source: OECD 2018]



This growth in plastics has been due to their unrivalled properties and because they are typically easy to manufacture and have low production costs.

In terms of physical properties, plastics are valued for their high strength to weight ratio, versatility, and resistance to chemical, biological and physical degradation. These properties and the wide functionality of polymers have led to plastics being increasingly used as a substitute for materials such as concrete, glass, metals, wood and paper.

2.2 Types of Plastics

Most plastics are polymers of small organic molecules, synthesised from crude oil and natural gas. The main category of plastics is thermoplastics, which melt when heated and solidify when they cool. This means that thermoplastics can be re-melted and recycled.

There are thousands of types of different plastics, each with its own composition and unique properties, although they are typically broken down into seven broad categories, as displayed in Table 1.

Table 1 Broad Categories of Plastics – Their Uses and Properties [Source: Long 2018]

Name & Recycling Number	Uses	Packaging Properties
Polyethylene terephthalate (PET) 	Soft drink & water bottles; food packaging; clothing	Lightweight, hard & strong; transparent and can be coloured; good gas barrier; widely recycled plastic
High-density polyethylene (HDPE) 	Short shelf-life products (milk bottles); bottle caps; grocery bags; shampoo bottles; pipes	Very versatile, can be rigid & semi-flexible; highly permeable to gas; widely recycled plastic
Polyvinyl chloride (PVC) 	Non-food bottles; drainage pipe; doors; window frames; roofing; food wrap; clothing	Can be rigid & flexible; good clarity; durable; inherent fire retardant; waterproof properties; limited recycling due to additives
Low-density polyethylene (LDPE) 	Shopping & food bags; sauce bottles; food wrap; personal product bottles; toys	Can be rigid & highly squeezable; flexible & tough; highly permeable to gas; challenges with handling & contamination limit recycling
Polypropylene (PP) 	Food containers; bottle tops; shopping bags; furniture; plant pots; thermal clothing	Can be rigid or flexible; translucent; high resistance to fatiguel good on moving parts; permeable to gas; limited systems for recycling
Polystyrene (PS) 	Fast food trays; disposable cutlery; vending cups; drinking straws; foam; insulation	Can be rigid or foamed; flexible; very lightweight; high clarity; brittle; poor barrier to gases / moisture; limited recycling
Other (O) 	Range of uses, including Nylon, Acrylonitrile & Butadiene Styrene	Various properties; limited recycling as hard to identify

2.2.1 Single-Use Plastics

Many plastic items are only used once before being disposed of, and often only after a very short period of use by the end consumer. The single-use nature of such plastics can be by design or simply through their actual use. Some products, such as those used in the medical industry (syringes, bandages, wraps, and some face masks), are designed to be disposable after a one-time use in order to prevent the spread of infection. Other single-use products, such as those used in some packaging and food and beverage service-ware, prioritise convenience over durability and represent a throwaway culture.

Food and beverage service-ware include items such as drinking straws and stirrers; disposable cups, plates, and cutlery; and meat and vegetable trays and containers. These products facilitate food and beverage consumption, as well as helping to extend the lifespan of foods and reducing the risk of contamination.

Plastic packaging is used in a wide range of food, beverage, and non-food products. Packaging may be in the form of a rigid-plastic container or a soft-plastic bag or wrap, which holds, protects, preserves and facilitates the transport, handling and use of a product. Packaging is often an integral part of the way a product is served, offering brands a way of presenting and marketing a product and influencing purchasing decisions. Global plastic packaging volumes have experienced strong growth in recent decades, representing approximately 25% of the total share of all packaging volumes (EMF 2016).

The widespread use of plastics has undoubtedly provided many benefits to society. However, the poor management of plastics, particularly with regards to end-of-life disposal and processing, has led to many economic, social, and environmental externalities and a leakage of material out of systems. Since the 1950s, 8.3 billion tonnes of plastic have been produced globally and the majority (79%) has gone to landfill or been discarded into the environment (Geyer et al. 2017). The entire plastics industry currently utilises 6% of the world's crude-oil, and this is expected to increase to 20% by 2050 (Ellen MacArthur Foundation (EMF) 2017). In 2012, plastics production alone resulted in a greenhouse gas footprint of 390 million tonnes of carbon dioxide equivalents (EMF 2016).

2.3 Post-Consumer Plastics

After consumer use, plastics are either discarded along with other wastes, or they are separated for recycling. Waste plastics will generally be either sent to landfill, dumped, or incinerated (waste to energy). Of the 8,300 million metric tonnes of plastic made throughout the world since 1950, 6,400 million tonnes have become waste: 79% is sitting in landfills or the environment, 12% has been incinerated and 9% has been recycled (Geyer et al. 2017). The EMF (2016) estimates that 95% of all the world's plastic packaging-material value is lost every year after a short first use, representing a loss to global economies of USD 80 – 120 billion.

2.3.1 Landfills

Many plastics end up in landfills or uncontrolled dumping sites. Globally, the proportion of plastics in landfills has grown from 1% in 1960 to over 10% in 2005 (Jambeck et al. 2015). If current trends continue there will be 12 billion tonnes of plastic in landfills by 2050 (Parker 2017). Plastics being disposed of in this way represent leakage of material out of the economy and lost opportunities, since many plastics are recyclable. Landfills require significant resources and costs for construction and management. Consequently, it is essential for societies to minimise the disposal of material that could still be utilised. Plastics are sometimes indiscriminately dumped and littered, often ending up in natural environments, including waterbodies and oceans.

Plastics show minimal biological degradation. Some polymers may take periods of tens or hundreds of years to degrade, but their actual longevity in the natural environment remains only an educated guess (Moore 2008). However, it is clear that due to their persistent nature this means that they can accumulate and impact ecosystems, wildlife, and human health (e.g., Barnes et al. 2009; Talsness et al. 2009).

2.3.2 Incineration

Plastic is also incinerated in waste-to-energy plants, or through the combustion of refuse-derived fuel in industrial processes such as cement kilns, pyrolysis or gasification. This approach reduces the need to separate wastes, eliminates the costs associated with landfill, and allows for the recovery of energy. However, the process still leads to a loss of material out of economies, and accrues further losses in the embedded effort, resources and labour that went into creating the material. Waste to energy releases carbon, emits greenhouse gases and may result in localised air pollution if

appropriate controls are not in place. There are also concerns that due to the high investment costs of waste-to-energy infrastructure, such facilities can create a 'lock-in' effect, pushing higher-value options such as recycling out of the market (EMF 2016).

2.3.3 Recycling

As stated above, the main category of plastics is thermoplastics. These polymers melt when heated and solidify when cool, which means that plastics can be re-melted and recycled. The most common recycling approach is mechanical as opposed to chemical recycling, a process whereby the plastic is de-polymerized to its feedstock monomers (Al-Salem et al. 2009). The mechanical approach involves physical treatment to directly reuse discarded polymers into new products, of either similar or lower value application:

- Closed loops: this method minimises the loss of value of materials by recycling them into similar products, such as bottle-to-bottle PET recycling.
- Open loops: this method leads to a reduction in the value of materials by down-cycling into different products, such as turning PET bottles into fleeces.

Global recycling rates have grown since 1980 when there was negligible recycling (Geyer et al. 2017). Overall recycling rates are believed to have increased in recent years. However, there is significant disparity across countries and regions, since the ability to recycle will depend on the types of plastics, the presence of local collection services and access to markets for post-consumer material for recyclers.

2.3.4 Global Impacts on Plastics

The waste and recycling industry has become increasingly globalised, which has brought about unprecedented challenges for individual countries. Demand for recovered plastics has been dominated by a few countries, with China historically being the largest importer of plastic waste (Geyer et al. 2017). However, many shipments of waste plastics sent to China for recycling were difficult to recycle since they contained mixed plastics or were contaminated with other kinds of waste (OECD 2018). In 2013, China implemented Operation Green Fence, aimed at preventing the nation from becoming a dumping ground. This was followed by a tougher crackdown in January 2018 with the National Sword Policy, which places restrictions and exclusions on a range of materials. This policy includes quality standards on all post-consumer plastic (e.g., some individual plastic streams have a maximum contamination level of 0.5%, which means the load will be rejected if any non-target plastic or material beyond this level is present). These standards have proven very challenging to comply with, and some waste types, including mixed plastic scrap, have subsequently received outright bans from being imported into China.

Several countries, including Malaysia, Vietnam, Indonesia and Thailand initially attempted to fill the void left by China, although they could never absorb the redirected volumes. Furthermore, quality in material streams continued to be an issue, along with concerns about environmental regulation and human-health safeguards, with inadequate processes that can often result in pollution of air and rivers. Studies have shown that Asia is responsible for a large proportion of the world's annual waste inputs into oceans, which are estimated to contain 150 million tonnes of plastics (Raynaud 2014; Jambeck et al. 2015).

In recent years, there has been a global backlash regarding the poor management of plastics, with the public in many developed countries raising concerns about transferring negative externalities, in the form of waste, to the least developed countries. In January 2021, an amendment to the Basel Convention (Control of Transboundary Movements of Hazardous Wastes and Their Disposal) came into force, which sought to improve the regulation of global trade in plastic waste to prevent environmental pollution. The updated agreement means exporters of contaminated or hard-to-recycle

plastic waste will require consent from the governments of receiving countries before shipping. This update does not prevent the sale of post-consumer wastes but incentivises trade in high-quality, sorted, clean plastic waste.

These developments have radically changed the global market and the approach to waste management. China's regulations significantly impacted the markets for some waste streams, particularly mixed plastics, making them no longer economically viable. The COVID-19 pandemic also has added major impacts on the transboundary movement of wastes and markets for recyclable materials, including market prices. Many countries, which previously relied on the cheap approach of disposing their wastes to Asia, have now had to refocus approaches to waste and recycling, including developing domestic services and infrastructure.

3. PLASTICS IN LAO PDR

3.1 Manufacturing and Imports

The majority of plastics placed on the market in Lao PDR are imported in the form of pre-packaged products that are manufactured in other countries. Although there is some domestic capacity in plastic production. Plastic is also imported as virgin material for domestic manufacturing.

3.1.1 Manufacturing in Lao PDR

A total of 77 companies that are involved in the manufacturing or recycling of plastic goods are registered with the Ministry of Commerce and Industry (World Bank 2020a). It is not clear exactly what type of goods are manufactured by these companies. In a World Bank project conducted in parallel with the current study (World Bank 2020a), some of these companies were interviewed, identifying that 17 out of the 77 companies are manufacturers of drinking bottles, carrier bags, other bags and sacks, furniture, baskets, rope and cups. These 17 companies have an annual production capacity of approximately 51,000 tonnes.

3.1.2 Imports and Exports

As a landlocked country with limited processed food production and manufacturing, Lao PDR is dependent on imports to satisfy many of its needs. Lao PDR also exports a range of goods, with agricultural products and natural resources accounting for the bulk of the country's exports. Laos' main exports are wood, clothing, coffee, electricity (from hydropower), metals, corn and rubber (Trading Economics 2019). Over recent years, Lao PDR has improved its balance of trade, with a trade deficit of 0.11 billion dollars in 2019 (Plecher 2020). Laos' main trading partners are Thailand and China, as shown in Table 2. A large volume of goods from other parts of the world also enters Laos via Thailand. Lao PDR is a member of the Asia-Pacific Trade Agreement (APTA), Association of Southeast Asian Nations (ASEAN), and the World Trade Organization (WTO).

Table 2 Lao PDR Top Trading Partners [Source: Trend Economy, 2019]

Imports			Exports		
Country	**Value (USD)**	**Share**	**Country**	**Value (USD)**	**Share**
Thailand	2.91 billion	50%	Thailand	2.4 billion	41%
China	1.68 billion	28%	China	1.67 billion	28%
Vietnam	451 million	8%	Vietnam	1.05 billion	18%
Japan	118 million	2%	Japan	93 million	1.6%

In terms of plastic itself, data is limited and where data is available there is a high degree of uncertainty. Many goods imported are pre-packaged. A recent report by the World Bank suggests that at least 173 kilotons (kt) of plastic packaging and plastic products were imported into Lao PDR in 2018 (World Bank 2020a). It appears that a large proportion of these imports is rubber (128 kt), with foodstuffs being the next largest category (31.5 kt), followed by vegetable products (9.4 kt) and animal products (4.2 kt). Lao PDR also imports some plastics in the form of recycled pellets, rubber products, and construction material.

Overall trade figures in plastics and rubbers are shown in Table 3, using raw data from the Ministry of Finance and Ministry of Industry and Commerce. Unfortunately, this data does not provide a detailed breakdown of product type. As with overall exports and imports, the main plastic trading partners are Thailand, China and Vietnam.

Table 3 Import and Export of Rubber and Plastics to Lao PDR in 2018 [Source: World Bank 2020a]

Product category	Export (tonnes)	Import (tonnes)
Plastic pellets (granules)	18,302	11,672
Plastic bags	18,409	-
Rubber products	-	153,827
Other products (e.g., PVC tubes, construction material)	89,660	4,764
Total	126,372	170,263

3.2 Plastics Placed on Market

The actual volume of plastics placed on the market each year, including those across different categories of products, within Lao PDR itself is unknown. Obtaining data in this regard is extremely challenging for most countries throughout the world, since plastics come in the form of direct imports of raw material (e.g., pellets), imports of recycled pellets, manufactured domestic plastic products, manufactured domestic packaging, and pre-packaged imported goods. Added to this, is the challenge of knowing the volume of products that have been sold in any one year, and how much plastic has been disposed of to landfill or through other means. Moreover, many companies do not want to share data on their specific sales due to commercial sensitivities, such as concerns about competitive information being obtained by rival firms.

In 2020, the World Bank undertook a study into the most commonly found plastic items that are littered, by surveying hotspots across six cities in Lao PDR. This study identified that food and drinks packaging was the most littered plastic, followed by household products, other packaging, and personal care products. The survey identified the following as the top fifteen most-littered items by number, with PET, LDPE and HDPE being the most common polymers (World Bank 2020a):

1. Bottles
2. Plastic caps/ lids/ rings from bottle necks
3. Bags
4. Carrier bags
5. Cups and cup lids
6. Food containers (fast food)
7. Foam packaging/ insulation
8. Polystyrene pieces
9. Straws and stirrers
10. Cleaner bottles and containers
11. Cover/ packaging
12. Shoes/ sandals
13. Crates and containers
14. String and cord/ baskets
15. Other bottles and containers

The World Bank study has provided a valuable insight into plastic found in pollution hotspots. However, this does not present a full understanding of the types of plastics placed on the market and utilised in Lao PDR, since the focus was predominantly on post-consumer flows of plastics into environments within Lao PDR.

Clearly, there are a number of different post-consumer flows of plastics in Laos, including plastics that are landfilled, dumped, reused for other purposes than originally intended, burned and those that have existing value for recycling. Although plastic pollution of waterways can lead to serious ecological impacts, it is also important to recognise that these other post-consumer flows have consequences for human health and the environment. A systemic approach to SUP requires consideration of all these impacts.

Further studies are needed into the exact nature of plastics placed on the market in Lao PDR. In the absence of robust data, only anecdotal descriptions of the types of plastics that are sold and used in Lao PDR are available, with no quantifiable data on volumes. These main types of current single-use plastics include the following broad categories:

- Food and beverage packaging.
- Food and beverage service ware.
- Personal care products.
- Household products.
- Packaging for non-food products.
- Carrier bags.
- Business-to-business packaging (tertiary packaging).
- Agricultural plastics.
- Medical products.
- Cigarettes.

3.2.1 Food and Beverage Packaging

Drinks Bottles: Plastics are used for soft drinks and water, with alcoholic products mainly using glass bottles. The predominant type of plastic utilised is Polyethylene Terephthalate (PET). PET has become one of the most widely used, versatile and trusted plastic materials in the world due to the fact that it is lightweight, hard and strong, with good resistance to heat and chemicals, while providing an excellent barrier to water and gases. PET resins are relatively easy to recycle, and as such these polymers are being recycled on a very large scale globally, particularly clear PET that has no colours added. A large share of recycled PET is used for making polyester fibres for textiles. PET bottles also have caps with tear-off rings on the bottleneck, which are usually manufactured from High Density Polypropylene (HDPE). Bottles may also contain other plastics such as sleeves or labels, and these can also involve the use of adhesives.

Food Packaging: Plastics are widely used across a range of food applications, particularly in relation to imported processed foods, as they are considered inert and provide an excellent barrier to protect

and preserve foods. Packaging can extend the shelf life of many types of food, thereby reducing food wastage. Food packaging utilises a wide range of polymer types, depending on the specific requirements around appearance, temperature range, barrier requirements, and whether the product requires heating within the packaging itself. Food applications include soft plastics in the form of bags and films (e.g., polyethylene; polypropylene), and rigid plastics (e.g., PET for meat, vegetables, salads and bakery products; polypropylene for dairy products and ready-to-heat meals) and foam food containers and boxes (e.g., expanded polystyrene (EPS)). In many cases, food packaging designs combine plastics with other materials, such as paper and metals, which makes sorting and recycling complicated and costly. In addition, post-consumer food packaging is often soiled with food waste, which further decreases its value as feedstock for recycling.

3.2.2 Food and Beverage Service-ware

Figure 4 PET Cup

This category includes a range of disposable food ware items, which may be used by food and beverage outlets or used by people consuming food away from home. These items are usually provided to consumers to help consume food and beverage products either on-the-go or through food delivery services, providing a convenient way of eating and drinking without the need for cleaning afterwards. Consequently, the majority of these items are only used once and include:

- **Drinking straws and stirrers:** single-use utensils to facilitate drinking, which are typically manufactured from polypropylene.
- **Disposable cutlery:** knives, forks and spoons, which are typically manufactured from polypropylene or polystyrene.
- **Disposable plates:** typically manufactured from plastic, paper, or a composite of plastic-coated paper (usually in the range of 80% paper to 20% plastic). Polystyrene is the main plastic utilised for plastic plates and polyethylene (LDPE) in plastic coatings. The plastic is added to improve

functions such as water resistance, tear strength, and heat resistance.

- **Disposable cups:** similar to plates these may be manufactured from plastic, paper, or a composite of plastic-coated paper. Clear PET is also increasingly being used for a range of hot and cold beverages, including clear PET cups with dome lids for straws (as shown in Figure 4) and PET closable sip lids.
- **Takeaway food containers:** a range of plastic bags, trays, cartons and boxes may be utilised by restaurants and food delivery companies to transport food to people's homes and workplaces. Polyethylene bags are widely used by many restaurants, along with expanded polystyrene boxes, polypropylene containers, and PET boxes and trays. A small number of restaurants use biodegradable containers. However, the majority of these products require commercial composting systems that are not present in Lao PDR.

3.2.3 Personal Care Products

Creams, Liquids, Powders and Gels: This includes products for personal hygiene, such as shampoo, soaps, body wash, moisturiser, and various other creams, liquids and powders. As in many other parts of Asia, the market for these products is dominated by small single-use sachets and pouches, which keep the products fresh. The use of these single-serve applications has provided a vehicle for international brands to spread usage across new markets, using sample packs to allow customers to try their brands (Manchanda 2020). However, this has also provided a means to make the product economically viable to a larger selection of poorer consumers, who may not be in the position to buy larger quantities of product in one go. These mini pouches are not easily recyclable, as they are made of multiple layers of different materials, such as various plastics and aluminium. Rising urbanisation and disposable incomes may lead to the increased adoption of personal care products in bottle formats, which are manufactured from HDPE, LDPE or PET.

Other Personal Care Products and Accessories: This category also includes a range of other accessories and products, such as cotton swabs, cleansing pads, wet wipes, nappies, sanitary towels, lipsticks, deodorants, toothpastes, toothbrushes and hairbrushes. The majority of these products involve various types of plastic, combined with other materials. These products are extremely difficult to recycle due to the product being comprised of multiple materials. These are difficult to separate, risk cross-contamination, and raise concerns over health and hygiene. Some personal care products also utilise microbeads, which are pieces of plastic that are used in products that have the functions of scrubbing or exfoliating. At this stage, to what extent such products are used in Lao PDR is unknown.

3.2.4 Household Products

Single-use household plastics include packaging associated with cleaning and maintenance products. As shown in Figure 5, some cleaning products, such as washing powders, are sold in single sachets or pouches, similar to personal care products. Non-toxic dishwashing liquids will typically be sold in squeezable PET or polyethylene bottles. Chemical-based cleaning and maintenance products, such as disinfectant and detergents, are usually contained within HDPE bottles since this plastic provides very good chemical resistance.

Figure 5 Sachets with Washing Powders and Detergents

3.2.5 Packaging for Non-Food Products

Non-food product packaging, such as packaging for electrical goods and kitchenware, generally utilises a range of plastics and cardboard materials. The plastic component of this packaging typically involves soft plastics in the forms of bags (HDPE, LDPE) and bubble wrap, which is also manufactured from LDPE and contains air bubbles to provide additional protection. Products may also be contained within rigid packaging, which can be manufactured using PET, polyethylene, polystyrene, polypropylene, or polyvinyl chloride (PVC).

3.2.6 Carrier Bags

Carrier bags are utilised by most retailers, providing customers with a free and easy way to transport purchased goods. These bags are typically manufactured from either HDPE, LDPE or Linear Low-Density Polyethylene (LLDPE). The majority of bags utilised in shops throughout Laos are lightweight HDPE, which are extremely thin and not capable of holding much weight. Consequently, it is not uncommon for shops to use double carrier bags. Carrier bags are often one of the most visible components of litter, since they are so lightweight and easily blown by the wind or carried by currents in water bodies.

3.2.7 Medical Products

Plastics are critical to modern health care, since they are clean and efficient, and ensure resistance to microbes, eliminating the need for sterilisation. As such, they are used in a range of medical applications and equipment, including: disposable syringes; bandages; plasters; intravenous bags and tubes; pharmaceutical casings; tubes; and face masks. Since these products are only typically used once, this results in hospitals producing a large amount of waste. Due to their hazardous nature

these wastes typically require special disposal, primarily incineration, in order to avoid the spread of disease and inappropriate reuse of products.

Figure 6 Discarded Face Mask

3.2.8 Cigarettes

While many people believe that cigarette butts are biodegradable, these filters are actually made from a plastic called cellulose acetate.

3.2.9 Business-to-Business Packaging

Business-to-business packaging facilitates the protection, handling, transportation and warehousing of products sent from one business to another. This packaging, referred to as tertiary packaging, is rarely seen by the consumer, since it is removed by retailers before products are displayed for sale. An example of plastic tertiary packaging is shrink-wrap (LDPE), which is used to keep products together on pallets whilst being transported.

3.2.10 Agricultural Plastics

Lao PDR is an agrarian-based economy, employing more than 60% of the country's workforce. However, the sector's share of the GDP has fallen in recent years. In 1997 agriculture, forestry and fishing contributed 51% of GDP, falling to 15% in 2019 (World Bank 2020b). Whilst urbanisation is rapidly increasing, there are still large parts of the population engaged in agricultural work, either for subsistence or commercial purposes. Rice is the major crop for the Lao PDR, accounting for 50% of national agricultural output (ADB 2018). Other crops include vegetables, beans (mung-beans,

soybeans), maize, tobacco, cotton, sugarcane, coffee, and tea. Tree farming is another important part of Lao agricultural life, including mango, coconut, banana, jackfruit, and tamarind.

In Laos, plastics are used in a range of applications in farming, where there is a reliance on fertilisers, herbicides, pesticides and other agricultural chemicals utilised in rice, vegetables, tobacco, cotton, sugarcane coffee, and fruit production. These chemicals are typically imported from neighbouring countries, usually in plastic packaging with instructions in foreign languages, which may result in over application and, therefore, also lead to higher levels of packaging (ILO 2020). Plastics are also increasingly used to protect crops.

Fertilisers: The utilisation of chemical fertilisers in Lao PDR has been low, historically, but there is evidence it is increasing (MAF 2017). Fertiliser sacks are typically made of hessian jute, but they are now increasingly manufactured from plastic (HDPE/ PP), as this material is chemical resistant and can protect the contents against rain.

Herbicides: Historically, herbicides have been used by farmers in the upland for maize cultivation and rubber plantation, and more recently in Chinese-investment banana cultivation. The majority of herbicide brands are purchased from Vietnam and Thailand, supplied in liquid form using HDPE containers.

Pesticides: These are widely used in Yardlong beans cultivation, some legumes and vegetables, as well as dry season rice cropping. Pesticides will typically be supplied in liquid form using HDPE containers.

Protected Cultivation Films: Plastics are increasingly being used in Lao PDR in crop production and cultivation protection, in the form of plastic film mulches, row covers, netting, pipes, tunnels and greenhouses. HDPE, LDPE, and PP are the most commonly used plastics in this regard, with the use of protected films in agriculture often being referred to as plasticulture.

Figure 7 Agricultural Plastics

3.3 Waste and Post-Consumer Disposal Routes for SUPs in Lao PDR

Lao PDR is facing new waste challenges due to changing patterns in consumption and production, especially in the region including the country's capital Vientiane. Rapid urbanisation, economic development, population growth and modernising lifestyles are leading to increased volumes of waste, as well as new types of wastes.

Reliable data on waste generation and composition rates in least developed countries is limited, due to insufficient local, regional and national data collection (Shekdar 2009). The limitations in monitoring are compounded by a lack of weighbridges at landfills and dumpsites, and the fact that a large proportion of the population self-disposes of their waste.

Waste production is likely to vary significantly across different parts of rural and urban Laos. In Vientiane, the waste generated per capita in 2019 has been estimated at 0.842 kilograms per person per day (kg/capita/day), having increased at a rate of 2.5% per year since 2011 (GGGI 2020). Data in other parts of Laos is limited, although the United National Environment Programme (UNEP) suggest that the average in Laos is 0.69 kg/capita/day, which confirms that rural areas and smaller towns are typically likely to produce less waste than the capital city (UNEP 2017). It is estimated that from 2000 to 2015 waste generation in the major cities has increased by 40-60% (MoNRE 2017).

The UNEP estimate that on average ASEAN countries produce 1.14 kg/capita/day, with Lao PDR producing the lowest quantity of municipal solid waste. However, waste production rates are predicted to grow for all ASEAN countries. Sources of waste generation are principally from domestic households. Other sources include markets, offices, shops, restaurants and schools, with limited industrial wastes due to the country having a low industrial base. There is an increasing portion of wastes that are generated by foreign tourists (prior to COVID-19), with Laos experiencing a rapid increase in the number of visitors from 894,806 in 2004 to 4,158,719 in 2014 and 4,384,000 in 2019 (Tourism Development Department 2014; UNWTO 2020).

As is the case with waste volumes, the types of waste will vary throughout rural and urban Laos. Household composition of waste varies considerably by income level, with the percentage of organic matter in waste decreasing as income levels rise (World Bank 2018). Waste composition analysis undertaken in 2014 in Vientiane showed that organic waste (e.g., food waste, wood, bamboo, leaves) accounted for the highest component of household waste at 60%, followed by plastics 11%, glass at 7%, and paper at 7% (GGGI 2020). The UNEP suggests comparable data for Laos as a whole, with the average composition of municipal solid waste estimated at 64% organic, 12% plastic, 7% glass, and 7% paper (UNEP 2017). Waste composition in Lao PDR is highly likely to change with increasing economic growth. Chapter 5 sets out potential scenarios around how plastic waste may change in the future.

The main disposal routes for household and business waste involve the collection by waste management companies and subsequent disposal at landfill/ dumpsite; burning of wastes; indiscriminate dumping of wastes; and, some reuse. Some post-consumer materials, such as PET beverage bottles, are collected by the informal sector (e.g., waste pickers).

3.3.1 Landfill Disposal

Waste collection services are limited throughout Lao PDR. This is due to the lack of existing collection services and the limitations of people being able to afford to pay for these services, which are not subsidised by the government. Collection services are predominantly only found in some urban areas, although urbanisation is rapidly increasing and whilst the coverage of these services in these areas is currently limited it is increasing. Rates charged to householders for waste collection are

typically in the region of 30,000 Laos Kip per month (just under USD 4).

The Urban Development and Administrative Agency (UDAA) of each city is responsible for the collection and disposal of waste, although they may contract the services to designated private waste companies. Every province has at least one waste collection company, but the area of coverage varies considerably. The vehicle fleet for most collection services is old with limited functionality, such as the ability to collect different types of wastes and recyclables. Insufficient vehicles and equipment are often an issue when short-term contracts are given to private companies, since there is little incentive for investment.

The Vientiane City Office for Management and Service (VCOMS) is the relevant agency for overseeing waste management in the capital city, with collection services provided by ten private companies and two public agencies (including VCOMS). These services cover approximately 78% of the capital area, with an estimated 37% of households in these service areas actually using the service, which amounts to only a quarter of all the city's households (GGGI 2020). However, neighbours will often share one contract to reduce costs, so the actual number of households reached is likely to be higher than 37%.

There are a limited number of controlled landfills within Lao PDR, with only the capital Vientiane and the four secondary towns of Luang Prabang, Thakhek, Savannakhet and Pakse using them for solid waste disposal. These sites may also have incinerators for disposing of medical and other hazardous wastes.

Figure 8 Waste being Dumped at Vientiane Landfill

Other towns and rural areas have unmanaged dumps, which are often poorly sited and in the vicinity of watercourses and sensitive adjacent land uses. On the whole, landfills and dumpsites in Laos have limited environmental designs, controls and management. Costs for dumping at landfills are either non-existent or low, particularly if management responsibilities are outsourced to private companies without enforcement capacity. At Vientiane's landfill, 32 kilometres from the city, the cost of dumping is just 40,000 kip per ton (just over USD 4). The low fees at Laos' landfills make the sustainability of operations unworkable, due insufficient revenue to cover costs.

3.3.2 Collection for Recycling

There are extremely limited collection services available for recyclable plastic materials in Lao PDR. There are no formal, government-organised sorting and recycling systems. Some private companies have become established, such as Wongpanit, but these companies typically provide a limited number of drop-off points rather than formal collection services from homes and businesses. The majority of collections are made by the informal sector, through the following categories of workers:

- **Street Material Pickers:** People who pick up recyclable material from the open environment or sort through bins/bags that have been put out for waste collection.
- **Waste Collectors:** People who work on municipal waste collections or at transfer stations and are paid by private sector companies or public agencies. Whilst the collection of recyclable materials is not formally their job, these people may opportunistically sift through the mixed waste and pull-out recyclables in order to earn some additional personal income. In this capacity, these people are considered informal workers.
- **Recyclable collectors:** Self-employed people who use pushcarts or other small motorised vehicles to buy recyclables from households and businesses.
- **Landfill Pickers:** People who scavenge through waste piles at landfills, pulling out recyclable material, which is usually extremely contaminated.

The activities associated with the collection of recyclables can cause additional problems, since these recyclable items are usually commingled with general waste, requiring collectors to sort through waste bags and bins. In some cases, this results in the bags being ripped, with the contents of waste being spilled onto the streets, resulting in litter and the need for additional clean up. There are also health concerns with this practice for collectors.

The main recyclable materials that are collected in Lao PDR are clear PET plastic bottles, aluminium cans, food ferrous (steel) cans, glass, paper, cardboard, and some plastic bags. Material that is collected will either be sold directly to recyclers in Laos or to buying centres/ junk shops/ resource recovery centres. These informal collectors are subject to a daily rate, set by market prices for recyclable material. Therefore, they are exposed to sharp fluctuations in prices, and depending on wider market conditions and demand from recyclers, at times certain materials will not be purchased at all. This makes it an extremely vulnerable livelihood.

Figure 9 Baling Recyclables at the Waste Pickers Association

The companies that purchase materials may perform some initial processing of the recyclable materials, such as the removal of labels and tops on drinking-water bottles, the washing of materials, colour sorting, shredding, compacting and baling, as shown in Figure 9. Despite some activity, it is observed that there is limited value-added creation by Laos-based processors along the recyclables value chain. Recovered materials are ultimately sold and processed in recycling facilities located in neighbouring countries, such as Vietnam and Thailand, although domestic recyclers have increased in recent years (Lao PDR Government 2018).

Over the years there have been numerous projects aimed at improving solid waste management in Lao PDR. This has included projects and grants by development partners, such as the Japan International Cooperation Agency (JICA), which have provided infrastructure, vehicles and equipment for waste management, as well as developing human resources and capacity.

3.3.3 Other Disposal Routes

Plastic that is not sent to landfill or recycled will typically either be burnt outside people's homes and businesses, buried, or dumped into surrounding urban and rural environments.

3.4 Impacts of Manufacture, Use and Disposal

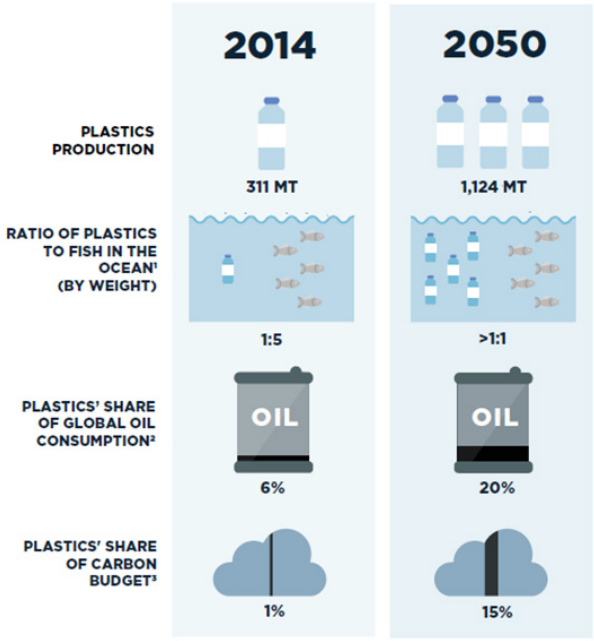
The manufacturing of plastics and the approaches to the disposal of plastics, as outlined in the previous section, can result in a number of environmental, social and economic problems. Plastics show minimal biological degradation. Some polymers may take periods of tens or hundreds of years to degrade, but their actual longevity in the natural environment remains only an educated guess (Moore 2008). However, it is clear that their persistent nature means that they can accumulate and impact ecosystems, wildlife, and human health (e.g., Barnes et al. 2009; Talsness et al. 2009). In the environment, larger pieces of plastics break down into small fragments (micro- and nano-plastics), which can easily be taken up by wildlife or ingested by humans.

3.4.1 Environmental Impacts

The manufacture and poor disposal of wastes can have an impact across all the environmental domains: air, atmosphere, land, freshwater, and marine.

Synthetic plastics are derived from crude oil, natural gas or coal. Globally, plastic feedstock utilises 6% of global oil consumption, with a greenhouse-gas footprint of 390 million tonnes of carbon dioxide equivalents, as shown in Figure 10 (EMF 2016). Global oil consumption for plastics is predicted to grow to 20% by 2050.

Figure 10 Plastic Growth, Externalities, and Oil Consumption [Source: EMF 2017]



Open burning of waste contributes to localised and regional air pollution problems (Kjellen, 2001). The burning of plastics present in municipal solid waste can lead to the release of toxic substances including Dioxins, Furans, Mercury and Polychlorinated Biphenyls (Verma et al. 2015).

When rain falls on landfills and dumpsites the water that passes through the waste can become contaminated with metals, oils and organic compounds. This leachate can lead to the pollution of groundwater, and surface-water contamination of rivers, wetlands and agricultural areas, particularly during the rainy season (McFarlane et al. 1983). Conversely, in the dry season dumped waste has the potential to cause fires, leading to habitat loss and danger to surrounding towns and villages.

The accumulation of macro and microplastics in terrestrial and aquatic environments are of concern because of their persistence and threat to ecosystems and wildlife. Plastics can lead to the entanglement, ingestion, choking, and starving of wildlife (Barnes et al. 2009). Microplastics have become a particular emerging environmental and health issue, due to their ability to bioaccumulate through the food chain, potentially resulting in detrimental ecotoxicological implications for the health of aquatic organisms and humans (Wang et al. 2019).

3.4.2 Social and Cultural Impacts

Traditionally, many people in Laos lived a subsistence lifestyle, with most waste being of organic origins that naturally degraded. The process of urbanisation and a shift to consumer lifestyles is leading to an increase in imported and manufactured plastic products and packaging. Plastics have undoubtedly made a major contribution to the modern world, transforming peoples' lives across a wide range of areas, from providing a way of keeping food fresher for longer to developing clean and safe medical products. Plastic in itself is not necessarily a problem, but the approach to how societies use and dispose of this material can lead to a range of health and quality-of-life impacts for people.

The burning of wastes can be detrimental to the health of people, through the inhalation of suspended particulates, including carbon monoxide, nitrogen dioxide, and sulphur dioxide, as well as a range of toxic gases. As such, the burning of solid waste has been associated with incidences of respiratory

health ailments such as asthma and emphysema, has the potential to increase incidences of heart disease, and can lead to rashes, nausea, headaches and damage to the central nervous system (Surijadi 1993; Broadi and Markku 2005; Verma et al. 2015).

Some wastes can become a breeding ground for pathogenic organisms, leading to the spread of infectious diseases. Plastic wastes, such as containers that hold water, can provide breeding grounds for mosquitoes, which transmit malaria (Reiter and Sprenger 1987; McMahon et al. 2008). Discarded waste can also become a nesting-ground for a range of other insects and rodents, which have the potential to transmit disease through food contamination (Broadi and Markku 2005).

Certain plastic waste containers, such as agrichemical packaging, may contain residue of hazardous material that is highly toxic, mobile, persistent and bio-accumulative. Therefore, indiscriminate dumping, burning, or reuse of these containers in homes may have both short and long-term health effects as well as impacts on ecological systems (Grisham 1986; Misra and Pandey 2004).

In addition to health effects, littering and dumping of waste in communities and surrounding environments reduces aesthetic qualities. The presence of large volumes of waste around homes can reduce people's quality of life and well-being.

3.4.3 Economic Impacts

The manufacture, use, and disposal of plastics can be both beneficial and detrimental to economies. In terms of the benefits of the material, there is a range of examples where plastics have helped inspire innovations and solutions that could not have been undertaken using other materials. For example, plastics provide an excellent barrier to preserve foods, thereby extending shelf lives and reducing food wastage. Plastics also can help save costs associated with energy: being efficient to manufacture, lower costs associated with the transport of goods and logistics, and being extremely lightweight compared to other packaging materials.

End-of-life plastics typically result in costs to society, as opposed to benefits. The fact that plastics are cheap to produce means that post-consumer material has limited value, which means that they are readily disposed of with little consideration.

The collection, transportation, processing and disposal of waste plastics are costly activities. However, the majority of these costs are not usually born by the manufacturers or direct users, but by society as a whole. This distribution of costs and benefits serves to encourage the excessive use of plastics and offers manufactures no incentive to consider recyclability.

The introduction of infrastructure and services for recycling plastics typically requires high upfront investment costs with long payback periods as well as budget requirements for ongoing operations and maintenance. These infrastructure requirements may include sorting machinery, plant for cleaning and decontamination of plastics, and plastic extruders. Collection services will require a range of vehicles, equipment and machinery. Furthermore, in order to ensure high collection rates then awareness raising programmes are necessary, which can be costly to implement and require commitment over long timeframes. It is essential that adequate consideration is given to investment across all three areas of infrastructure, services, and awareness raising. There is limited ability for the private sector to invest in these areas within Lao PDR.

Waste collection has high service costs and landfills are expensive to construct and manage. Recyclable materials, such as drinking-water bottles manufactured from PET, are a resource that can be turned into new products. These materials take up unnecessary space in landfills, adding to the costs and resources required to manage these sites. Landfilling of plastics represents a leakage of material out of the economy, losing opportunities for further processing and use.

Littered environments can have significant and long-term adverse impacts on local businesses, property prices, and community development, and this holds back economic growth.

Indiscriminate dumping and littering of waste plastic also result in direct costs of clean up, increases in maintenance costs for sewage and drainage systems, roadways in urban and rural areas, and a decrease in other values. Internationally, the presence of litter on streets has been shown to decrease property values, and litter in commercial areas can lead to a reduction in sales as shoppers are averse to visiting degraded environments (Skogan 1990; Schultz et al. 2013).

Inappropriate disposal, such as burning and dumping in open environments, may lead to additional costs for health treatment. These costs would include higher incidences of respiratory disease, along with additional medical requirements for the treatment of infectious disease that are spread by pathogenic organisms living in waste.

Tourism produces a substantial amount of waste, often producing more than local residents, putting huge strains on what are often inadequate waste management systems. Although, there has been limited research on tourism and waste in Lao PDR, global studies offer an indication of the potential problem and cost implications.[2] The Asia-Pacific Economic Cooperation (APEC) estimates that the direct costs of ocean plastics to the tourism, fishing, and shipping industries are US 1.3 billion dollars per year in the Asia-Pacific region alone (UNEP 2014).

Figure 11 The Plastic 'Verge' on Laos' Roads

2 A report by the World Wide Fund for Nature claimed that in the Mediterranean region tourists result in a 40 percent surge in marine litter during the holiday season, of which 95% is plastic (WWF 2018). In addition to producing waste itself, the tourism industry can be negatively impacted economically by plastic pollution. Cleanliness is increasingly seen as an important factor in people's decision of where to visit. A study in South Africa showed that the high levels of litter on beaches deterred 40 percent of foreign tourists and 60 percent of domestic tourists from returning for subsequent visits (Mouat et al. 2010).

4. CURRENT POLICIES AND APPROACHES IN LAO PDR

4.1 Responsibilities

The Ministry of Public Works and Transport (MPWT) and the Ministry of Natural Resources and Environment (MoNRE) have the main responsibility for policy around municipal solid waste management. The Department of Housing and Urban Planning (DHUP) of the MPWT, has overall responsibility for urban planning and development.

MoNRE's responsibilities for environmental issues associated with solid waste management includes pollution control. MoNRE is responsible for coordinating and conducting research, formulation of plans on management and use of natural resources, and to perform a coordination role in the protection of the environment in collaboration with sector agencies and local administrations.

The legislative basis for waste management in each city and area is by provincial decree, which allocates the scope of work and sets any fees. The Urban Development and Administrative Agency (UDAA) of each city is responsible for the collection and disposal of waste.

Other Government agencies and departments that have some responsibility for guidance on waste legislation include: the Ministry of Public Health (Department of Hygiene and Diseases prevention); the Ministry of Industry and Commerce (Department of Industry); the Ministry of Agriculture and Forestry (Department of Agriculture); and the Ministry of Energy and Mines (Department of Mines).

4.2 Sustainable Procurement and Consumption Policies in Lao PDR

Lao PDR's policy framework and long-term vision documents have an increasing focus on green growth, with the recent National Green Growth Strategy providing a real step change in this area. However, Lao PDR is still in the early stages of policy development in this area, and a tangible and realised shift towards circular economy approaches is still yet to be demonstrated.

4.2.1 Socio-Economic Development Plans

The ten-year Socio-Economic Development Strategy for 2016–2025 emphasises inclusive and sustainable growth as being the way forward (Lao PDR 2016). The Lao PDR 8th National Socio-

Economic Development Plan (NSEDP) 2016-2020 emphasised the three pillars of the Green Economy including inclusive growth, investment in human development and protecting the environment as priorities in its transition from Least Developed Country (LDC) status (Lao PDR 2016). The latest plan, the current 9th NSEDP (2021-2025), puts an increased focus on green growth and climate change actions including:

- Promoting priority sectors (which includes nature-based tourism) with green growth potential.
- Reducing dependency on the natural resource sector by taking circular economy approaches that employ reduction, reuse, and recycling.
- Promoting holistic industrial development and use of by-products.
- Promoting alternative packaging (such as cotton bags, banana leaves) over single-use plastics for consumer goods, and promoting environmental-friendly behaviour in this regard.

4.2.2 National Green Growth Strategy 2030

In February 2019 the Government of Lao approved a National Green Growth Strategy 2030 aimed at strengthening the balance between economic expansion, environmental protection and social development to ensure the maintenance of high, stable, sustained and durable economic growth. Green growth in Lao PDR has been determined as:

"National Green growth of the Lao PDR means the economic growth, poverty reduction and raising of living standards of the people in a comprehensive, inclusive and equitable manner by raising the efficiency, effectiveness and sustainability of the utilization of limited natural resources to ensure optimal benefits, decreasing the pollution, wastes and greenhouse gas emissions as well as minimizing the risks and vulnerability of the economy to natural disasters and global economic uncertainties."

The Strategy recognises the developments that Lao PDR has made in economic growth in the past decade, but also notes that this has been achieved through the unsustainable use of resources. This unsustainable use has resulted in a range of impacts including the degradation of the urban environment from a number of factors, including solid waste, resulting in a gradual decrease in the quality of living conditions of the people in the urban areas.

The Strategy addresses economic, social, and environmental pillars, with objectives that seek to: improve living standards; create jobs and income-generating activities; be inclusive and reduce poverty; achieve sustainable use of resources; reduce vulnerability to natural disasters and global economic uncertainties; and decrease emissions, pollution, and waste.

The relevant focus areas of the Strategy include developing the industrial sector and promoting manufacturing industries (e.g., food and beverage), and implementing financial mechanisms to help entrepreneurs utilise material-saving technologies, including recycling. The Strategy notes the issues with domestic trade, such as markets, that use large amounts of plastic bags, highlighting the need to shift to degradable packaging. From an urban development perspective, the Strategy seeks to improve waste management systems to make them more efficient and effective by developing peoples' awareness around disposal, reuse, and recycling. It also seeks to improve the financial mechanism of waste management, and aims to build and improve infrastructure. This approach includes encouraging and promoting domestic and foreign investment in waste-related business activities, in order to reutilise wastes, decrease the use of resources, and create jobs.

4.3 Solid Waste Management Policies

The development and implementation of policies, legal instruments and mechanisms relating to waste management and pollution control are still relatively new in Lao PDR. A specific legal

framework in Lao PDR on solid waste management is lacking, and the roles and responsibilities of different government agencies are not clearly defined horizontally or vertically in order to provide the necessary technical, financial, institutional, cultural and social interventions required for an integrated approach to waste management.

However, there are a number of laws and regulations relating to waste, which are detailed in the next section. Waste management is considered in many key institutional frameworks and legislation, including the Environmental Protection Law (1999) and the National Socio-Economic Development Plans. Nevertheless, in most cases, policy statements around waste management are broad, with few tangible actions and robust targets. There is no official definition of municipal waste in Lao PDR (Borongan and Okumura 2010). Currently, two key pieces of waste legislation are under preparation: the Ministerial Declaration on Pollution Control and the Decree on Solid Waste Management (MoNRE); and, the Draft Decree on Municipal Solid Waste Management (MPWT).

A major constraint on the development of waste infrastructure and services is the availability of sustainable finance mechanisms. Waste management requires significant investment to develop a comprehensive waste management system for the collection, transportation, processing, recycling, and final disposal of wastes. Although foreign assistance has provided some investment in various parts of the country, the inability to sustain this over time often leads to neglect in infrastructure, operations and services. These inabilities stem from a variety of challenges including lack of capacity at individual and institutional levels, inconsistent revenue streams, limited operational budgets, and poor maintenance of machinery and equipment.

There is inadequate available financing from central funds and a lack of any financial contribution from polluters, with additional challenges in respect to fee structures for collection and landfilling. Public/private enterprises are not given the proper mandate in accordance with the law, or not given sufficient budget to enable them to function in accordance with the law (ADB 2012; Aphaylath 2015). Lao PDR is a signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. In early 2019 the Convention was amended by consensus to improve the regulation of global trade in plastic waste to prevent environmental pollution.

4.4 Relevant Legislation

Table 4 outlines the current legislation relevant to the sustainable consumption and production of single-use plastics.

Table 4 Legislation Related to Waste Management and Recycling in Lao PDR

Legislation	Key Relevant Details
National Constitution, 1991	Article 17 states that all Lao citizens must protect the environment and natural resources.
Environmental Protection Law, 2012	Specifies necessary principles, regulations and measures for managing, monitoring, restoring and protecting the environment in order to protect human health, including the protection of natural resources and the richness of nature, and to ensure the sustainable socio-economic development of the nation. Relevant Articles include: • Article 4: "Waste means objects, chemical substances or anything that persons or legal entities do not want and cannot recycle such as used oil, rubbish, wastewater and others, which are toxic or non-toxic."

Legislation	Key Relevant Details
	• Article 38 Waste Disposal: "Disposal of general wastes, particularly rubbish, shall be separated for different purposes such as recycle, reuse, reprocess as new products and elimination with methods and techniques within identified areas based on regulations." • Article 47 Environmental Information Services: "The natural resources and environmental sector shall develop the systems for environmental information management and services to ensure the public information provision based on regulations. Persons, legal entities and organizations shall be able to access environmental information." • Article 52 Obligations of Natural Resource Users: "A natural resource user shall fulfil these obligations: 1. Using natural resources with economical, rational, effective and sustainable manners." • Article 68 General Prohibitions: 4. "Burn, bury, dispose and demolish wastes, release and discharge wastewater into canals, rivers, natural water sources or any sites without treatment based on the technical standards."
Law on Hygiene, Disease Prevention and Health Promotion, 2001	The Law on Hygiene, Disease Prevention and Health Promotion "has the function to determine the principles, regulations and measures relating to the organisation of activities on hygiene, disease prevention and health promotion to maintain the good health, quality of life and longevity of the people thus contributing to national preservation and development." Relevant Articles include: • Article 11. Community Hygiene: "All persons in a community have the obligation to dispose of solid and liquid waste, and to preserve the cleanliness of water sources, water for drinking or use, roads, drains and public places, in order to avoid the occurrence of disease and ensure orderliness and beauty for their own health and the health of the whole society." • Article 14. Hygiene of Buildings: "… Solid and liquid waste shall be regularly disposed of." • Article 19. Hygiene in Production: "Hygiene in production refers to ensuring conditions and standards in the production of consumption goods to avoid the spread of germs and toxic chemicals which could be hazardous to consumer health, especially in relation to goods for daily consumption, children's toys and cosmetics. Individuals and organisations producing the above-mentioned consumption goods shall comply with technical standards for production, waste disposal management techniques and principles of hygiene in order to avoid hazards to human health and the environment. It is forbidden to release waste, chemicals or wastewater from factories, including other production sites, into water bodies or elsewhere without undergoing treatment." • Article 22. Hygiene of Markets: "….a system for wastewater disposal, a system for waste storage and disposal." • Article 47. Fines: "Persons or organisations will be fined in the following cases: … 2. Persons disposing or releasing waste, animal carcasses, or chemicals into streams or rivers, in public parks or roads, or in other places;"

5. CHANGING CONSUMER HABITS, TOURISM AND TRAVEL

5.1 Overview

Lao PDR is currently in a period of significant economic and social transformation through economic development, urbanisation, lifestyle changes, and increases in standards of living. Traditionally Laos had a rural population, however, there has been rapid urbanisation in recent decades. Lao PDR's share of the urban population in the total population is currently estimated at 36% and is expected to continue to grow (Statista 2021; World Bank 2021). Although, many of Laos' traditions and cultures remain intact, the country is being increasingly exposed to global products, new retail channels, increasing numbers of foreign tourists (prior to COVID-19), and higher levels of domestic travel and tourism. In recent years, there have been high levels of domestic and international investment in infrastructure and development, resulting in the construction of Laos' first highway and railway, as well as urban development in the form of new shopping malls and other retail outlets.

This section looks at how these changing economic and social conditions in Lao PDR may impact the volume and types of single-use plastics, along with the additional implications for waste management. This section also includes a special report on how the COVID-19 pandemic is having an impact on single-use plastic consumption and plastic waste management.

As detailed below, these social and economic changes may have the potential to result in increased volumes and types of plastics associated with:

- Tertiary plastic packaging (business-to-business).
- Packaging for processed foods sold in supermarkets.
- Packaging for perishable goods sold in supermarkets.
- Food and beverage containers for home-food deliveries.
- Personal protective equipment, including facemasks.
- Packaging and products for the growing domestic and international tourism sector.[3]
- Food and beverage containers consumed whilst travelling on Lao PDR's new travel infrastructure.
- Food and beverage containers, and other packaging, associated with cultural events and night markets.

3 International travel and tourism growth will be subject to restrictions being lifted after the COVID-19 pandemic.

5.2 Consumer Habits and Retail Channels

5.2.1 Overview

Consumer habits and the way that products are sold have a direct impact on plastic volumes and types, particularly in relation to packaging. Consequently, in developing policies for single-use plastics, it is critical to attempt to understand future trends and changes in these areas. From a consumer perspective, product choices and shopping habits will depend on a range of social, economic and cultural factors including standard of living, changes to labour market structures, rising incomes, purchasing power, and urbanisation.

Southeast Asia is gaining momentum and being targeted as an attractive market to regional and global companies, particularly because of the growing populations, stable economic growth, growing consumer confidence, and increased incomes (Nielsen 2019).

Aside from anecdotal accounts of changes occurring within Lao PDR itself, there have been only limited in-country studies on changing consumer habits and marketing channels. Consequently, only trends in neighbouring ASEAN countries can be drawn upon, even though it must still be noted that this is not a homogenous region and each country has its own unique characteristics with markets that are at different stages of maturity and differing consumer needs. Nevertheless, the following sections describe some key changes that appear to be occurring within Lao PDR, including shifts away from traditional wet markets, the rise of supermarkets and convenience stores, and an increase in e-commerce and home deliveries.

It is also important to note that this section is not intended to be a thorough analysis of consumer trends, but more to provide an overview of potential changes and the impact that these may have on plastic volumes and types.

Product choices and marketing channels will impact the type of packaging that is utilised by manufacturers and retailers, who naturally have the ultimate aim of selling their products as effectively and efficiently as possible. Packaging is a key part of most offerings, providing a means of transporting, protecting, preserving, displaying, handling and using products, across all stages of the products life from manufacture and retailing to the end consumer. Packaging is the first thing that customers see and can heavily influence their buying decisions.

Figure 12 Packaged Meat and Fish Products

5.2.2 The COVID-19 Pandemic

The global COVID-19 pandemic has had a strong impact on countries in Southeast Asia and, at the time of writing, the region is still attempting to reduce the spread of the virus and to protect people's health. Efforts to contain the public health crisis, including lock-downs and mobility restrictions, have disrupted economic activities and impacted livelihoods, especially in low-income households. The pandemic has also led to an increasing use of plastics, especially for single-use items, and burdened already over-stretched waste management systems. For example, China is estimated to have produced 108 million tonnes of plastic waste in 2020, up from around 60 million tonnes annually before the pandemic (Benson et al. 2021). Meanwhile, plastic waste generation in Thailand increased from 5,500 tonnes per day before COVID-19 to 6,300 tonnes in May 2020 (Böll 2021).

The increase in plastic waste generation is mainly due to the following reasons:

- Increasing use of personal protective equipment (PPE), much of which is made of or contains plastics. For example, in Malaysia medical waste, including PPE, gloves, and virus test tools, surged sharply in the first half of 2020, increasing by 27% in March compared to the previous month; by another 31.5% in April; and, by 24.6% in May (Böll 2021). Medical wastes can be contaminated and need to be handled safely, often requiring incineration. In addition, they are often made of material combinations that are hard to separate and recycle.
- Increasing use of home delivery services during lockdowns, which often use plastic packaging. This trend has been particularly strong for food and beverages, especially ready-made meals, which are commonly packed in plastics. A consumer survey conducted in Asian countries in 2020 found that online spending on food had increased by up to 70%(McKinsey 2020). Containers that have been used for ready-made food are often greasy and are, therefore, not so attractive for recyclers.
- Decreasing acceptance of reusable items due to concerns about spreading the virus, especially related to food and drinks. Some cafe chains, including Starbucks, have decided to no longer allow customers to bring in their own coffee cups.
- In addition to increased consumption of single-use plastic and a higher generation of plastics waste, the pandemic has had a negative impact on waste management and recycling, especially in the following areas.
- Decreasing demand for recycled plastic due to low oil prices: In 2020, movement restrictions introduced by governments to reduce the spread of the COVID-19 virus led to a sharp fall in the price of oil. Cheaper oil led to falling prices of virgin plastics, making it difficult for recycled plastics to compete. According to market analysts, in August 2020, recycled PET plastic was around 90% more expensive than new plastic (Reuters 2020). Some Asian recyclers have reported that their business has shrunk by half. In 2021, oil prices have rebounded but it will likely take time for the plastics recycling industry to fully recover, especially for small enterprises.
- Reductions in people utilising waste collection services: COVID-19 has severely impacted the livelihoods of many people, particularly those who work in tourism and the hospitality sectors. Although no formal studies have been undertaken on the impact on waste collection schemes, anecdotally it appears that some people may be resorting to improper disposal (e.g., burning and dumping) of their wastes, as households readjust their spending following the loss of income.
- Disruption of informal waste collection: The informal sector plays an essential role in waste collection in Southeast Asia, particularly in the collection of recyclables. These waste workers, who are already marginalised and working under challenging conditions, often saw their livelihoods deteriorate during COVID-19-induced lockdowns, when they faced difficulties in collecting waste items for income (IFC 2020). Waste collectors' drop in income was made worse by the falling prices of recycled plastics.

5.2.3 Wet Markets

Wet markets have been a pillar of Laos culture for a long time, forming the hub of many communities. These traditional methods of food distribution are characterised by short supply chains, typically involving localised production, sourcing, retail and consumption. As such, wet markets contain numerous small family-based vendors, who typically sell a range of predominantly domestically produced perishable, un-processed goods including fresh meat, fish, seafood, fruit and vegetables. Many markets also have sections that sell non-perishable goods, including some processed staple foods, clothes, fabrics, electronics, household and personal care products.

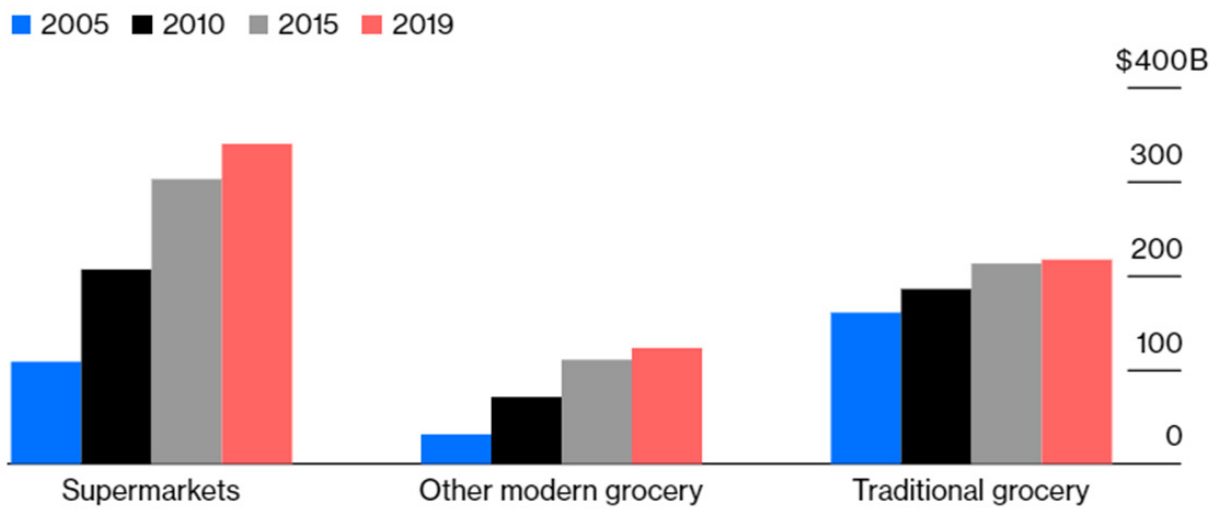
Produce is typically transported by vendors to the markets in basic containers or simply on the back of vehicles, and then placed on display in markets with limited cover over raw foodstuffs. Fans are often used to keep flies and other pests away from fresh produce, with ice and water used to keep meat, fish and other foods from spoiling (hence the term wet market due to the wet floors that are typical in these markets).

Traditionally, once most goods were bought in the wet markets, they would have been wrapped in banana leaves or carried in baskets made from natural resources. In rural areas, some of these natural products may still be used, but increasingly throughout the country there has been a shift to plastic bags, which are usually of low quality. Yet whilst these bags offer customers an easy and cheap way to take their purchases home, they are unintentionally increasing waste pollution and posing broader environmental health concerns.

Phytosanitary measures (regarding plants) tend to be weak, especially in wet markets, something that has been further highlighted during the COVID-19 pandemic. Concerns about the spread of animal-borne diseases and viruses may contribute to an increase in plastics use, particularly in the use of flexible packaging to improve food safety (Food Safety Magazine 2020). The use of plastic containers to transport food to markets, along with various films to cover produce while on display may also increase. However, these changes would typically be in response to tighter regulations around food handling and distribution practices, which at this present time are fairly limited in Lao PDR.

In many parts of the world, including Asia, wet markets are in decline, increasingly being displaced by supermarkets and convenience stores. Although there is little hard evidence of this occurring in Lao PDR, studies in neighbouring countries show that wet markets are losing ground to alternative retail outlets. In China, whilst wet markets have actually grown in the past 15 years due to an increasing population, they have failed to keep relative pace with other outlets, as shown in Figure 13 (Fickling 2020).

Figure 13 Retail Channels in China



5.2.4 Supermarkets and Convenience Stores

Historically, supermarkets have not been present in Lao PDR in any great number. Small family shops have been the main retail channels for non-food and non-perishable products, along with some basic dried foodstuffs and beverages. However, supermarkets and convenience stores are becoming increasingly dominant distribution channels for food, beverages and non-food products throughout the Asian region (Baker and Friel 2016). There has been particular growth in convenience marketing channels across Southeast Asia, demonstrated by an increasing number of visits to mini-markets and convenience stores (Nielsen 2020). This is seen as a response to urbanisation, with busier lifestyles and longer amounts of time spent travelling to and away from home, leading to an increased desire for convenience with respect to eating and drinking.

The rise of supermarkets has been experienced through successive waves in many other Asian countries, such as the Philippines, Korea, Thailand, Indonesia, China and Vietnam. The trends display patterns of convergence, with the switch initially occurring in the big cities, targeting rich consumers, with a focus on processed and bulk staples. In time, this moves into smaller cities and towns, to middle and poorer consumers, and into fresh and perishable foods. Although Lao PDR does not have the market size of many neighbouring countries, it appears that similar trends are occurring, with larger stores becoming increasingly dominant players in food retail. In recent years there has also been an increase in the construction and opening of new shopping malls, supermarkets, and convenience stores, with investment coming from China, along with Japan, the Republic of Korea, Thailand and Malaysia, with a primary focus on Vientiane Capital (Fong 2016).

Unlike the short supply chains associated with wet markets and family stores, these new methods of food production typically involve complex, regionalised or globalised networks. This involves many actors across long supply chains involving a wide variety of processed and semi-processed foodstuffs, and non-perishable goods. Improved economies of scale within larger supermarkets, along with stronger purchasing power and links to international corporations, will likely lead to a substantial increase in the variety of products that are available in Lao PDR. The fast-moving consumer goods sector particularly targets fast-growing Asian markets (PWC 2016).

Figure 14 Packaged Fresh Produce in Laos

Although this has expanded consumer choice, these products will predominantly come from foreign countries and will be pre-packaged. This limits the ability for Lao PDR to influence the nature and type of packaging as well as increasing the issues associated with end-of-life disposal. Many processed food and drinks products, such as soft drinks, confectionery, savoury snacks, and processed meats and fish use plastics for packaging. In some cases, this packaging is multi-layered, containing a variety of types of plastics along with other materials, making separation and recycling extremely challenging.

Supermarkets will also sell a range of perishable, un-processed goods including fresh meat, fish, seafood, fruit and vegetables. In the interests of maintaining profits and ensuring cost-effectiveness, supermarkets will have a high interest in avoiding food wastage. Consequently, this will require increased levels of packaging to ensure freshness, improved sterilisation, tracing and recall, as well as extending and maximising shelf life.

When compared to many westernised countries, Southeast Asian countries currently have much lower consumption of flexible and rigid packaging for fresh produces, such as rigid meat trays and films for wrapping vegetables. However, the increase in supermarkets, along with higher demand for convenience foods, may lead to an increased use of rigid trays and films. Indeed, as shown in Figure 14, there is already a move towards packaging fresh produce for convenience and freshness, using rigid plastic trays and soft plastic films.

In terms of non-food products, many household and personal care products (e.g., washing powders and shampoos) are sold in Southeast Asia in single-serve packaging, usually contained within small plastic pouches that keep the products fresh for long periods of time. This marketing approach has allowed international brands to easily target new markets, allowing customers to sample their products (Manchanda 2020). It has also made the products more economically accessible to a larger section of consumers, that is people who may not have enough disposable income to buy larger bottles and packs. These mini pouches are not easily recyclable, as they are made of multiple layers of different materials, such as various plastics and aluminium. Although, these materials may be recyclable on their own, these products are extremely hard to sort and disassemble.

With the rise in demand for convenience, there may also be further implications for single-use plastics with an increase in purchasing and use of disposable products. The increase in health awareness is also likely to have an impact. Two examples in this area are disposable baby nappies and disposable face masks. The markets for disposable nappies, feminine hygiene items, and incontinence products are continuing to rise throughout the Southeast Asian region, with increasing investment by both local players and multinational companies (McIntyre 2019). The Asia-Pacific region is predicted to hold the largest global share of the market in these products by 2025, with growth occurring at a faster rate than other parts of the world (Inkwood Research 2017).

Nappies are made from a variety of materials, including various plastics, and in a household that uses these disposable products they can make up 50% of the entire household waste (Ajmeri 2016). As a result of the COVID-19 pandemic, the use of face masks has increased in an attempt to limit the spread of the virus (along with other plastic-based products, such as gloves and bottles of hand sanitisers). While an essential commodity, and one that is likely to be required for some time to come, disposable face masks are leading to the release of microplastics into landfills and marine environments (Dharmaraj et al. 2021).

5.2.5 E-Commerce and Home Deliveries

In recent years, Asia has experienced incredible growth in online purchases and deliveries, particularly in food but also in other household goods. This growth in the digital economy has also been greatly accelerated due to the COVID-19 pandemic. Research shows that the pandemic is hastening the development of digital ecosystems, in which consumer goods companies are partnering with food delivery services and online marketplaces (Yendamuri et al. 2020). A study of 8,600 consumers

in six Southeast Asian countries (not including Lao PDR) found that while 47% of consumers had decreased traditional offline purchases, 30% had increased their online spending (Bain & Company 2020). Essential goods, such as fresh or packaged groceries, accounted for many such purchases. Beyond the pandemic, this trend is set to continue, with 83% of consumers stating that they will continue to rely on e-commerce after the crisis ends.

Lao PDR is considered to be at the frontier of growth over the next few years with respect to online purchases of food and drink (PWC 2016). Indeed, the country, particularly Vientiane, is experiencing rapid technological innovation, with the COVID-19 pandemic significantly changing the way people view and use information technology for online purchases (Homsombath 2020).

Take-away food is not a new phenomenon in Lao PDR, with some restaurants having offered food deliveries for some time, along with a few local food delivery companies. However, the growing presence of large home-delivery companies is a sign that things are changing.

Food Panda, an international food order and delivery service offered through a mobile phone app, launched in Laos towards the end of 2019. Since then, it has increased its presence significantly and it is now present in 9 of the 17 provinces in Lao PDR. During the onset of the COVID-19 pandemic, it was estimated by Food Panda and Go Teddy (another home-delivery company) that online orders had grown from approximately 100-200 per day to up to 2,000 per day (Homsombath 2020).

This growth in online purchases is not just for food, there is also an increasing range of household products being advertised online and delivered directly to homes. The growth in online purchases is closely connected to smartphone use and internet penetration. The annual global digital overview report for 2020, has shown that 79% of the population in Lao PDR now has a mobile phone (an increase of 1.3% from 2019), with internet penetration at 43% (an increase of 6.5% between 2019 and 2020) (Yap 2020).

The increase in both food and non-food deliveries will have implications for packaging. Non-food deliveries are likely to involve primary packaging (packaging in direct contact with the product to protect/ preserve/ contain/ inform the consumer), secondary packaging (used for branding and display purposes – e.g., boxes to contain a smaller number of products), and tertiary packaging (which facilitates protection, handling and transportation of products – e.g., business-to-business packaging).

Food deliveries result in higher levels of packaging to transport food than when people eat at restaurants. The particular methods of packing food are chosen by individual restaurants, even when delivered by the main food delivery companies. Restaurants will typically choose the most cost-effective method, which often involves plastic bags (LDPE) tied with rubber bands, polystyrene boxes (EPS), small plastic rigid pots and containers (PET/ PP), and disposable cups (PET or laminated paper) with straws (PP).

Some restaurants have shifted to more environmentally friendly packaging, such as compostable boxes. These are typically restaurants that cater to tourists or have a strong expatriate customer base. Whilst the intentions for changing packaging must be applauded, these packaging products are not always as environmentally friendly as they are initially perceived. Many compostable containers take more energy to produce than their plastic counterparts and require separate collections and commercial composting facilities, which are not present in any great number in Lao PDR. However, in the short term, these changes may be as much about signalling intent as opposed to actually reducing the carbon footprint. The challenge is to ensure that wider uptake occurs throughout all restaurants in the country and that the packaging and collection/ processing systems are flexible and aligned.

Figure 15 Discarded Takeaway Containers

5.3 Tourism, Travel and Cultural Events

5.3.1 International and Domestic Tourism

Lao PDR's tourism sector had been growing rapidly prior to the COVID-19 pandemic. The World Tourism Organization states that in 2019 there were 4,384,000 international tourist arrivals, a 16.3% increase from 2018 (UNWTO 2020). In 2019, tourism accounted for 13% of GDP and 13% of Lao PDR's total employment, and international tourism receipts in 2019 that totalled over USD 900 million (Government of Lao PDR 2021). The ADB cites tourism as having a larger impact, reaching an all-time peak of 4.79 million international visitors, with receipts of USD 934 million (ADB 2020).

Analytical work undertaken by the World Bank suggests that Tourism has the potential to be the number one foreign exchange earner and the biggest rural employer in Lao PDR (World Bank 2019). The country is highly desirable as a tourist destination due to its rich natural and cultural heritage, friendly people, attractive landscapes, globally significant biodiversity, and large parts of the country designated as protected areas.

Since March 2020, COVID-19 has paralysed tourism as countries closed their borders, suspended commercial aviation, restricted domestic travel, and implemented other restrictive measures. In Lao PDR this appears to have had a devastating impact on tourism enterprises, particularly those that predominantly serve international guests, resulting in closures and reductions in employees (ADB 2020). It remains to be seen how quickly tourism will bounce back and how restricted international travel will be over the next few years.

Enterprises that target domestic guests have been more resilient, with domestic travel having been stimulated following the end of Lao PDR's lockdown in March/April 2020. Anecdotally, it appears that

many more Lao people are travelling to other parts of the country, with some leaving their hometowns for the first time in their lives to explore the towns and rural areas of their country. Local travel has been boosted further with the opening of the first section of the China-Lao Expressway, which has resulted in a surge of domestic travellers from Vientiane to Vang Vieng and other areas north of the capital. However, this domestic travel has been curtailed by Lao PDR's subsequent lockdown.

While tourism brings revenue, investments, and employment opportunities to the region, it also brings waste and additional strain on local infrastructure and services. Various studies show that there is a wide variation in the volume of waste generated by tourists, typically ranging between 1 to 12 kilograms per guest per day, although in Lao PDR this waste is likely to be towards the lower end of the scale (ISWA 2015). The types of plastic waste typically produced by tourists include packaging associated with food and beverages (e.g., drinking-water bottles, soft drinks bottles, straws, stirrers, cutlery and food containers), and personal care products (e.g., cotton buds, shampoos, toothbrushes and toothpaste).

Many tourist areas, particularly in rural locations, do not have the infrastructure and services to cope with the excess waste from tourists, with local governments lacking the necessary funds to invest in the development of waste management. This can result in challenges for waste collection, diversion of recyclables, and pollution impacts from poorly constructed, located, and managed waste dumps. The experience of other nature-based tourist destinations throughout the world demonstrates the importance of good environmental management as being a key ingredient for sustainable growth in this sector (World Bank 2019). Consequently, as tourism develops in Lao PDR it is essential that investment and consideration is given to waste management, protecting local populations and the environment.

5.3.2 Travel

In December 2020, the first phase of the China-Laos Expressway opened between Vientiane and Vang Vieng. The subsequent phases of construction will link to Luang Prabang, with the final Expressway providing 440 km of road between Vientiane and the Chinese town of Bolen. As such, this Expressway will become the backbone of central and northern Laos' transportation, promoting further economic and social development. The first phase of the Expressway will have eight toll gates, three services areas, and two parking areas (Xinhua 2020).

Figure 16 China-Lao Expressway *[Source Xinhua 2020]*

The Expressway will be further complemented by Lao PDR's first major railway, which will also run between Vientiane and Boateng, scheduled to be complete by the end of 2021. There will be over 30 stations along the length of the railway. These transport routes are likely to significantly open up Lao PDR to tourists throughout the region, increasing numbers in tourist hotspots such as Vang Vieng and Luang Prabang. In turn, this will result in higher volumes of waste in these areas.

It will be possible to purchase food and beverages at the service areas along the Expressway, with similar purchases possible at the railway stations. These items are likely to involve plastics in the form of takeaway cups and food containers, many of which will be technically recyclable. The introduction of these transport networks and associated service areas will require waste management systems to be established, such as bin infrastructure and collection services.

People throwing litter out of cars is a common phenomenon in Lao PDR, although there are regular signs along the Expressway warning people not to do so. Car parking areas are also highly likely to be places where people dispose of the waste that they accumulate during their journeys. These areas are also likely to require bins and collection services, as well as budgeting to allow for periodic litter clearance.

5.3.3 Cultural Events

Laos is rich in culture, with plenty of festivals and celebrations enjoyed throughout the year. Many festivals are linked to agricultural seasons, Buddhist occasions, or political holidays. Key festivals include:

- Boun Pi Mai (Lao New Year), which takes place annually around April and involves colourful parades and the throwing of water.
- Boun Bang Fai (Rocket Festival), which takes place in May and symbolises a call for rain for the planting season. During this festival, villages come together to create homemade rockets that are launched into the sky.
- Boun Suang Heua (Boat Racing Festival) is held in Luang Prabang in August on the Nam Khan River, and in October in Vientiane on the Mekong River. This event includes candlelight processions and night markets selling food, drinks and various non-food products.
- That Luang Festival is held in November during the full moon, and is considered to be one of the biggest festivals in Vientiane, attracting people from all over the country. Market stalls, food vendors and amusement rides are set up all around That Luang in celebration.

Other big festivals include Lao Handicrafts Festival, Luang Prabang Film Festival, as well as various food festivals and half marathons. Many towns and cities also hold daily night markets, which comprise large numbers of stalls selling street food, souvenirs, and various other items including clothes, jewellery and mobile phone products.

Festivals, events and night markets create large amounts of plastic waste, including food and beverage packaging as well as packaging associated with non-food products. These plastics are often found littered around the sites where the events have taken place, since there are usually few litter bins and a low level of awareness amongst participants in disposing of waste appropriately. Although some festivals and night markets may have organised clean-ups afterwards, there are frequent occasions when litter is simply left for local people to deal with, or this litter has to be cleaned up by the local authorities. For example, in 2020 it was estimated by local authorities that there were 30 tonnes of waste, many of which were plastics, left in Chao Anouvong Park and surrounding streets and areas after the Boat Racing Festival (The Laotian Times 2020). As shown in Figure 17, the ongoing popularity of these festivals will continue to cause problems in regards to waste and litter unless systems are put in place and higher levels of awareness are achieved amongst participants. Conversely, these large gatherings offer opportunities for showcasing and

inducing behaviour change through sensitisation campaigns.

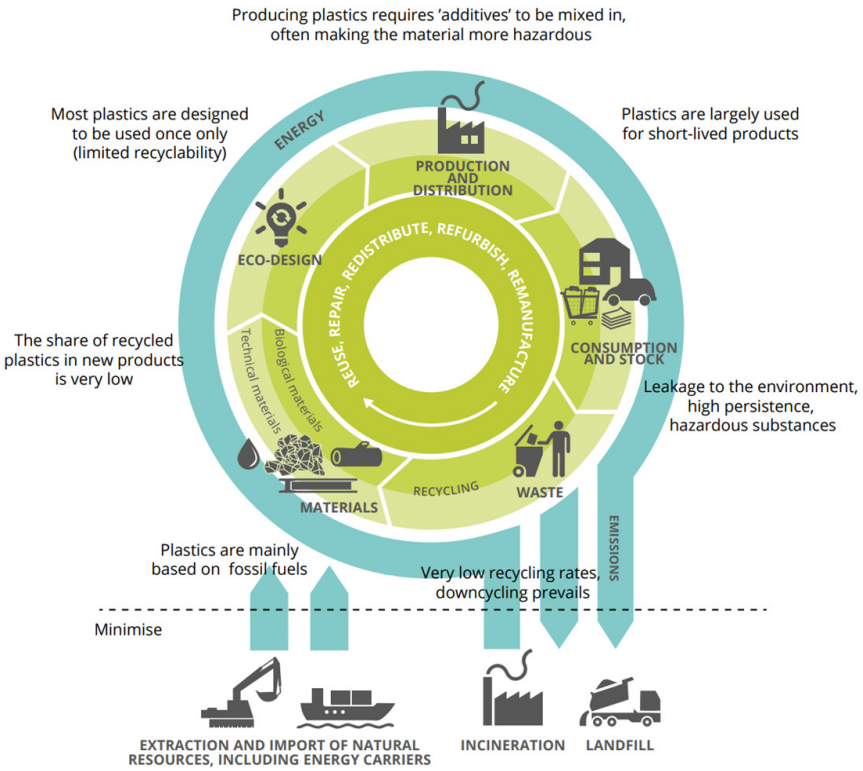
Figure 17 Waste Left Over After the Boat Racing Festival in Vientiane *[Source: The Laotian Times 2020]*

6. A SYSTEMS APPROACH TO SINGLE-USE PLASTICS

6.1 Environmental Impacts Across the Plastics Value-Chain

The current use of plastics follows closely what has been labelled a "linear economic" model, where natural resources are extracted at the lowest cost possible and turned into cheap materials used for products, which are often short-lived and quickly become waste. This model drives excessive demand for natural resources and generates large amounts of waste, while contributing to a range of other environmental impacts. Marine plastic pollution and the challenges of plastic waste management are currently receiving close attention, but plastics are associated with several other issues at all stages of the value chain, as shown in Figure 18. For example, over the entire life-cycle, plastics are considered to be responsible for around 7% of human emissions of carbon dioxide (European Environment Agency (EEA) 2021).

Figure 18 Issues Across the Plastics Value Chain [Source: EEA 2021]



The extraction of petroleum and fossil gas generates greenhouse gas emissions and creates the risk of water pollution. In recent years, an increasing share of plastics is made from gas extracted through hydraulic fracturing (so-called fracking), which is water-intensive and requires the use of chemicals that can pollute surrounding water bodies. Fracking is controversial due to its environmental impacts and has been banned in some countries. The production of basic plastics involves multiple petrochemical steps that are energy-intensive, often cause air pollution, and generate hazardous waste.

For most applications, manufacturers mix plastics with additives – for example, substances that are added to give plastic products a certain colour, to make them soft, UV-resistant or inflammable. Some of the additives commonly used in plastics are hazardous or suspected to be hazardous and can leak out during the use and disposal phases. There is also a risk that such substances contaminate recycled plastics and end up in products where humans can easily be exposed. Such risks increase when recyclables are not carefully sorted and where there is a low level of awareness of chemical issues among actors in the recycling chain. Also, with improper waste treatment or when plastics leak into the environment, additives can threaten the health of ecosystems (Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC) 2020).

The issues associated with the end-of-life stage of plastics are well-known. High use of plastics increases the volumes of waste to be collected and treated, and increases the associated costs. Well-controlled incineration can limit health risks, but it is costly and contributes to climate change. Open burning, still common in Lao PDR, generates hazardous substances and pollutes air, water, and soil. Leakage of plastics into the environment causes a range of negative impacts to ecosystems and human health.

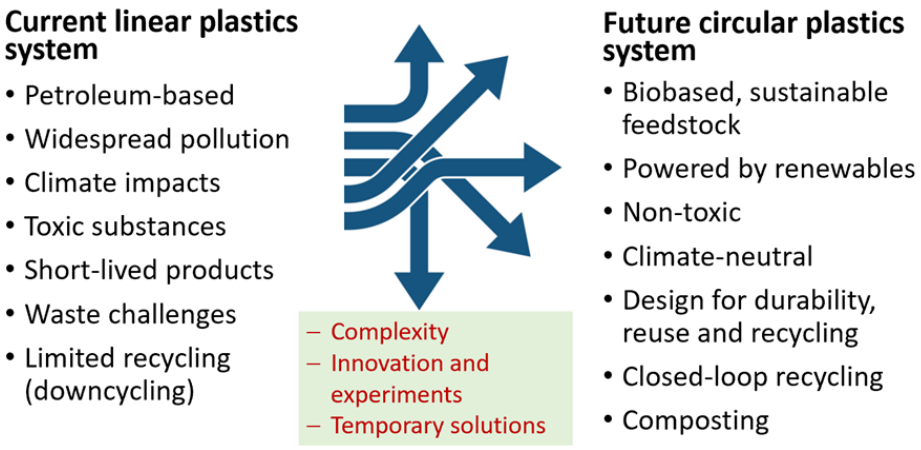
As for recycling, even in advanced countries, only a small share of post-consumer plastics is currently recycled. Most of the existing recycling is in the form of downcycling, generating a lower-quality product that cannot be used for its original purpose and thus contributes little to reducing the demand for new plastics.

Figure 19 Burning of Waste in Vientiane

6.2 Towards a Circular Economy for Plastics

Addressing the multiple issues related to the production and use of plastics requires major changes. There is increasing recognition of the need to shift from the current linear model for plastics to a "circular economy", where these materials are used sustainably, safely, and for the greatest possible societal value. Figure 20 shows a characterisation of the current plastics system (left-side panel), focusing on some of its major challenges, and a vision of what a future sustainable circular system could look like (right-side panel). The circular system presented here is inspired by the New Plastics Economy Global Commitment, developed by the Ellen MacArthur Foundation (EMF), and signed by over 450 organisations worldwide, including several multinational corporations and some national governments (EMF 2021). It is a challenging vision that calls for drastic changes, but it is important to note that such a transformation is considered both desirable and feasible by major businesses who are currently placing huge amounts of single-use plastics on the market.

Figure 20 The Transition from a Linear to a Circular Plastic System
[Source Authors, inspired by EMF New Plastics Economy Global Commitment]



Transforming the current unsustainable linear plastics approach to a circular economy model is a complex task that calls for new forms of governance and policymaking. In this landscape, conventional forms of governance and policy, characterised by compartmentalised responsibilities and top-down decision-making are unlikely to be effective. Innovative problem-solving requires new forms of partnerships. Implementing solutions to plastics issues demands technical as well as social innovation, testing of ideas, and learning. This is more likely to be realised if a wide range of actors, with different types of knowledge and capacity, are involved in formulating and implementing alternatives, and in monitoring outcomes.

A policy process that can guide and facilitate the transition toward circular plastics systems would need to be based on the following principles:

- Engaging key stakeholders, including ordinary citizens, in identifying the main problems and co-creating solutions.
- Connecting actors from across value chains, such as product designers and recyclers.
- Developing shared visions and roadmaps – multipronged strategies that address all the key stages of plastics value chain.
- Engaging all relevant government bodies.
- Avoiding lock-in to solutions that improve the current situation but still have unwanted environmental impacts.

6.3 A Hierarchy of Circular Strategies

The circular economy concept is sometimes misunderstood as mainly a call for more recycling. However, while recycling plays an important role in a circular economy it is not the main strategy for circularity. On the contrary, recycling is considered as one of the options with the lowest priority. This is due to several reasons, including:

- Recycling can save resources but is not completely "green", since it requires energy and can cause pollution, which reduces the environmental benefits.
- The quality of recycled materials is commonly inferior to that of new materials and, so, recycled materials often cannot replace new ones.
- Recycled materials are often used for low-cost products that are thrown away or burnt after use (so-called downcycling).
- Most of the products currently found on the market are not designed with recycling in mind, with materials mixed in ways that make recycling difficult and prohibitively costly.

There are several circular strategies that can retain more value from materials than is possible through recycling. For example, cleaning and reusing existing products usually requires less energy than recycling them and producing new ones. Reuse or refill systems therefore usually have a higher sustainability potential than systems based on single-use and recycling. A recent series of studies commissioned by the UNEP reviewed existing life-cycle assessments, comparing the environmental performance of single-use plastics with that of reuse options. The studies, which covered bags, bottles, takeaway food packaging, beverage cups, and cutlery, clearly showed that reusable alternatives have a lower environmental impact (UNEP 2021a).

Other circular strategies include replacing products with immaterial services, enabling multiple users to have access to the same product (product sharing), maintaining and refurbishing products to keep them in use for a long time, and repairing products that break. However, when products eventually wear out or are no longer useful, they should be designed to be either easily recycled to a high quality, or safely and easily composted. Figure 21 shows nine circular economy strategies organised according to their sustainability potential, with the more desirable options at the top.

Figure 21 A Hierarchy of Strategies for a Circular Economy *[Source: Adapted from Potting et al., 2017]*

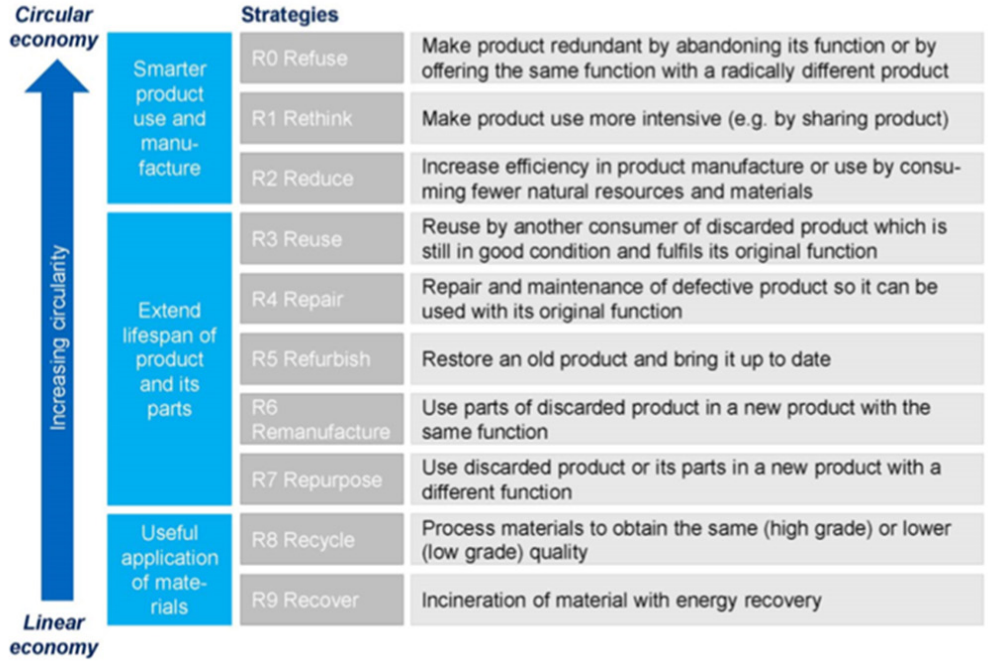


Table 5 offers clear examples as to how circular economy strategies, which are particularly relevant to single-use plastics - refuse, replace, reuse/refill – are already being implemented. The examples illustrate that both established companies and start-ups can play a role in promoting circular practices.

Table 5 Examples of Circular Approaches to Single-use Plastics

Examples of how circular economy practices can be applied to single-use plastics
Eliminating plastics
• Some supermarket chains in Europe and Australia have stopped using plastic wrapping and packages for fruits and vegetables. One example is Morrisons in the UK. • Lush, a global cosmetics and personal care chain, has developed a range of solid products, such as shampoo bars and toothpaste tablets, that don't require plastic bottles or tubes. • ICA, a major Swedish supermarket chain, has started printing product information directly on some fruits and vegetables using laser technology, eliminating the need for plastic wrapping and labels.
Replacing plastics with more sustainable materials
• Evo Jello, drinking cups made from seaweed, made by the Indonesian company Evo & Co, can be eaten after use or easily composted. • Ritter Sport, a German chocolate brand, is testing plastic-free coated paper packaging, which can be recycled together with other kinds of paper. • Apeel, developed in the US, is an edible but tasteless, plant-based spray, used to coat fruit and vegetables to increase their shelf life – replacing plastic wrapping.
Reuse/refill systems
• Siklus Refill, an Indonesian company, provides refill services of liquid household products through stationary dispensers in grocery stores as well as home-delivery services from dispensers installed on motorcycles. • Refill My Bottle, an initiative that started in Bali and has spread to neighbouring countries including Lao PDR, provides a smartphone app that allows users to find places to refill their drinking bottles with safe water at no cost. • BambooLao, a Lao start-up company, produces reusable drinking straws and eating utensils made from bamboo. • Reusable MMP glass jars, traditionally used for yoghurts by several major dairy companies in Germany, is now also used for an expanding range of dry and un-chilled wet products.

7. EXPERIENCES FROM OTHER COUNTRIES – GOVERNMENTAL ACTIONS ON SINGLE-USE PLASTICS

7.1 Overview

This chapter sets out how national governments in selected countries are taking action on single-use plastics, particularly through efforts to reduce the production and consumption of such items. Actions by governments in the other ASEAN Member States are considered most relevant to the situation in Lao PDR, due to cultural similarities, development status and trade relations, and are therefore described in greater detail. Actions from other world regions are only introduced briefly and for a few selected countries, to serve mainly as examples of different policies and approaches. The chapter ends with a summary of general experiences gained in this area, with lessons for governments that are planning to step up their actions.

7.2 Global Approaches

In recent years, there has been a heightened focus on tackling plastics at the global level, arising from concerns about the level of plastics in the world's oceans, the impacts of micro-plastics on food chains, and the market changes resulting from China's import restrictions.

As mentioned in earlier chapters, Lao PDR is a signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. In early 2019, the Convention was amended by consensus to improve the regulation of global trade in plastic waste to prevent environmental pollution. The updated agreement means that from January 2021 exporters of contaminated or hard-to-recycle plastic waste will require consent from the governments of receiving countries before shipping. This will not totally prevent the trade of plastic waste, but it will incentivise trade in high-quality, sorted, clean plastic waste and help ensure that it is those materials that are being shipped for recycling, as opposed to a cheap approach to disposal.

There are a range of other global initiatives, including the Global Plastic Action Partnership, a platform for public-private collaboration to align on a common approach for addressing plastic; the Ellen MacArthur Foundation's New Plastic Economy initiative, which applies the principles of the circular economy and brings together key stakeholders to rethink and redesign the future of plastics; and, the World Tourism Organization's Global Tourism Plastics Initiative, which requires tourism organisations to undertake a range of actionable commitments around eliminating problematic or unnecessary plastic packaging and moving away from single-use plastics.

7.3 Other ASEAN Member States

7.3.1 Cambodia

The government of Cambodia regulates the use of plastic bags under its 2017 *Sub-Decree No 168 on Management of Plastic Bags*. The Decree prohibits the import, production, distribution and use of plastic bags thinner than 0.03 millimetres. Furthermore, the import or production of plastic bags for commercial purposes in quantities exceeding 100 kg requires a permit from the Ministry of the Environment. The Decree also requires supermarkets and business centres to charge customers 0.10 USD per bag, with penalties for violations (Akenji et al. 2019). Supermarkets are allowed to keep the revenues from the collection of these charges. Smaller shops and fresh-food markets are not covered by the regulation.

A limited field study conducted in 2019 (UNDP) found that, despite limited enforcement actions by the government, more than half of the supermarkets examined had complied with the Decree. Compliant supermarkets reported that the demand for single-use plastic bags had dropped by around half. Some supermarkets had developed reusable bags with their logos, which they distributed for free to frequent customers or sold for USD 0.8-1, which is a fairly high price for low-income households. Smaller supermarkets reported difficulties with implementation, mainly due to staff limitations. The overall impression was that the communication around the Decree had been poor and most consumers were still unaware that the bag charges were mandated by law.

The government is also promoting the use of biodegradable bags and bags made from biomaterials. The import and production of such bags are supported through preferential taxation (UNDP 2019). However, it is unclear what standards are used for classifying bags as biodegradable and whether such bags have lower impacts on the environment. In most countries, bags classified as biodegradable need to be treated in industrial-scale composting facilities, since if they are discarded in nature, they actually do not degrade much faster than conventional plastic bags.

More generally, the government is seeking to expand waste collection services in urban areas and to promote the separate collection of plastics for recycling.

7.3.2 Malaysia

In 2011, the Malaysian government launched a nationwide “No Plastic Bag Day Campaign”. On the designated plastic-free days, customers need to pay a fee for single-use plastic bags. Wet markets, restaurants and night markets were exempted from this requirement. Two years after the campaign was launched, an evaluation found that around half of the customers surveyed were using reusable bags or no bags at all. Building on this initial success, some states in the country extended the ‘No Plastic Bags’ campaign to all days of the week (Asmuni et al. 2015).

In 2018, the government adopted a comprehensive *Roadmap towards Zero Single-Use Plastics 2018-2030*, which aims to phase out a number of single-use products currently made of conventional plastics, initially targeting carrier bags, food trays and straws. These products should be either eliminated, made easily recyclable, or replaced with alternatives made from more sustainable materials, including compostable plastics.

Malaysia has in place a set of ecolabelling criteria for biodegradable and compostable plastic packaging materials as well as standards related to biomass-based products for food-contact applications. These ecolabelling standards also include criteria for products made of recycled plastic or rubber. The government stimulates the production of biobased and biodegradable plastics through tax-breaks (Akenji et al. 2019).

The government is now developing a circular economy roadmap for plastic and establishing a national plastic pact, which brings together public and private stakeholders. The members of the pact are expected to set targets and formulate actions in the following areas: product design, research and development for circular plastics, extended producer responsibility, and plastic waste management (Government of Malaysia 2020).

7.3.3 Singapore

In 2007, Singapore launched the *Singapore Packaging Agreement* (SPA), which aimed to promote product stewardship and reduce the environmental impacts of packaging. The SPA was a voluntary partnership between the government and the private sector. Under the SPA, the government recognised company initiatives through the annual 3R Packaging Awards. However, some critics called the non-binding SPA "toothless" and also pointed out the lack of quantitative assessments as a weakness of the initiative (Subramaniam 2017). In 2020, the SPA was terminated and replaced with a new industry-led programme called the Packaging Partnership Programme (National Environment Agency 2021).

Building on the experiences of the SPA and the resulting relationship between the government and the business community, Singapore is now developing an Extended Producer Responsibility (EPR) system for packaging, which will require businesses to become financially and/or physically responsible for the collection and end-of-life management of their packaging. To prepare for the introduction of the EPR system, the government has introduced a mandatory packaging reporting (MPR) framework from 2021. Under this framework, businesses with an annual turnover exceeding 10 million USD that place packaging on the market, including producers of packaged products and retailers, should report annually on the types and amounts of packaging materials (including plastics) they are placing on the market. They should also submit plans on how they intend to reduce, reuse or recycle packaging. The planned EPR system is expected to include a Deposit Refund Scheme for beverage containers (UNEP 2021a).

In 2016, the government commissioned life-cycle assessment studies on the environmental impacts of carrier bags and food containers, including both single-use plastics and various other options. The main conclusion was that all materials are associated with environmental impacts, pointing to the need to shift from single-use to reuse options. In line with these findings, the government is phasing out the use of disposables at open food stall centres and is also installing water dispensers in public places (UNEP 2021a).

The government launched an awareness campaign in 2019 to reduce the use of disposables. This campaign is run in partnership with major food and beverage establishments, malls/retail chains, e-commerce operators, supermarkets, hotels, schools, and other organisations. Some of the participating companies are now also voluntarily offering incentives to customers who bring reusable products (UNEP 2021a).

In 2019, to provide incentives for waste minimisation and recycling, the government established the Towards Zero Waste Grant, which supports initiatives targeting packaging waste, food waste or e-waste. The grant is open to individuals, NGOs, and private companies (Akenji et al. 2019).
In 2020, the government convened a Citizens' Workgroup on Reducing the Excessive Consumption of Disposables. The group is aimed to help co-create practical recommendations, ranging from actions by individuals to government policies (UNEP 2021a).

7.3.4 Thailand

In recent years, the government of Thailand has undertaken several initiatives related to single-use plastics, including the following (GIZ 2018).

- Collaboration with industry associations and a major university to develop a database on the flow of plastic materials in Thailand.
- Campaigns to eliminate plastic cap seals of drinking-water bottles.
- Ban on plastic bags and Styrofoam containers in national parks.
- Phase-out of plastic bags in 30 hospitals.
- Agreement with 16 business groups (operators of supermarkets, convenience stores and department stores) to introduce two plastic-bag-free days per month.
- Promotion of bioplastics production under a separate National Roadmap since 2008.
- Efforts to increase plastic recycling under the Plastic Debris Management Plan (2017-2021).

The government has also made a voluntary agreement with food delivery platforms and restaurants to collaborate on activities to reduce single-use plastics products in food delivery operations (UNEP 2021a).

In 2018, the Public-Private Partnership for Plastic and Waste Management (Thailand PPP Plastic) was launched. Initially, 15 organisations joined the programme and by 2019 the membership had reached 33 organisations, including government agencies, business associations, private companies, and NGOs. PPP Plastic has established six working groups: Waste separation and management; Innovation development; Policy development and legislation; Communication; National plastics database; and, New sources of capital. It is also running pilot projects involving some of the participating companies.

In 2019, the government adopted a *Roadmap on Plastic Waste Management (2018-2030)*, which aims to reduce and stop the use of plastics and replace these materials with environmentally-friendlier options. According to the roadmap, plastic cap seals for water bottles, oxo-degradable plastics, and plastic microbeads will be banned from 2019. The use of plastic bags of less than 36 microns in thickness, Styrofoam food boxes, plastic straws, and single-use plastic cups will end by 2022. However, the government has fast-tracked the phase-out of plastic bags by asking 43 large retailers, plastic manufacturers and department stores to stop handing out single-use plastic bags already from the beginning of 2020.

7.3.5 Vietnam

Since 2011, Vietnam charges a tax on the production and import of plastic bags. This tax is relatively low (around USD 2 /kg) and has reportedly had only a limited effect on consumption. As of August 2020, an increase of this tax was still under discussion (Hanoi Times 2020).

In 2012, Vietnam introduced a standard for eco-friendly plastic bags and a system for certification. Such bags are exempt from the tax charged on regular plastic bags and manufacturers can receive other kinds of government support. These incentives, combined with awareness campaigns, appear to have been effective. A 2017 study found that the market share of conventional plastic bags had fallen to around 50%. The government aims to completely phase out conventional plastic bags by 2026 (Akenji et al. 2019).

However, the environmental advantages of eco-friendly bags compared to regular ones is not fully clear and the integrity of the certification system has been questioned. For example, it has been

reported that oxo-degradable bags, which are banned in the EU due to their environmental impacts, can be certified as eco-friendly.

Recently, Hanoi city, in coordination with the national government, has launched an initiative to form a coalition with major supermarket chains. The objective is to encourage a shift from single-use bags to reusable ones. Many retailers are already offering discounts to customers who bring reusable bags. However, the use of single-use plastic bags remains high, especially in traditional markets and small shops.

In 2019, the government of Vietnam launched the *National Action Plan for Management of Marine Plastic Litter by 2030*, with targets for 2025 and 2030. The overarching objective of the plan is to reduce the amount of ocean plastic by 50% until 2025 and by 75% until 2030.

One of the specific objectives for 2025 is to prevent the use of single-use plastics and non-biodegradable plastic bags in 80% of coastal tourism areas, tourist attractions, tourist accommodations, and other coastal tourism services. The corresponding objective for 2030 is 100%.

The plan indicates four complementary solutions areas:

1. Education and behaviour change (to be achieved through campaigns, training, awards for good practices, and improved enforcement of bans on plastic-waste dumping).
2. Collection and processing of plastic waste from coastal and ocean-based activities (through clean-up campaigns, provision of infrastructure for collection and treatment, and improved data collection).
3. Control of plastic litter at source (through source separation, improved data on waste sources, and strengthened enforcement of regulations).
4. International cooperation (including knowledge exchange, international technical assistance and investment, joint research projects on impacts, and joint monitoring systems).

Plastics are also identified as one of the priority sectors in the *National Action Plan on Sustainable Consumption and Production (2021-2030)*, adopted in 2020. According to this plan, in the period 2021-2025, the government will promote the "production, distribution and consumption of eco-friendly packaging which replaces single-use, non-degradable plastic items." Plastics is listed as one of the sectors where a "5-8% decrease in resources and materials used for production" is envisaged for 2021-2025. The corresponding target for 2030 is 7-10%. By 2025, "85% of supermarkets, commercial centres distribute and use eco-friendly packaging which gradually replaces single-use, non-degradable plastic items." The corresponding target for 2030 is 100%.

In 2020, the Prime Minister issued *Directive No. 33 / CT-TTg on Strengthening Management, Reuse, Recycling, Treatment and Minimization of Plastic Waste*, which includes several actions targeting single-use plastics. Government agencies are instructed to minimise the use of disposable plastic products on their premises and during meetings, and also to separate recyclable plastics waste at source. Vietnam's Ministry of Environment and Natural Resources (MoNRE) was requested to act on a number of measures:

- develop technical guides on separation at source;
- develop a plan for the phasing out of single-use plastic products;
- explore how the extended responsibility of companies can be implemented and how to improve private sector engagement, including through better enforcement of existing regulations;
- develop standards for the use of plastic micro-beads and for recycled plastic products and to revise standards for eco-friendly plastic bags;

- build up a database on the use of plastics and plastic waste at the national level;
- conduct studies on the current situation and trends in the management of plastic waste; and
- conduct awareness campaigns on the reduction, separation, recycling, and treatment of waste plastics.

In 2020, the new National Assembly passed a new Environmental Protection Law, which stipulates extended producer responsibility (EPR). Responding to this law, the MoNRE has established an EPR National Platform tasked with developing a national strategy and action plan (IUCN 2020).

7.4 Other World Regions

7.4.1 European Union

In 2018, the European Union (EU) adopted its first-ever *European strategy for plastics in a circular economy*. The strategy intends to transform the way plastic products are designed, used, produced and recycled. It presents a vision for a new plastics economy by 2030, including the following objectives (EU n.d.):

- All plastics packaging placed on the EU market is either reusable or can be recycled cost-effectively.
- More than half of the plastics waste generated in Europe is recycled.
- Sorting and recycling capacity has increased fourfold compared to 2015.
- Export of poorly sorted plastics waste has been phased out.
- Substances hampering recycling processes have been replaced or phased out.
- Demand for recycled plastics in Europe has grown four-fold.
- Innovative materials and alternative feedstocks for plastic production are developed and used where evidence shows that they are more sustainable.
- New companies emerge that provide circular solutions, such as reusable packaging or other alternatives to single-use plastics.

As part of this plastics strategy, the European Commission has proposed a *Single-use plastics directive* – EU-wide rules targeting the 10 single-use plastic products most often found on Europe's beaches and in its seas. The proposed rules are based on how each of the 10 items is produced, distributed and used by businesses and consumers, how it is disposed of, and how it may end up in nature. The proposal includes the following measures, adapted to the characteristics of each product (EU 2018):

- **Bans of problematic and non-essential products:** Where alternatives are readily available and affordable, single-use plastic products will be banned from the market. This will apply to *plastic cotton buds, cutlery, plates, straws, drink stirrers, balloon sticks, food containers made of expanded polystyrene, and products made from oxo-degradable plastic*. From July 2021, these products will have to be made exclusively from more sustainable materials.
- **Consumption reduction targets:** Plastic *food containers and drinks cups* will continue to be allowed but EU member states will have to reduce their use. Each country should collect data to be able to monitor consumption volumes and trends and consider setting national reduction targets. They should also make alternative products available for consumers or require mandatory charges for single-use plastic items.
- **Obligations for producers:** Producers will help cover the costs of waste management and clean-up, as well as awareness-raising for *food containers, packets and wrappers, drinks containers and*

cups, tobacco products with filters (such as cigarette butts), *wet wipes, balloons, and lightweight plastic bags*. These "polluter-pays" measures should be introduced by the end of 2024. The industry will also be given incentives to develop less-polluting alternatives for these products.

- **Collection targets:** Member states should ensure that 90% of single-use plastic drinks bottles are collected by 2025, for example through deposit refund schemes.
- **Labelling requirements:** Certain products will require clear and standardised labelling, which indicate how waste should be disposed of, the negative environmental impacts, and the presence of plastics in the products - applies to sanitary towels, wet wipes, and balloons.
- **Awareness-raising:** Member states will be obliged to raise consumers' awareness about the negative impact of littering of single-use plastics and fishing gear as well as about the available re-use systems and waste management options for all these products.

7.4.2 Individual EU Member States

In 2002, **Ireland** became the first country to impose a plastic bag levy. Customers have to pay EUR 0.15 for each single-use plastic bag. The levy led to a 90% drop in the use of plastic bags and generated USD 9.6 million for a green fund supporting environmental projects (Irish Environment 2015). However, as the use of plastic bags was reduced, a drastic increase in single-use paper bags was observed, which is likely to have resulted in increased emissions of greenhouse gases from landfills.

The Netherlands was the first country to introduce a ban on microbeads (pieces of plastics less than 5mm in diameter) in cosmetic products in 2014 (Watkins et al. 2019).

Many European countries have deposit refund schemes (DRS) for beverage containers, generally achieving collection rates well above 90%. This is not limited to the largest and wealthiest countries; for example, **Lithuania**, which has one of the smallest populations among the EU member states (2.8 million people), introduced a DRS in 2016 and now has the highest recycling rate for plastic packaging in Europe. This scheme involves a mandatory deposit on all beverage bottles, with approximately 1,000 reverse vending machines and 1,700 manual collection points throughout the country.

7.5 Other Countries and Regions

South Australia introduced a deposit refund scheme for beverage containers in 1977. Consumers have to pay a deposit of AUD 0.10 for each container, which is refunded when returning an empty container to a shop. After the system was introduced, the number of beverage containers found on beaches dropped by around two-thirds (Watkins et al. 2019). However, some consumers complained about increased upfront prices.

From March 2021, single-use plastic straws, cutlery and stirrers were prohibited from sale, supply or distribution in South Australia. The ban includes bioplastic alternatives. In 2022, the ban will also cover expanded polystyrene cups, bowls, plates and clamshell containers. The manufacturing and sale of oxo-degradable plastic products will also be prohibited from 2022 (Government of South Australia n.d.).

In 2020, **China** announced that certain single-use plastic items will be phased out. Single-use plastic bags will be banned in all urban areas in 2022, although fresh food markets will be exempt until 2025. The production and sale of plastic bags that are less than 0.025mm thick will also be banned. Restaurants must reduce the use of single-use plastic items by 30%. Hotels must stop offering free single-use plastic items by 2025 (BBC 2020).

In **Ecuador**, a refundable USD 0.02 deposit on PET drinking bottles, introduced in 2011, led to a significant increase in PET bottle recycling, which increased from 30% in 2011 to 80% in 2012 (Watkins et al. 2019).

Kenya banned single-use plastic bags in 2017, as one of the first African countries to take action to reduce plastics. The problems related to these bags had been recognised for a long time and a ban had been discussed for over a decade before being finally enacted. The bag ban has been partly effective, mainly due to the harsh penalties involved. However, enforcement is still challenging and some illegal importing continues. It has also been reported that some of the reusable bags commonly used after the ban are of low quality, quickly break and cannot be effectively recycled.

The government has established technical standards and banned the import of low-quality bags and bags made of mixed plastics, but many retailers now say that they are confused over what is banned and what bags should be used (HuffPost 2020).

In 2020, Kenya also prohibited the use of plastic water bottles, cups, disposable plates, cutlery, and straws in its national parks, beaches, forests, and conservation areas (UNEP 2021b). Based on a proposal by the Kenyan Association of Manufacturers, the country is also in the process of introducing an extended producer responsibility system, where manufacturers will pay a fee for the plastic they put on the market. These fees will be used to fund collection, processing and recycling (HuffPost 2020).

In 2008, **New Zealand** passed the Waste Minimisation Act to encourage the reduction of waste and environmental harm, whilst delivering economic, social and cultural benefits. The Act provided a range of tools to the government, including mandatory product stewardship schemes (extended producer responsibility). Since the passing of the Act, successive governments have favoured voluntary approaches amongst producers, brand owners, importers, retailers and consumers. This led to the development of a number of product stewardship initiatives being developed by the private sector, typically with support from the government, across a range of product areas including soft plastic recycling and public place recycling schemes.

This preference for a voluntary approach to regulation has been driven by a desire for flexibility in the design of schemes based on individual products and sectors, and a wish to avoid poorly designed regulations that could be expensive to administer and result in significant losses to the economy. In recent years, the government has also started to consider some mandatory schemes, which address priority wastes that incur significant problems with disposal, and free-riders (non-participants who seek to benefit while not complying with the mechanisms or contributing to the costs).

7.6 Experiences and Lessons

This section summarises the experiences of other countries in dealing with single-use plastics issues. It is important to be aware that all countries are struggling to find ways to use plastics sustainably, and there are no ready-made solutions that work for all types of plastics and all kinds of products. While several countries have successfully addressed certain product categories, such as PET drinking bottles and plastic carrier bags, it is only recently that some countries have begun targeting single-use plastic items more comprehensively.

7.6.1 General Approaches

Actions in most countries are **multipronged**, showing that no single solution can work in isolation. It is only when different policy approaches are combined that they can become truly effective. For example, discouraging or banning certain types of single-use plastic products often need to go hand-in-hand with promoting better options, such as reuse models or single-use products with better sustainability performance.

Investments in **awareness-raising** around plastics issues are essential, both to bring about behaviour change and to increase acceptance of regulations or charges. However, awareness-raising and education must be in line with available services and infrastructure. For example, campaigns promoting source segregation of recyclables can do more harm than good if there is no separate collection system in place. Trust is key for public participation in collection schemes.

Regular dialogues with major sectors can build awareness and mutual trust, and help to establish shared long-term objectives. Several countries have established national platforms to facilitate communication between the government and the business community, sometimes also involving academia and civil society organisations.

The government needs to send a **strong message** that it takes plastics issues seriously and that changes to waste management are unavoidable. Some governments show their commitment by incorporating plastics-related criteria in their public procurement policies.

Addressing plastics effectively requires the **coordination** of multiple government ministries. For this to happen, decisive leadership at the political level is essential.

Data is the key to understanding plastic flows through the economy and environmental leakage. Knowing where the hot-spots are is an important basis for sound target setting and effective policy design. Data is also key in determining trends and identifying potential future scenarios with regards to the volumes and types of waste that are generated over time. Data is also essential for monitoring policy outcomes and, so, building systems for data collection and analysis is a vital investment for governments.

It is important to tailor priorities and actions to **local circumstances**. Large cities and tourist areas often have consumption patterns and challenges that differ from other areas but they can also offer opportunities, for example with large volumes of post-consumer plastics being available for recycling.

In developing policies, it is critical to take into account the **country context**. Each country is unique in terms of its cultural norms, levels of awareness, institutional set ups, policy frameworks, levels of economic development, enforcement ability, nature of supply chains, and business practices. Consequently, while lessons can be learnt to a degree, what works in one country in terms of reducing SUPs will not necessarily work in another.

7.6.2 Specific Policies and Solutions

Starting with **voluntary agreements** with a few businesses can be a feasible and effective way to begin reducing SUPs. If there is limited enforcement capacity at governmental levels then implementing mandatory measures can be challenging. A better strategy can be to initially work with businesses that are willing to make changes and then try to bring others on board.

Bans can be effective but are more likely to be successful with the following conditions:

- High level of awareness around plastic issues and the need for change.
- Phase-in period to allow businesses to prepare and adapt.
- Availability of alternatives with lower environmental impact (entire life-cycle).
- Availability of alternatives that are affordable and convenient.
- Adequate enforcement capacity and motivation among government officials.
- Penalties that create strong disincentives.

Mandatory charges can play a role where bans are not feasible, but will disproportionately impact poorer members of society if low-cost alternatives are not available. The willingness to accept charges can be higher if the money collected is earmarked for specific projects, for example, to protect or clean up the local environment, rather than going to central treasuries.

Product stewardship/ extended producer responsibility (EPR) is possible to implement in many countries, but takes time to get right. These systems often include **deposit refund schemes** to ensure high collection rates. Most countries that have been successful in making producers and importers responsible for post-consumer collection and treatment have prepared the ground for such policies through careful deliberations, both within the government and with the stakeholders concerned. Product stewardship/ EPR are not fixed systems but rather general principles that can be implemented in various ways. Each system needs to be adapted to the situation at hand, considering a range of factors including the capacity of businesses, residents' awareness and willingness to segregate waste at source, and the availability of collection infrastructure and services. There typically need to be good logistical systems in place for product stewardship and EPR to work, including reverse logistics that allow for the efficient transportation of post-consumer products to reprocessing plants.

7.6.3 Alternative Products and Materials

Biodegradable bags and packaging can be suitable in certain cases, but there is a risk here that the properties of such products are misunderstood. Most of the biodegradable plastic products available on the market do not degrade rapidly in nature/ home composting and can be as harmful as conventional plastics. To break down quickly, they require treatment in industrial-scale composting facilities, which are not widely available. Some bioplastics degrade more easily, even in regular garden composts, but are not yet common. To have a low environmental impact, such easily biodegradable plastics need to be treated in the right way, such as through aerobic composting. If they end up being disposed of in a landfill, they can easily generate methane, a powerful greenhouse gas.

Some plastics that are marketed as biodegradable are so-called "oxo-degradable" materials. These plastics quickly disintegrate into small fragments, known as microplastic particles, which can remain in nature for a long time and accumulate in living organisms. Their environmental impact can be similar to or even worse than that of conventional plastics. Oxo-degradable plastics are therefore banned in some markets, including the EU.

There are also other issues with biodegradable plastics. The production of these materials can be energy-intensive, which increases their overall environmental impact. Furthermore, at the waste stage, if biodegradable plastics are mixed with conventional plastics that are collected for recycling, this can disturb the recycling process and result in low quality and poor functionality in recycled materials. These biodegradable plastics are usually difficult to identify and separate from conventional plastics.

8. SITUATION ANALYSIS FOR LAO PDR

8.1 Overview

This chapter identifies the strengths, weaknesses, threats, and opportunities in respect to Lao PDR developing policies and initiatives around the reduction of single-use plastics. The analysis is based on the current situation and expected trends as described in chapters 3 to 5.

8.2 Strengths

Lao PDR's main strengths are in relation to the country's strong culture and traditions as well as the respect that people have for the environment. Despite the country's businesses being predominantly comprised of small, medium and micro enterprises, there are a number of well-established industry bodies and business associations that can provide platforms to help initiate and drive change. There are also a number of well-informed NGOs present in Laos, who already have good experience in establishing various initiatives around sustainable consumption and production, reducing litter, and improving waste management.

Although Lao PDR lacks significant investment in infrastructure and services, manual costs are low, giving the country an advantage. Laos is in a good geographic position, surrounded by countries that have wide experience in managing wastes and reprocessing materials such as plastics. This opens up the possibility of developing partnerships with neighbouring countries.

Lao PDR is a signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, and is also actively engaged in other regional approaches to waste management.

8.3 Weaknesses

Lao PDR's inherent weaknesses are predominantly in relation to the legal framework for sustainable consumption and production as well as waste management, and the capacity and capability of relevant government institutions. Although progress has been made in recent years, Lao PDR has a fragmented legislative framework and limited experience in this field. A particular weakness is enforcement, with limited capacity in implementing and monitoring laws and regulations.

A key problem is in relation to data on plastic material flows, including data on plastics placed on the

market and disposal routes. In general, Lao PDR has very limited capacity in respect to data collection and management, with very few data repositories and systems across government ministries and departments. Data is critically important in evidence-based policy development and obtaining waste management data is a challenge for many countries.

With respect to waste management, infrastructure is lacking, and services have limited coverage. Domestic recycling capacity and capability is still developing. Investment is limited, noting that a lot of waste management infrastructure involves high capital costs and long returns on investment. From a recycling perspective, it is possible that the private sector also has concerns about uncertain and unstable volumes of post-consumer materials, since existing collection schemes are limited. Although, the number of recyclers and the volumes of waste processed has increased in recent years. This may be due to the impact of China's import ban on plastic waste, with the industry seeking new countries to operate in.

Traditionally in Laos, many wastes were organic and would have been returned to land or river environments after use (e.g., food waste). However, new materials require proper disposal at the end of life, and here there is a low awareness amongst the general public on the impacts of inappropriate disposal of wastes.

8.4 Threats

The biggest threats in relation to the production and consumption of single-use plastics come from changing consumer habits and new marketing channels. The country's traditional lifestyles, which have been predominantly focused on fresh foodstuffs, appear to be changing. Wet markets will still clearly have an important role in Lao culture, however, there is a clear rise in supermarkets, home deliveries, and food takeaways. Whilst bringing about increased exposure to a greater diversity of products, these changes will have serious implications in regards to the volume and types of single-use plastics.

Increased amounts of packaging, when coupled with the current low public awareness on the impacts of resource use and poor disposal of wastes, could result in even greater issues around plastic pollution and material use.

Changes in waste management must take into account the impact on the existing informal sector that is engaged in the collection, sorting, and processing of recyclable materials. Recognising that these people are often from the poorest parts of society, it is important that their livelihoods are not compromised.

Whilst an increase in domestic recycling capability and capacity would be good for the economy, it will be essential to ensure that Laos does not become the dumping ground for poor quality post-consumer waste plastics from other countries (e.g., receiving poor quality mixed plastic waste streams, which are not cost effective to recycle and may result in large volumes of material requiring disposal). It is already apparent that imports of post-consumer plastics have increased in Lao PDR since China's import restrictions were introduced in 2018 (World Bank 2020a). As a Party to the Basel Convention, it is important that Lao PDR addresses the legal response to this situation, while ensuring that negative environmental externalities and social impacts are avoided.

8.5 Opportunities

The opportunities for improving the sustainable consumption and production of plastics in Lao PDR are significant, though not without challenges. Being an early adopter of circular economy principles will ensure that linear approaches of take-make-dispose do not become fully engrained within Lao culture. In the first instance, this will require improved information and the establishment of greater awareness-raising activities, which target the hearts and minds of all people in Laos.

Achieving cultural, social, economic and environmental change will require contributions from all parts of society, not just the government. This will necessitate improved coordination and enhanced communications across the public and private sectors. It is important to recognise that regulations alone are not the solution, noting the challenges in passing laws within required timeframes, and also acknowledging the difficulties in enforcement within Lao PDR. As such, prohibitive laws may have a place at certain times, but voluntary initiatives and economic/ social incentives may achieve more rapid change in the short term.

Lao PDR has the potential to develop its tourism sector (post COVID-19), particularly nature-based and cultural tourism, due to its rich natural and cultural heritage (World Bank 2019). However, this will require sufficient infrastructure in waste management, in order to minimise litter and other associated problems.

A well-informed collaborative platform may have success in attracting interest and investment within Lao PDR. There are many small countries, such as Kenya and Chile, throughout the world that are changing their approach to sustainable consumption and production. Lao PDR also has a great opportunity to show proactive leadership in this area, making a mark regionally and globally.

8.6 Summary

Table 6 below summarises the major strengths, weaknesses, opportunities and threats discussed in this section.

Table 6 Summary of Strengths, Weaknesses, Opportunities and Threats

Strengths	Weaknesses
• Relatively small population, meaning that overall waste volumes will remain relatively low. • Rich natural and cultural heritage. • Lao PDR is signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. • Opportunities for alternative natural materials, such as bamboo and banana leaf. • Lao PDR is in a good geographic position, with neighbouring countries that have well established post-consumer processing of plastics and related know-how. • Manual costs are low, meaning that processing operations can be cost-effective. • Limited current consumption of processed and pre-packaged foods, with a focus on fresh produce. • A number of well-informed NGOs are present in Lao PDR to help drive change.	• Fragmented legislation and significant loopholes in laws and regulations. • Weak implementation and enforcement of existing laws and regulations. • Lack of decision-making tools for integrated planning and cross-sectoral coordination. • Low technical capacity of staff, with a reliance on volunteer staff members. • Division of governmental roles and responsibilities is often unclear, while being complicated and with overlaps. • Limited and uncertain operational budgets. • Lack of data on plastics flows. • Outside of main urban areas, the population is geographically spread over wide areas. • Limited coverage of waste collection services especially in rural and semi-urban areas; low willingness or ability to pay for available services.

• Key industry and business bodies, such as the Lao Chamber of Commerce/ Euro Chamber of Commerce, with a large membership base. • Some shops, cafes, and restaurants are already reducing the use of single-use plastic items – so far mainly targeting expatriates and tourists. • High use of smartphones and social media amongst the public, meaning that information can spread relatively quickly.	• Very little waste segregation at source, recyclable plastic items often mixed with other waste and thus contaminated. • Low domestic capacity for materials recycling and poor quality in collected material streams. • Limited motivational incentives for change. • Despite improvements, poverty is still a serious issue for parts of the population.
Opportunities	**Threats**
• Adoption of circular economy principles before linear approaches to material flows are fully developed and entrenched. • Government departments to show leadership in sustainable production and consumption through procurement. • Improved coordination and cooperation between government departments. • Develop systems for collection and evaluation of data on waste and plastic material flows. • Establish an awareness-raising program, which targets the hearts and minds of all people in Lao PDR, particularly focusing on social media. • Foster regular dialogues with businesses and other stakeholders on plastics issues, visions, and practical steps. • Obtaining international funding/ private sector investment in developing services and infrastructure. • Develop product stewardship/ EPR. • Develop domestic production and processing of post-consumer materials, benefitting Lao PDR's economy. • Cooperate with other ASEAN countries in promoting sustainable production, including more sustainable packaging of consumer goods.	• Low awareness on issues around unsustainable production and consumption will make change difficult. • Increase in home deliveries resulting in increased packaging, particularly takeaway-food containers. • Increase in processed foods and associated packaging. • Decline in wet markets and an increase in supermarkets and stores selling pre-packaged products. • Increasing inflow of poor-quality post-consumer plastic waste from other countries, resulting in Lao PDR becoming a dumping ground. • Loss of livelihoods for the informal sector, particularly those involved in collecting recyclables. • Policies that may unduly impact poorer parts of society, reducing product choice and accessibility.

9. GENERAL POLICY APPROACH

9.1 Problem Statement

Lao PDR is facing new challenges as a result of changing consumption and production patterns, which are resulting in higher volumes of waste and an increasingly complex waste stream with a falling share of biodegradable materials. A large and increasing component in waste streams are plastics, particularly plastics used in packaging.

Many plastic items are single-use products such as bottles, food packaging and carrier bags, which are designed for a short usable life span before being discarded. Currently, Lao PDR does not have comprehensive policies around sustainable production and waste management, has limited public awareness over issues resulting from inappropriate use and waste disposal, and lacks services and infrastructure to collect, sort, and process post-consumer wastes.

A large amount of waste plastic is disposed of inappropriately or mismanaged, resulting in a range of environmental, social, and economic impacts and negative externalities. Many households and businesses burn plastics, potentially resulting in human health impacts. Plastics are also dumped on land and in river environments, damaging natural beauty, causing pollution and leading to negative impacts on ecosystems and wildlife. Waste and litter results in a range of economic costs to society, including the need to develop and manage landfills, clean-up urban and rural environments, and clear out blocked streams, stormwater canals and drainage systems.

Changing the approach to plastics will help align Lao PDR with regional and global initiatives to combat pollution and reduce demand on natural resources, helping move the country towards circular economy principles, including reducing the reliance on natural resources and the volume of materials that are leaked out of the economy.

9.2 Policy Aims

The policies outlined in this action plan concerning the reduction of single-use plastics seek to achieve the following broad aims:

- Decouple economic growth and the development of people's standards of living from unsustainable natural-resources use, by minimising the use of virgin plastic material.
- Avoid negative externalities from plastic use and disposal, which result in environmental, economic and social degradation, including waste, pollution and littering.
- Contribute towards the health and prosperity of Lao PDR, by providing packaging and other products that contribute to a high quality of life, within regenerative waste management and

resource-efficient consumption and production system, which allows for the regeneration of material wherever possible.

9.3 Policy Objectives

These policy aims will be achieved through the following objectives:

- Eliminate single-use plastics where feasible by promoting alternative packaging and product solutions.
- Where plastics are necessary, shift to reusable options or materials and products that can be recycled domestically.

9.4 Guiding Principles

The policies outlined in this report have been developed under the following guiding principles:

Links to Systems and Frameworks:

- A systems approach must be utilised that considers the whole lifecycle of products (avoiding making improvements at individual stages at the expense of the overall product chain).
- Policies and initiatives must reflect the priorities of the waste hierarchy and be based on circular economy principles.

Domestic and International Linkages:

- Where possible, domestic development in manufacturing and materials recycling is to be encouraged, thereby contributing to economic growth in Lao PDR.
- Domestic policies will link with wider regional and global policy frameworks, ensuring that Lao PDR makes a meaningful contribution to environmental solutions across the ASEAN region and beyond, particularly in regards to reducing pollution in riverine and marine environments.

Approaches and Timeframes:

- A range of policies and initiatives will provide 'building blocks' that enable solutions across short, medium, and long-term phases.
- Policies will include a mix of tools, involving incentives as well as hard approaches.
- Policies and initiatives will bring about behaviour change by combining awareness-raising with service establishment and infrastructure development.
- Policies and initiatives will require leadership, transparency, accountability and collaboration across all layers of society, including government, industry, business, not-for-profit organisations, and consumers.
- Transforming consumer awareness and behaviour change is central to all policies and initiatives, taking into account changing consumer habits and lifestyles.

Economic, Environmental and Social Safeguards:

- Policies and initiatives must not unduly impact the economic development of Lao PDR and must avoid negatively impacting the poorer members of society.
- Policies and initiatives must not cause unreasonable additional costs for businesses or households.

- Policies and initiatives must not result in significant loss of employment/livelihood opportunities (specifically in relation to the informal sector and the collection of recyclable materials).
- Policies and initiatives must protect both the natural environment and public health, including the avoidance of risks related to food safety.

9.5 Broad Policy Options

9.5.1 Overview

There are a number of broad categories of policy options for reducing single-use plastics:

- ***Regulatory Instruments:*** these are direct measures taken by the government to influence behaviour and actions through formulated rules and directives. These instruments can be affirmative to encourage certain behaviours and actions, or prohibitive to ban certain behaviours and actions.
- ***Economic Instruments:*** these involve financial mechanisms, as opposed to the direct mechanisms employed by mandatory regulation, meaning that participants are not obligated to take part in the measures. These instruments may include incentives, such as a subsidy, or may involve a disincentive in the form of taxes or levies.
- ***Information Instruments:*** these attempt to influence behaviours and actions through the provision, communication and transfer of knowledge and argument.
- ***Supportive Instruments:*** these involve the use of broader platforms to encourage voluntary agreements and approaches, particularly between the government and the private sector. These involve the development of voluntary product stewardship/ EPR schemes, the establishment of services, and investment in infrastructure.

By understanding policy within its broadest definition, it is possible to see that in the context of single-use plastics policies towards solutions should not be seen as being entirely under the remit of government. Taking a broader view is particularly important in Lao PDR, where there is often limited governmental capacity. Achieving sustainable consumption and production requires leadership from all parts of society, with the private sector and NGOs being key initiators and agents of change.

In the context of reducing single-use plastics and improving sustainable production and consumption, it is important to recognise that no single policy alone will achieve success. A blend of policies will be required over short, medium, and long timescales. Successfully achieving goals and objectives is likely to require a mix of policy instruments, both inside and outside of government.

9.5.2 Regulatory Instruments

Regulations can be prohibitive in disallowing certain actions, or affirmative by shaping certain expectations. Regulations are key instruments in many aspects of environmental management, particularly where there are few other incentives to modify behaviour and actions. These instruments can employ fines and penalties to ensure compliance. They can also provide clarity and certainty through defined requirements, achieving a level playing field in terms of expectations and compliance. However, there is a drawback in that they only encourage the achievement of minimal standards, rather than encouraging people to strive for the maximum outcome. The provision and receipt of adequate levels of information, monitoring, and enforcement are critical in the implementation of regulations, since these instruments are deterrents as opposed to incentives for change.

Bans are the main prohibitive regulatory instrument and are seen in many parts of the world as the most obvious approach to minimising single-use plastics. However, in the context of Lao PDR, outright bans may be problematic for a range of reasons:

1. Lao PDR's position in regional supply chains means that it is very difficult to influence how products are packaged and an outright ban of certain plastics would limit the range of products that can be imported into the country.
2. In the absence of widely available, cost-effective, and cheap substitutes and alternatives, bans may further limit product choices, as well as resulting in challenges with transporting goods and keeping food produce fresh.
3. Experience in other countries, such as Kenya, shows the importance of consistent and continuous enforcement. Prior to establishing a ban, Lao PDR would need to further develop its waste information systems and capacity in the ability to monitor and enforce bans of this nature at national, provincial, and district levels.
4. Finally, enacting regulations can be a lengthy process, with resultant controls also being extremely rigid and hard to adapt to changing economic, social and environmental conditions.

Therefore, initially, it is not recommended to utilise national mandatory regulations. Over time, however, it is likely that mandatory regulations will be required and may even be requested by the private sector in order to "level the playing field" and eliminate free riders. A free rider is a term used to describe businesses and organisations that take advantage of waste management or product stewardship schemes, without making any contribution, either financially or otherwise, towards the administration of these schemes.

Although regulated national bans are unlikely to achieve the desired results, the introduction of voluntary local "bans" of certain products, based on agreements between local governments and related private companies, could be successful in building momentum and raising awareness. These bans could be targeted to specific geographic locations, within individual stores or markets, or employed only for restricted periods. In fact, Lao PDR has already started utilising this approach. The Vientiane Clean City Project, established by DoNRE and business owners, seeks to reduce plastic-bag use by introducing plastic-bag free Wednesdays in certain supermarkets, markets and stores. This follows an outright ban of plastic bags in Kuadin morning market. Although localised bans will not be mandatory, it will be critically important for government to provide support in these approaches, through the provision of advice, awareness raising and endorsement.

Some individual businesses, such as restaurants, have taken their own initiatives to stop using certain items, such as plastic straws and plastic takeaway containers. These initiatives provide a useful indicator as to which products are non-essential and could potentially be banned. A key consideration in these bans is to ensure that businesses have sufficient lead-in time to prepare for them and inform their customers. It is essential that customers can obtain cost-equivalent and convenient alternatives to plastic items such as carrier bags. It is also important that people with disabilities are not unduly impacted by bans of certain products, such as straws, which allow them to easily and safely consume food and beverages.

9.5.3 Economic Instruments

Economic instruments can provide incentives or disincentives towards certain actions. Incentives are typically in the form of subsidies, loans, grants or tax breaks, which provide either direct finance or relief to private entities to assist in enterprises advantageous to the wider society. Conversely, disincentives seek to penalise certain activities and actions through fees, taxes, levies and duties. These instruments can be used to internalise the costs of pollution and other externalities that result from certain products or activities.

Some economic instruments utilise a combination of both incentives and disincentives. For example, some countries use landfill levies. If these fees are set at the right market level, then this discourages people from dumping large volumes of waste. This approach, in turn, may motivate society to find ways of reducing waste, such as increased re-use or recycling. However, it can

also lead to alternative negative behaviours around dumping wastes to avoid such fees, requiring additional levels of enforcement. Landfill levies do generate revenue for the government, though, which can be used to improve waste minimisation services and infrastructure. In some countries, this revenue is used to fund grant schemes, which provide finance to both governmental and private entities involved in waste minimisation. This approach highlights the increased policy effectiveness if revenue generated by taxes and levies is invested in the waste management/ resource use sector, as opposed to being diverted to central treasuries. Earmarking money for specific purposes in this way can also increase the willingness to pay fees and taxes.

Economic instruments often require regulations, but they can reduce the need for enforcement, since they create the motivation or discouragement of certain actions through market mechanisms. They can also be used to create subsidies or tax relief for actions that are not initially profitable or investments that require long payback periods, thereby reducing the risk for private entities. However, some economic instruments can also impact market prices, restricting access to certain products for certain parts of society due to higher costs.

Economic instruments could offer potential solutions within Lao PDR, particularly those that incentivise certain actions and help with investment in services and infrastructure. Investment in waste management and materials manufacturing/ processing/ reprocessing is critical in reducing single-use plastics and developing alternatives. However, these sectors typically operate under extremely tight margins and are exposed to the volatility of global market prices. Businesses, investment and innovation could be encouraged through economic instruments such as tax breaks and subsidies, although there would be fiscal challenges at the government level in budgeting for the latter.

Caution is recommended around certain economic measures that disincentivise, such as import taxes on plastics and taxes on domestic manufacturing, since these would involve extensive dialogue with neighbouring countries and may restrict trade and impact business viability. It is also highly likely that these taxes would unduly impact poorer members of society, as higher costs to businesses are likely to be passed onto consumers. However, due to Lao PDR's position in regional supply chains, the use of import taxes on plastics are one of the few ways of reducing plastics at source and should be considered over time.

Charges on carrier bags could be utilised if the disincentives were set at a fair level, alternatives were cost-effectively and conveniently available, and awareness was improved on issues with single-use plastics. Prior to any mandatory charges at a national level, the use of voluntary charges could be introduced at specific locations, along with the availability of long-lasting reusable bags (which could be manufactured from stronger plastics, cotton, or other materials).

Landfill levies are also not recommended, noting the current low levels of maturity in the waste management sector in Lao PDR and acceptance by the public. The willingness to pay for household waste collections by many householders is already very low, meaning that take-up is limited in areas where services exist. Additional charges will only further constrain the situation. Moreover, higher gate fees at landfills may result in negative behaviour by some waste management companies, encouraging greater levels of fly-tipping and unmanaged dumping of wastes outside of managed facilities or designated sites.

9.5.4 Information Instruments

Information instruments provide the foundations for all other policy instruments, since without adequate education and awareness, regulatory and economic tools will not be understood or effective. If persuasive enough, information can also be instruments of change on their own. Such instruments rely on credible data and this information and can range from labelling on products through to national awareness-raising campaigns.

The basis of any information instrument is credible and robust data, both quantitative and qualitative. It is essential that Lao PDR develops systems around research, data collection and analysis, monitoring and reporting. The recent establishment of the SEA Plastic EDU training project at the National University of Laos provides a great opportunity to further develop country-specific research and training in the sustainable consumption and production of plastics in Lao PDR. The wider curriculum also needs to ensure that school-age children are educated on sustainable consumption and production.

Beyond educational establishments, wider systems, including at governmental levels, are needed for data collection and monitoring. However, it is noted that obtaining data on material plastic flows in relation to the manufacturing, use, and disposal of plastics can be extremely challenging, particularly when such information is commercially sensitive.

As with other environmental actions, changing behaviour in relation to plastic littering and correct disposal will have a range of determinants including structural/ situational, psychological and value-based factors, which combine to provide a complex behavioural response by the public (Barr 2003). Achieving culture change in the area of waste management and resource use requires the sustained use of information instruments, which recognise the need for incentives and the necessity for environmental action to be seen as normative behaviour. Clear communications of requirements are needed to ensure public participation in waste collection schemes, and people need to fully understand the impact of littering and poor waste disposal on human health, the environment, and the economy. As such, it is key that information is provided in a way that people throughout the country can understand and relate to within a Laos context.

It is important to recognise that calls for behaviour change need to be supported by available and accessible services and infrastructure. For example, there is little point in asking householders to separate their wastes and recyclables, if there are no separate collection schemes for these materials. Public trust is key. Yet this has been rapidly eroded in some parts of the world where wastes have been carefully separated only to then be carelessly mixed together in one collection vehicle. The provision of information, along with the presence of a convenient infrastructure, such as bins for recyclable materials, will influence people's psychological variables, including the individual's perception of convenience and simplicity, and society's subjective norms of behaviour.

Whilst, historically, national awareness-raising campaigns could be costly, depending on the media utilised, social media can now provide a cost-effective means of spreading messages. There are also several capable NGO's (e.g., Zero Waste Laos, Green Vientiane) engaged with sustainable consumption and production of single-use plastics and the reduction of littering, and they will be valuable partners in the area of information tools. There is also international evidence that investment in education and awareness-raising provides value for money and cost savings throughout the wider supply chain, through increased public confidence and participation in recycling collections and reduction in littering (WRAP 2015).

9.5.5 Supportive and Collaborative Instruments

This area of policy refers to a range of approaches, which typically require collaboration and partnerships. These partnerships may involve the private sector, government, NGO's and the informal waste management sector. Collaborative environmental governance and initiatives can achieve individual objectives as well as common goals that contribute to tackling wider social and environmental issues. The approach recognises that although government plays a critical role in governance, it is not the only participant. From the private sector perceptive, the intent behind these approaches may be for a variety of reasons including business development, marketing, or corporate social responsibility and as a way of offering more flexible and cheaper regulations than centralised legislation. Governments may see collaboration as a way of achieving change without having to resort to introducing regulatory or economic instruments, while utilising the skills and experience of other sectors. To the wider public, these approaches offer greater awareness, understanding and

participation in achieving some form of environmental sustainability (Klyza and Sousa 2008). As such, supportive and collaborative approaches are seen as delivering outcomes which are better for the environment, society and economy than traditional top-down governance (Weber 2003; McGuire 2006; Miller and Fox 2007).

These policy approaches can take a variety of forms, including the articulation of wider objectives that should be pursued by the private sector, such as guidelines and standards; the establishment of platforms that encourage, collaboration between public and private sectors; the development of green public procurement strategies, which provide support to sustainably produced products; and tools that contribute to the principles of product stewardship and extended producer responsibility (EPR).

Product stewardship is a principle whereby producers, importers, brand owners, retailers, consumers and other parties involved in the life cycle of a product accept responsibility for the environmental impacts of a product through its life cycle. EPR is a similar term, though usually it has a narrower focus on the responsibilities of producers themselves. These approaches usually involve parties internalising the environmental costs arising from final disposal of their products, ensuring that costs are considered at the point of purchase, using arrangements such as advanced disposal fee schemes and container deposit schemes. These schemes result in the reduction of waste and recovery of materials. These approaches may be undertaken in relation to one individual product or may cover an entire product range through collective responsibility (e.g., beverage bottles in a container deposit scheme).

Such schemes can be tailored to specific project needs and waste situations and can be established in a manner that suits the industry. However, they can require significant investment by businesses and industry through product design (e.g., changes to materials in products); the provision of product information (e.g., labelling); the establishment of services (e.g., collection schemes); and the development of infrastructure (e.g., reverse vending machines for container deposit schemes; sorting equipment to separate plastics; and recycling infrastructure).

Achieving this kind of investment within Lao PDR may be challenging, particularly for domestic brands. Although, there may be potential for international brands to show leadership and help develop collective schemes, as well as the potential for international development funds. The flexibility of these approaches means that it is entirely possible to start at a small scale and gradually increase the impact over time.

For some product categories, the government could after some time convert voluntary schemes into mandatory schemes through regulation, which will eliminate any free riders who utilise the schemes without contributing to them. The government could also choose to identify priority waste streams where there are significant problems with disposal, or the waste stream is growing rapidly.

9.5.6 Combining Instruments for Effective Policy Design

Achieving complex policy objectives, such as transforming production and consumption systems for enhanced sustainability, usually requires combinations of different policy instruments (Rogge and Reichardt 2016). For example, awareness-raising of consumers often has a limited impact on behaviours if more sustainable options are hard to access, difficult to distinguish from conventional options, or perceived as too expensive. Similarly, regulations and charges/taxes can be hard to enforce if key stakeholders lack awareness and do not recognise the need for change.

Policy design is therefore not just a matter of choosing the most effective instrument for the problem at hand, but to combine such tools into effective mixes that can support, encourage and enable changes in behaviours and business practices. The following framework (Table 7) can help to identify mutually supportive policy instruments.

Table 7 Three Categories of Policy Instruments with Complementary Functions
[Source: adapted from Akenji 2014.]

Function of policy instrument	Effect on stakeholders	Examples
Awareness and attitude	Recognise the need for changes; intention to take action; acceptance of government action	• Education • Dialogue processes
Availability of better options	Make better options available on the market	• Subsidies for R&D • Regulations and design standards
Facilitators	Enable broad uptake of better options by making them easy to access and distinguish, attractive, and affordable	• Economic instruments • Voluntary agreements and pledges • Public procurement • Labelling schemes

10. ASSESSMENT OF SPECIFIC POLICY OPTIONS

This chapter provides an assessment of specific policy options across each of the main instruments that have been utilised in other parts of the world (chapter 7). This is a country-specific assessment, recognising that what works in certain parts of the world, even in countries that are in the same region, may not necessarily be effective in Lao PDR.

This assessment takes into consideration the strengths, weaknesses, opportunities and threats outlined in chapter 8, giving particular attention to capacity constraints at institutional levels (e.g., expertise and enforcement ability), cultural and social challenges and opportunities, and economic conditions. It is only by using these different lenses that it is possible to reach a realistic evaluation of the policies that are most likely to be effective in Lao PDR.

10.1 Product and Material Bans

Category: Regulatory Prohibitive.

Overview: Bans can be used on problematic or unnecessary single-use plastic products in order to restrict market availability and accessibility. Bans can be used in relation to:

- Product Categories: complete bans on certain products such as plastic carrier bags, plastic straws, and plastic cutlery.
- Individual Characteristics of Products: while not banning entire product categories this approach provides limits on certain characteristics (e.g., some counties have banned thin carrier bags that are under a certain level of thickness).
- Specific Plastics: this involves a ban on the use of specific plastics, either in general or in certain product applications (e.g., bans of oxo-degradable plastics or a ban of the use of EPS in food takeaway packaging).

The types of items that are banned need to be carefully thought out, considering their availability, environmental impacts, cost, convenience, safety, and acceptance of alternatives.

Approaches: A range of mandatory national bans have been utilised in several countries including Thailand, the EU, Canada and a number of African countries. Bans can also be developed on a voluntary basis, with these approaches typically employed in defined geographic locations, events, or a specific site. For example, such voluntary bans can be employed in shops, retail chains, markets, cultural and

heritage sites, music events, conferences, town centres, and national parks. Furthermore, bans of certain products and materials can be utilised within individual organisations, through procurement strategies (government procurement approaches are discussed in section 10.8).

Development of Policy: National bans will require legislation, with the products, material, uses and exemptions clearly defined, so that there is no ambiguity as to what is banned and what is permissible. As such, bans will require political support and development undertaken by relevant ministries. Consultation with stakeholders will be essential, as bans are likely to be met with some resistance and are likely to have impacts on a number of businesses, industries, and consumers. Consequently, the development of national bans and associated legislation is likely to take some time.

Voluntary bans do not require legislation. The development of this approach will depend on the scope of the ban and the span of control of the lead agency. For example, bans in retail outlets can easily be developed by the management or owner of the business. Conversely, bans in wider areas, such as town centres and national parks, would require agreement by all relevant key stakeholders. In all voluntary cases, it is still highly advisable that consultation is undertaken with all impacted stakeholders so that the reasons behind the ban are fully understood.

Conditions and Exemptions: National bans may require certain exemptions to be defined, particularly in regard to permitting use for certain medical applications and for people with medical conditions (e.g., people who have difficulty in consuming beverages without the aid of a straw).

Implementation: National and voluntary bans will require enforcement capacity, although there would be different capacity requirements with each approach. National bans require ongoing commitment and will need to be enforced by government agencies, with input across national, provincial and district levels, along with an administrative system also required for fines.

Voluntary bans are simpler to enforce, with social pressure providing an important role. Voluntary bans are unlikely to involve fines. In both approaches, lead-in times are essential to allow people to prepare and find alternatives to the banned products. Phased approaches can be utilised if required, with progressive bans introduced over time.

Suitability for Lao PDR: Table 8 below outlines the benefits and challenges of bans, both nationally and voluntary, in Lao PDR. Mandatory national bans are generally ineffective policy tools in countries where there is weak monitoring and enforcement, along with limited acceptability and adaptability by local communities (Ocean Conservancy, 2019). As such, it is not recommended that national bans are introduced into Lao PDR without the prior establishment of clear institutional roles and responsibilities and further investment in developing capacities within relevant departments at national, provincial and district levels.

Conversely, voluntary bans can be introduced into the country as a way of raising awareness and building momentum. As such, it is recommended that these bans are piloted in a range of locations throughout Lao PDR. These could include bans on:

- Plastic drinks bottles at high-profile events (e.g., Boun Suang Heua Boat Racing Festival).
- Carrier bags at night markets (e.g., Luang Prabang).
- Plastic drinking-water bottles at key national conferences.
- Plastic straws and drinks stirrers at major hotel chains.
- The use of EPS takeaway containers by major food delivery companies.
- Plastic-free days at schools and temples.

In all of these situations, it will be essential that the project is well publicised and that cost-comparative alternatives are provided.

Table 8 National Bans

Advantages in Lao PDR	Implementation challenges in Lao PDR
Mandatory National Bans	
• Removes problematic SUPs from the domestic market. • An upstream approach that eliminates many of the downstream externalities (e.g., waste management; litter removal; clearing drainage systems). • Eliminates associated problems around littering and degradation or urban/ rural environments, but the gains depend on what alternatives are utilised (e.g., shift to paper is likely to still result in littering). • Reduces waste collection volumes and saves landfill/ dumpsite space. • Can encourage innovation and the development of alternatives.	• Requires legislation and consultation, which may take a number of years to pass. • Lao PDR imports most of its consumer goods, so the country has limitations in determining how products are packaged. • May lead to some higher costs to government, business and consumers. • May impact poorer groups disproportionately, reducing the availability and accessibility of affordable daily products. • Alternatives may not exist, may be less safe in terms of food contact, or have a higher carbon footprint (e.g., energy in production and biodegradation that results in greenhouse gases). • International experience shows that bans are challenging to maintain and enforce over time. Impacts on personal convenience may result in resistance. Difficult to implement in Lao PDR, due to costs and limited capacity to communicate and enforce regulations.
Voluntary Bans	
• Removes problematic SUPs out of local supply streams and reduces associated externalities (costs for waste collection). • Eliminates associated problems around littering. • Is already being implemented in certain places on a voluntary basis (e.g., Khuadin Market, Vientiane). • Can be implemented relatively quickly and used as an example and build momentum towards wider national changes. • Potential to be implemented at a range of levels including geographic areas/ events/ businesses.	• Voluntary efforts require champions to develop the schemes. • Requires consultation with key stakeholders, and communication to consumers. • May lead to some higher costs to government, business and consumers. • Possible resistance from some retailers/ businesses. • Requires alternatives, such as banana leaves as wrapping, or that people bring reusable bags or containers. These may be less convenient and less safe and could in some cases have a higher carbon footprint than plastics.

10.2 Levies on Products at Point of Sale

Category: Economic Disincentive/ Regulatory Prohibitive.

Overview: Charges are market-led measures that can disincentivise usage of certain plastic products, which are typically given away for free or as part of the packaging for food and beverages. The aim of introducing charges is to disincentivise the use of plastics while encouraging alternatives, and enjoy the added benefit of raising revenue. The impact of charges on certain items such as carrier bags is widely debated, although in most cases the measure does lead to a reduction in demand. For example, in England, it is estimated that plastic-bag use has declined by 86% since the charge was introduced in 2015 (UK Parliament 2020).

Approach: A mandatory levy can be imposed at different parts of the supply chain, though in this section the focus is predominantly on charges placed on consumers at point of sale (import and manufacturing taxes are considered under economic instruments). Charges could be imposed on a range of products, including bags, straws, cups, and polystyrene packaging; although, this policy instrument is predominantly used for carrier bags, with levies introduced in Vietnam, Japan, Malaysia, New Zealand, many European countries. Charges are typically placed at point of sale, requiring retail outlets to collect the revenue from customers.

Development of Policy: Mandatory national levies will require legislation, specifying the products that are included, the charges, and the use of revenue. The level of charge will be important in relation to customers' willingness to pay, so that it acts as a real disincentive, as opposed to a straightforward revenue-making stream. Levies can be used as a precursor to outright bans, by creating favourable market incentives and facilitating the transition to alternatives.

Conditions and Exemptions: In respect to charges for carrier bags, the legislation will need to define the types of bags (including the thickness of bags) that are charged and the types of retail stores where charges must be incurred (e.g., do charges apply to food and non-food retail stores/ stores of a certain size). The use and beneficiaries of the generated revenue will need to be determined. Revenue may be kept by retailers, donated to charities, used to fund waste minimisation activities, or incorporated into government budgets.

Implementation: National bans will require all retail outlets to be party to the scheme, requiring widespread communications and the development of administrative systems for monitoring, reporting and collecting revenue in a transparent and accountable manner (the level of administration will depend on the recipient of the revenue, but these measures can be costly to implement and there are currently limited administrative approaches in Lao PDR for these instruments). Lead-in times are essential to allow people to prepare and find alternatives to the products that will incur a charge.

Suitability for Lao PDR: Table 9 outlines the benefits and challenges of levies at point of sale, particularly in relation to carrier bags. Levies at point of sale can only be effective if suitable alternatives for the targeted product are widely available. Prior to introducing charges for carrier bags, many countries had already established cost-effective alternatives, such as 'bags for life'. Consequently, while it is recommended that charges for carrier bags should be introduced into Lao PDR, it is advised that these measures are introduced in the long term (beyond five years), in order to allow the country time to develop cost-effective alternative products, thereby avoiding disproportionate impacts on low-income households.

Table 9 Levies on Products at Point of Sale

Advantages in Lao PDR	Implementation challenges in Lao PDR
• Discourages the use of SUP carrier bags. • Encourages the use of reusable bags or single-use bags made of other materials, such as paper. • Revenues can be used for waste minimisation activities, innovation in alternative materials, or other environmental protection projects.	• May impact the poorer parts of society disproportionately. • Does not directly eliminate the upstream production of SUPs. • Questions over the availability of alternatives. • The life-cycle environmental impact of alternatives may not be negligible (e.g., energy to produce paper; greenhouse gas emissions). • May lead to some higher costs to government, business and consumers. • Challenging to administer in Lao PDR, due to requirements for monitoring and collection of revenue, with limited current accountable administrative systems in place. • Awareness-raising campaigns will be necessary, which will require additional costs and ongoing commitment.

10.3 Taxes, Penalties, and Levies

Category: Economic Disincentive.

Overview: Taxes are market-led measures that can disincentivise the import and sale of certain plastic polymers or certain plastic products. Although these are not outright bans, the approach results in increased prices of taxed items, thereby driving down demand, and encouraging substitution with more sustainable materials. Penalties can be used to punish socially unacceptable and environmentally undesirable behaviour, such as littering and fly-tipping. Levies can be introduced at landfills in order to disincentivise waste volumes and encourage diversion by finding more effective and efficient ways to reduce, reuse, recycle or reprocess waste. Each of these policy instruments would help raise government revenue.

Approach: Taxes may be imposed on defined products or polymers at various upstream stages of the supply chain, including production, import, conversion and distribution. Taxes on exports from Lao PDR may also need to be considered. Tax levels may be based on the weight of the product, the number of individual items, or as a percentage of the price of the product. Penalties typically involve a range of measures depending on the severity of the offence, including fines, confiscation of goods, and imprisonment. Landfill levies are taxes applied to the volume of weight that is disposed of at landfills, on top of standard gate fees.

Development of Policy: These policy instruments would require legislation, clearly defining without any ambiguity the products or plastic polymers that are included, the level of the tax, and the nature and degree of penalties. It is likely that in Lao PDR the revenue from these economic disincentives would be incorporated into general government budgets, but the revenue could be reused for waste

minimisation and other environmental initiatives. The introduction of any import taxes would require consultation with Lao PDR's main trading partners.

Conditions and Exemptions: Plastic polymers or products that have a certain level of recycled content may be deemed exempt from the tax, thereby encouraging recycled plastics other than those manufactured from virgin plastics. The legislation would need to be clear on composite packaging, which contains a combination of different materials (e.g., only including packaging that is predominantly plastic by weight). Penalties for activities such as littering and fly-tipping would need to take into account any mitigating circumstances. The cost per tonne for landfill levies would need to be high enough to act as a disincentive, and certain types of waste could be deemed exempt (e.g., medical wastes and material that can be used as landfill cover).

Implementation: These new economic instruments would need to be incorporated into Lao PDR's wider import taxes, customs checks, and financial systems. All of these measures would require promotion and enforcement of compliance, to prevent any opportunities for tax/ levy/ penalty avoidance and evasion. The system would need to be established in a way that minimises the administrative burden for the government and operators.

Suitability for Lao PDR: Table 10 outlines the benefits and challenges in import and manufacturing taxes, penalties and landfill levies. The introduction of taxes would need to consider the availability of cost-effective alternatives and the impact that taxes would have on the accessibility of various products to the public and businesses in Lao PDR, particularly low-income households. Due to Lao PDR's position in regional supply chains, there would be a real danger of taxes resulting in limitations in the supply of certain foods and household products or may result in only affluent members of society being able to afford certain products. Although, this option has considerable merit for Lao PDR, the development of alternatives should be considered prior to the establishment of taxes to avoid unwanted consequences.

Laws already exist in relation to some behaviours around littering, however, there are challenges in the current enforcement capacity, and a potential unwillingness for many people in Laos to report such behaviour to the authorities. As such, it is recommended that existing laws are complemented with wider education and awareness-raising campaigns and that more effective and efficient ways of enforcement are examined.

The introduction of landfill levies would require additional infrastructure at landfills to weigh incoming wastes, and administrative systems to record and report waste volume and the fees collected. The revenue generated could be extremely useful in Lao PDR in providing funding for other waste minimisation activities, but due to the maturity of the current waste collection system a landfill levy is not recommended at this time. Increased costs of waste disposal are likely to have negative consequences, with costs resulting in people opting out of waste collection schemes, and the potential for waste collection companies to inappropriately dump wastes.

Table 10 Taxes, Penalties and Levies

Advantages in Lao PDR	Implementation challenges in Lao PDR
Manufacturing Taxes	
• Market-led measure that can disincentivise SUPs and pushes manufacturers to shift material use and approaches to packaging. • Can be used to remove non-recyclable/ limited recyclable materials from the supply chain (e.g., expanded polystyrene).	• Challenging to define the products to be targeted and at what rate to charge the tax. • The higher costs from taxes will likely be passed down the supply chain to retailers and consumers. • May impact the poorer parts of society disproportionately. • Governance, administration, monitoring and enforcement challenges.
Import Taxes	
• Would help reduce single-use plastics from entering the country across regional and global supply chains. • Can promote products made from recycled content. • Revenue can be utilised in waste management and other environmental initiatives.	• Changing import taxes can be highly challenging, with established tariffs across ASEAN countries, noting that Lao PDR is already in dialogue regarding a number of free trade agreements. • Enforcement and governance challenges. • Revenue likely to go to the central Treasury, as opposed to being used for resource and waste minimisation activities. • May lead to increased consumer prices, which in turn may reduce imports as well as product availability and diversity in Lao PDR. • May impact low-income households disproportionately
Penalties	
• Fines imposed on serious litterers with the aim of preventing, eliminating and reducing illegal dumping and littering. • Fines can be used to pay for enforcement.	• Requires effective monitoring and enforcement. Existing bans on waste burning currently have limited enforcement. • May disproportionally impact poor people who do not have the ability to pay for collection services.
Landfill Levy	
• Encourages the reduction in waste that is disposed of at landfill, reducing landfill management costs and incentivising recycling and reuse. • Generate revenue that can be used to fund new waste minimisation activities.	• Higher costs may reduce participation by householders in waste collection schemes and may lead to waste companies dumping waste (with enforcement capacity low, these activities are likely to go unpunished). • Additional landfill infrastructure required, including weighbridges. • Requires extensive administration systems.

10.4 Subsidies/ Tax Breaks

Category: Economic Incentive.

Overview: Tax breaks, or direct payments from the government in the form of subsidies, can be used to promote sustainable manufacturing of alternatives to single-use plastics, sale of products, or to encourage the establishment of waste minimisation and management services and infrastructure. These instruments can also be used to support research and development in this area. Subsidies and tax breaks are typically used to support business development in areas that have uncertain economic viability, allowing risks to be shared between the public and private sector.

Approach: Subsidies can be delivered by the government through a variety of financial mechanisms. These include non-repayable grants, low-interest loans, underwriting risk for projects with other investors, or through equity whereby the government takes part-ownership of a business in exchange for funds.

Tax breaks can involve a tax deduction, tax credit, or tax exemption. A tax deduction reduces the amount of gross income that is subject to taxes. A tax credit offsets the taxpayer's liability on a dollar-for-dollar basis. A tax exemption shields a portion of the income from taxation.

Development of Policy: Subsidies will typically require the government to have available budgets in order to provide finance to business and industries. These budgets may be generated through other charges, such as import and manufacturing taxes or landfill levies/ gate fees. Tax breaks will require the government to have sufficient general budgets to cope with the loss of revenue. These mechanisms do not necessarily require legislation and can theoretically be introduced in relatively short timeframes.

Conditions and Exemptions: Subsidies in the form of grants and loans will typically be distributed via a contestable process, whereby a number of businesses will compete for available funds. Tax breaks will require specific definitions in order to determine the types of businesses and activities that are eligible.

Implementation: Subsidies will require significant administrative systems, along with associated budgets and expertise, to allocate and monitor the transfer of funds, although functions can be contracted out to third-party specialist private-sector entities. Tax breaks can be incorporated into the existing taxation system.

Suitability for Lao PDR: Table 11 outlines the benefits and challenges with subsidies and tax breaks. Although, these instruments could provide much-needed impetus to investment, the major challenge is the capacity of government budgets to offer subsidies. This tool could be utilised in combination with import taxes on certain plastic products as detailed in the previous section. This would require revenue generated from these taxes to be utilised for subsidies within the waste management and resource-use sectors, as opposed to being diverted to the central treasury.

Table 11 Subsidies and Tax Breaks

Advantages in Lao PDR	Implementation challenges in Lao PDR
• Market led measures that encourage businesses to move away from SUP to alternative materials and approaches. • Can stimulate industry to establish infrastructure and services, by sharing risk.	• Limitations in national budgets to provide financial incentives. • Governance, administration and enforcement challenges.

10.5 Design Standards, Guidelines, and Labelling

Category: Information.

Overview: These are measures used to set design packaging standards for manufacturers to improve recyclability, minimise overall footprint, and to contribute to circular economy principles of keeping material in circulation for longer in high-value product applications. Guidelines can assist businesses, including retailers and the hospitality sector, in making decisions around product use, packaging, and waste minimisation. These guidelines can help businesses improve their approach to resource use and waste minimisation. Labels are important in providing details to consumers on recyclability and how to dispose of products at end-of-life, improving consumer awareness and reducing littering.

Approach: The design of plastics plays an important role in determining the ability to collect, separate, and recycle materials at end-of-life into further high-value secondary products, or to reuse the product entirely. Guidelines are important throughout all life stages of a product, so that importers, retailers, businesses, tourism enterprises, and consumers understand the requirements around its use and disposal. On-product labelling can complement guidelines and standards. In-store labelling, such as the already established 'Plastic Free Laos', also be used to promote businesses that have adopted sustainable practices.

Development of Policy: Design standards can be introduced initially as voluntary measures or established as binding requirements through legislation. They would typically be introduced by the government, but could also be voluntarily developed by industry. Guidelines and labelling can be introduced by either government, private sector, NGO's or a combination of all through a partnership.

Conditions and Exemptions: Design standards and guidelines need to overcome the complex trade-off between the sustainability/ recyclability of a product and other overriding key functions. For example, food packaging must not compromise food safety and must meet food contact approvals. Labelling should be developed in a way that is consistent and easy to understand.

Implementation: Design standards can include details on material composition, functionality, size, shape, and aesthetics. Standards can also be used to specify the levels of recycled content that should be contained within products, although these aspects will typically need to be backed up by legislation.

Guidelines can be developed to complement standards or can be undertaken as a stand-alone source of information to help manufacturers improve the design of products, as well as providing information to the wider supply chain to improve the understanding of material usage and requirements for end-of-life processing.

Labels aimed at consumers will need to incorporate visual elements as well as text so that they are understandable by all parts of society. Labels need to invoke the desire to do the right thing with products at the end of life and, so, need to be highly relevant in a Laos context.

Suitability for Lao PDR: Table 12 outlines the benefits and challenges for standards, guidelines and labelling in Lao PDR. Overall, these instruments, particularly guidelines and labelling, have the potential for improving design and awareness about recyclability.

The development of standards requires considerable time and expertise, along with a suitable standards organisation that can help develop and disseminate the standards. Furthermore, Lao PDR's position in regional supply chains means that a lot of pre-packaged products are imported from neighbouring countries, requiring the joint development of standards. Consequently, at this stage, the development of standards is not recommended.

Although guidelines require expertise and time to develop, they could provide a valuable resource and deliver benefits to domestic industries and businesses. Such guidelines could be developed in consultation with the private sector and can be updated as required. Given the growth in domestic productivity, guidelines should be developed in the short term, to prevent unsustainable practices from becoming fully engrained across the private sector. It is recommended that guidelines are developed as a partnership between the government, private sector and NGOs.

For product labelling, there will be similar challenges as with standards, with many products being imported into Lao PDR. However, there is a growing domestic plastic manufacturing industry and it may be timely in the short to medium term to develop a labelling scheme that is specific to products that are manufactured in Lao PDR. It is recommended that any labelling scheme is established after the development of guidelines and that a similar partnership approach is adopted. The already established 'Plastic Free Laos' scheme should be fully supported by all government departments and its adoption encouraged by businesses, particularly restaurants and hotels.

Table 12 Design Standards, Guidelines, and Labelling

Advantages in Lao PDR	Implementation challenges in Lao PDR
Design Standards for Packaging	
• Reduces levels of unnecessary material use, including a shift from multi-layered packaging. • Improves the quality and recyclability for plastics products entering markets. • Can include requirements on recycled content. • Can increase the use of refillable and reusable packaging. • Can be combined with labelling to inform consumers. • Private sector initiatives are more likely to drive progress.	• Lao PDR's domestic production of plastics is very limited. • Since Lao PDR imports a lot of pre-packaged goods, these approaches would require time-consuming coordination with other countries. • Can be extremely challenging to develop due to the range of products on the market. • Can meet resistance to change from brands. • Requires expertise, long timeframes, and a competent standards organisation.
Guidelines	
• Can be used to cover both consumer packaging and business-to-business packaging. • Can be used to cover design, as well as use and end-of-life disposal. • Can be flexibility and updated at intervals.	• Reaching out to a large number of small businesses can be a challenge, especially as so many retailers in Lao PDR are small and medium sized enterprises.
Labelling	
• Can significantly increase awareness and reduce littering. • An existing labelling scheme exists 'Plastic Free Lao' and can be built upon to promote sustainable businesses. • Can be used to promote brand Laos.	• A large number of products in Lao PDR are imported pre-packaged, with limited domestic production. Therefore, these instruments would need to be applied on a regional basis, requiring extensive work by multiple countries to establish and implement. • Labels need to be consistently applied, as multiple labels can cause confusion amongst the public.

10.6 Waste Management and Recycling

Category: Affirmative Post-Leakage Plastic Capture

Overview: Although these activities will not directly reduce the volume of single-use plastics, they will lead to a reduction in waste and leakage of material out of the economy, by increasing the amount of recyclable plastics that are diverted from landfill or disposed of inappropriately, while contributing to Lao PDR's economy and supporting livelihoods.

Approach: These approaches seek to improve the collection, sorting and processing of end-of-life single-use plastics. This requires the development of organised separate collections for recyclable materials, in addition to existing waste collections, as well as the development of domestic pre-processing infrastructure.

Development of Policy: Legislation is not required for this policy tool. The challenge is in how the private sector can be encouraged to invest in services and infrastructure, as well as how these collection schemes are promoted to householders and commercial entities.

Conditions and Exemptions: There may be geographic limitations as to where schemes can operate, with rural areas and semi-urban areas proving to be challenging in terms of running cost-effective recyclable collections.

Implementation: Encouraging significant private sector enterprise is likely to require some sort of government intervention, in the form of subsidies or tax breaks, since the private sector may be reluctant to invest in substantial infrastructure when the returns and payback periods are so uncertain. These schemes also require householders and businesses to separate and segregate their wastes at source, activities that some people will not wish to undertake unless there is significant awareness and an incentive. Requiring householders to segregate wastes will take time to achieve, and may need to be undertaken in a series of steps (e.g., initially householders could be encouraged to separate dry waste from wet waste, which would improve the ability to sort out recyclable materials from compostable materials).

Suitability for Lao PDR: Table 13 outlines the benefits and challenges for developing waste management and recycling. Developing major waste management infrastructure may be challenging, with the limitations in government budgets for providing subsidies and tax breaks. Although, there is the possibility of Lao PDR receiving international development money, as a number of agencies are currently investing in waste management in Southeast Asia. Having coherent policies around sustainable consumption and production may bolster Lao PDR's chances of obtaining such investment.

Some basic equipment, such as shredders and balers, are relatively cheap and when coupled with the availability of cheap manual labour could result in Lao PDR becoming a good centre for pre-processing materials before exporting to neighbouring countries for recycling. The challenge will be in guaranteeing quality in material streams, as many countries have more stringent requirements in regard to contamination levels; stances that have been further strengthened by changes to the Basel Convention.

Collection schemes for waste already struggle with coverage and participation, meaning that additional collection schemes for recycling may meet similar challenges, particularly with the added requirement for source separation. Awareness-raising schemes would be essential in complementing this policy measure. Unlike waste, recyclable materials have value and there may be the opportunity to develop schemes where householders receive payment for these materials, or credits that can be used to offset the cost of general waste collection.

There are a large number of workers in the informal sector who currently collect recyclable materials. However, there is no reason why these workers cannot continue to be involved through more formalised collection schemes. Technology, such as the use of smartphone apps, could also be utilised, linking up householders and businesses who want to sell recyclable materials with buyers. This technology could be pioneered in Lao PDR to make collections more efficient so that buyers can only collect when sufficient volumes have been amassed.

Table 13 Waste Management and Recycling

Advantages in Lao PDR	Implementation challenges in Lao PDR
Improved Collection of Recyclables	
• Organisation of separate collections for waste and recyclable materials will increase recycling rates and reduce contamination in material streams. • Fees can be linked to other utility bills, such as water/ electricity. • Incentives/ penalties can be introduced to encourage source separation. • Opportunities for investment via global and regional development agencies. • Potential to use smartphone apps to link sellers and buyers of recyclable materials.	• Requires the introduction of infrastructure and services: capital and operational costs. • Many people in Laos cannot afford/ do not want to pay for disposal, so will continue to burn/ dump wastes. • Challenges in providing collection to dispersed rural populations. • Formal collections will impact the livelihoods of informal collectors (street/ landfill pickers). • Requires households to source separate. • International recycling markets are highly volatile.
Developing Domestic Capacity in Pre-processing Recyclables	
• Potential for increasing the value in post-consumer supply chains, by developing quality material streams with high rates of collection. • Pre-processing equipment (shredders/ balers/ basic cleaning machines) are relatively cheap. • Lao PDR's economic situation means that manual labour is cheap and likely to remain so for a long period of time. • Neighbouring countries, such as Vietnam, are expanding their recycling industries, following China's National Sword import restrictions. • In time this may lead to the development of Lao PDR's own recycling industry. • Creates value, thereby reducing current disposal routes (burning/ dumping).	• Will require improvements around source separation, with awareness-raising schemes essential. • Can only realistically be utilised for a narrow range of high value plastic materials (clear PET/ some HDPE), where markets are reasonably consistent. • Still leaves Lao PDR exposed to the volatility of international markets in recyclable materials. • Changes to the Basel Convention and stricter import requirements around contamination levels means that it is essential to ensure adequate capacity to meet specific quality standards. • Does not reduce SUP in itself, but does improve resource use and circularity. • Still requires some capital investment, which can be significant for infrastructure.

10.7 Product Stewardship

Category: Economic Incentives; Sustainable Marketing; Affirmative Post-Leakage Plastic Capture

Overview: Product stewardship, including Extended Producer Responsibility (EPR) are principles that can involve a range of different measures such as advanced disposal fee schemes, container deposit schemes, and other product take-back schemes.

Approach: Product stewardship is a principle whereby producers, importers, brand owners, retailers, consumers and other parties involved in the life cycle of a product accept a financial and/ or logistical responsibility for the environmental impacts of the products, including when they become waste at the end of their useful life.

Development of Policy: Product stewardships schemes can be voluntary or mandatory. They may be industry-led, government-led, or established through a supportive partnership approach. In some cases, voluntary schemes may be superseded by government legislation to address certain priority products or eradicate issues with free riders.

Conditions and Exemptions: These approaches may be undertaken in relation to one individual product or over an entire product range (e.g., beverage bottles through a container deposit scheme) through collective responsibility.

Implementation: The implementation requirements will depend on the actual policy that is utilised, with the following outlining some of the key measures that are used in relation to plastics:

- ***Container Deposit Schemes:*** These involve a fee that is charged at point of purchase and is refunded when the consumer returns the bottle or can to a retail outlet. Increasingly in some parts of the world reverse-vending machines are used to reimburse the fee. Consequently, these schemes can require a considerable upfront investment for infrastructure as well as an administrative body that oversees and monitors the scheme. Captured material is subsequently sent to recyclers.
- ***Product Take-Back Schemes:*** In these schemes, manufacturers/ importers/ retailers provide opportunities to consumers to return products and packaging at the end of their useful life, through funded collection schemes. These schemes can include take-back schemes for used containers, such as large water containers, which are subsequently cleaned and reused.

Often a third-party not-for-profit organisation, termed Producer Responsibility Organisations, will operate the administration of a product stewardship scheme. Companies that are involved in these schemes will pay a membership fee, which can be profit-based or based on market share.

Suitability for Lao PDR: Table 14 outlines the benefits and challenges for developing product stewardship and EPR schemes in Lao PDR. This area offers significant opportunities for Lao PDR, since these schemes can be established initially on a collaborative, non-mandatory basis and will provide significant benefits to domestic and international brands, manufacturers, importers and retailers.

The Lao Brewery Company is already operating a quasi-deposit return scheme for its large glass beer bottles. This scheme does not actually operate with a deposit, but has achieved cultural acceptance over time operating on the requirement of returning empty crates before being able to purchase more beer. There could be potential for expanding this into drinking-water bottles, which are one of the most problematic items that are littered in Lao PDR. As such, it is recommended that the main national brands and international brands examine the potential for container deposit schemes for PET bottles.

Developing take-back schemes and refill schemes also has significant potential in Lao PDR.

Many householders already utilise such schemes, through the delivery of water in large refillable bottles. There could be the potential to expand this into other household and personal products, such as washing powders and shampoos, thereby providing a cost-effective alternative to single-use pouches. There is also huge potential in the tourism and hospitality sector in developing refill schemes, with the potential to reduce environmental impacts as well as cutting down on operational costs to businesses.

Agricultural plastics is another area that would benefit from the establishment of a product stewardship scheme, providing protection to the environment and rural populations by avoiding the current practices of burning or dumping used or unwanted agricultural plastics. Agricultural plastics include containers and packaging used for fertilisers, pesticides, and other chemicals as well as plastic films used for crop protection. A product stewardship scheme here could help with improved awareness around the use of agricultural chemicals and the disposal of containers, and thereby health and safety in the agricultural sector, whilst providing for the safe disposal of unwanted chemicals and used containers.

The development of a national plastics platform would formalise the improving cooperation and collaboration between different parts of the supply chain, the government, and NGOs. This is similar to what has been established in Thailand. and could provide for many new opportunities. This would include the ability to share information and ideas on how to reduce plastics use and packaging requirements, achieving alignment in materials usage, shared logistics in product takebacks, and in developing joint awareness-raising and marketing campaigns. The government should take the lead in establishing the collaborative governance arrangements that would be necessary for a national plastic platform.

Table 14 Product Stewardship

Advantages in Lao PDR	Implementation challenges in Lao PDR
Deposit Return Scheme	
• Deposit return scheme already exists for Beerlao, who takes back large glass beer bottles. The Beerlao Brewing Company is also the main producer of bottled water, so there is the potential to extend this scheme to plastic PET bottles. • Return rates in developed countries with such schemes are often over 80%. • Allows the informal sector to continue to collect materials. • Potential to introduce reverse vending machines	• Due to the nature of consumer goods sales (many spread out and small retailers) managing take-back would have high-cost implications and capacity challenges. • Reverse vending machines are costly to purchase, though can initially be situated in a few select locations. • Increased prices usually pushed on to consumer, thereby impacting the poorer parts of society disproportionately. • May shift revenue away from existing informal sector if businesses return bottles directly. • Schemes require governance and administration.

Advantages in Lao PDR	Implementation challenges in Lao PDR
Take-back Schemes	
• Many plastic containers have the potential for reuse/ refilling. • Schemes already exist for one of the most problematic SUPs (bottled water): treated water in drums delivered to homes is far cheaper than bottled water; refillable water bottles in Luang Prabang. • Opportunities for refillable packaging for a range of household products, such as shampoos and washing powders, noting the current approach of households to buy these goods in small single applications (often pouches) as they cannot afford large bottles of product at once.	• Food safety implications for some plastics and products. • Requires significant awareness raising and behaviour change – consumer acceptance is key. • Needs to be cost effective.
National Plastics Platform	
• Multi-stakeholder events to review the situation regarding plastics in Lao PDR, to identify priority challenges and opportunities for collaboration.	• Requires the ability to pull together a diverse range of stakeholders. • May require a small administrative budget.

10.8 Government Procurement

Category: Economic Incentive.

Overview: Government departments at national, provincial, and district levels can support and promote sustainable production through their own purchasing strategies, giving preference to suppliers and products that minimise the use of single-use plastics.

Approach: Sustainable Procurement is a process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment. As a major purchaser of goods and services, the government can directly make an impact on the market forces, as well as providing leadership to other organisations and businesses throughout the country.

Development of Policy: Developing a sustainable procurement strategy will require extensive consultation across the government to determine current approaches to procurement and the main categories of goods and services that are purchased. The strategy will need to identify the overall aims and objectives of sustainable procurement as well as procedures around how individual departments undertake procurement.

Conditions and Exemptions: There are various approaches to sustainable procurement strategies, which may include detailed minimum standards for certain goods and services, guiding principles, or designated lists of preferred suppliers. If the latter is employed, it will be essential that the process is open and transparent.

Implementation: In the context of plastics, procurement criteria can address different aspects of the plastics value chain. For instance, avoiding the consumption of particularly wasteful or polluting plastic products (e.g., small drinking-water bottles); or promoting good practice in waste management (e.g., separation of recyclable materials); favouring products which are well designed (i.e., for re-use and recycling); and giving preference to suppliers that have sustainable track records and minimal impact on the environment.

Suitability for Lao PDR: Table 15 outlines the benefits and challenges for developing a sustainable procurement strategy for the government. Following the adoption of the National Green Growth Strategy, Lao PDR is also in the early stages of a regional project, "Sustainable Consumption and Production Outreach in Asia – the Next Five", which involves the development and implementation of a Green Public Procurement policy. The development of this policy is likely to take some time and will then require promotion and dissemination. In the interim, it is recommended that individual government ministries and departments show leadership by actively reducing the use of single-use plastics (e.g., small water bottles).

Table 15 Government Procurement

Advantages in Lao PDR	Implementation challenges in Lao PDR
• Internal government policies on requirements for procuring plastic items can reduce SUPs. • Government procurement is often high and helps support sustainable businesses and materials. • Provides an example to wider society.	• Can be challenging to roll out across government, due to the number of different departments, split across national, provincial, and district levels.

10.9 Scaling Up the Use of Alternative Materials

Category: Economic Incentive.

Overview: Finding and developing cost-effective, convenient, and widely accessible alternatives to plastics is a key precursor to many of the policies outlined above. The challenge in finding alternatives to plastics is the fact that these materials are cheap to produce and have a wider range of functionality than any other materials.

Approach: Plastics are a product of 20th century innovation. The development of this material has undoubtedly transformed people's lives across so many areas, from extending the lifespan of foods using packaging that provides a barrier, through to developing clean and safe medical products. The challenge now is to use innovation to ensure that societies still enjoy the many benefits of plastics, without compromising the environment. In some cases, this may require returning to use traditional products and materials, where the knowledge of how to make and use such products is still available.

Development of Policy: Scaling up alternatives will require impetus from a range of policy areas, thereby creating a self-reinforcing circle of change. Economic incentives and regulatory instruments will result in push and pull factors with respect to alternatives.

Conditions and Exemptions: It is important to recognise the positive impact that plastics have had on people's quality of life throughout the world. Plastics will not be, nor should they be, entirely discarded. There are many areas where plastics are essential, such as in food safety and medical applications.

Implementation: In addition to push and pull policies around the production and use of single-use plastics, there needs to be a deliberate focus on finding alternatives. This will require research and development, pilot schemes, champions, and investment.

Suitability for Lao PDR: Table 16 outlines the benefits and challenges for scaling up alternatives to single-use plastics in Lao PDR. The major challenge in Lao PDR is the lack of available funds for investment. However, globally, many countries are currently focused on finding alternatives to single-use plastics, so Laos has the potential to be an early adopter of new products and materials. There is already considerable momentum across Lao PDR for finding alternative products and materials to plastics, and the country is abundant in natural alternatives. There is huge potential here to build on traditional approaches, natural resources, and heritage (e.g., bamboo for straws and banana leaves for wrapping food). One of the key challenges with changing materials will be to ensure that these are available, accessible, and affordable to all people throughout the country, including the most impoverished.

Table 16 Scaling Up Alternatives

Advantages in Lao PDR	Implementation challenges in Lao PDR
• Opportunity to develop Lao PDR specific approach, which will increase national pride (i.e., use materials that are unique to Laos). • Khuadin Market, Vientiane shows that alternatives do exist, including traditional packaging (banana leaves). • Some restaurants and hotels are using compostable packaging/ bamboo straws etc. • Opportunity to find local champions and scale up.	• Plastic materials are cheap and plentiful. Substituting may come at a cost (money/ effort). • There is limited available funds for investing in research and development in Lao PDR. • Many people see plastic as a good thing, as it is a sign of the economy growing/ quality of life increasing. • Challenging to encourage take-up of alternatives to wider businesses. • Some alternative materials have higher environmental impact than plastics (e.g., GHG emissions, energy use), and do not have systems for reprocessing (e.g., commercial composting).

10.10 Education, Awareness Raising and Marketing

Category: Information Instruments.

Overview: Education and awareness measures provide the foundation for all of the policy options discussed thus far. Research and the collection and monitoring of data are also key components, since without this information it is not possible to develop evidence-based policymaking or to develop education and awareness raising activities. The development of policies and the provision of services and infrastructure can only be successful if the general public is aware of the reasons behind them. Marketing can help stimulate interest and promote champions.

Approach: Educational establishments, such as universities, will be important institutions in undertaking research and development. Government agencies will also have a key role in the collection of data, including through the establishment of routines and formats for regular reporting by the private sector.

The development of awareness amongst the general public over sustainable consumption and production will require formal education as well as awareness-raising schemes that are promoted throughout the country. Business will require targeted schemes to encourage sustainable practices, with marketing and publicity used to promote best practices.

Development of Policy: Sustainable consumption and production should be formally incorporated into educational curricula, and wider education and awareness campaigns should be supported by the government wherever possible.

Conditions and Exemptions: Education and awareness-raising activities need to be widely available and accessible to all parts of society. Campaigns should be well aligned to avoid mixed messaging. Implementation: Funding is required for ongoing research and development, as well as education. Awareness-raising campaigns require ongoing initiatives to reinforce messaging and achieve cultural change. It is important to recognise that calls for behaviour change need to be supported by available and accessible services and infrastructure.

Suitability for Lao PDR: Table 17 outlines the benefits and challenges for education, awareness raising and marketing. Research and development are key in finding solutions to issues caused by plastics, particularly with regards to collecting and analysing data. The recent establishment of the SEA Plastic EDU training project at the National University of Laos will be a valuable institution in this regard. At the government level, data collection approaches must be established, along with data-sharing systems across relevant government departments, and the ability to analyse and report on progress with plastic material flows, including plastics placed on the market, sent to landfill, disposed of by other means, and recycled.

National awareness-raising campaigns can be costly, requiring a large amount of ongoing resources and expertise over long periods of time. However, social media can provide cost-effective and simple ways of spreading messages far and wide.

Lao PDR has a number of passionate and well-experienced NGOs and established community groups and national organisations, such as the Lao Women's Union and Lao Youth Union. Each can play a vital role in the education and awareness-raising of the general public and commercial entities. Village committees can also play an important role in helping national messages to connect at local levels, to capture people's hearts and minds in changing approaches to the use and disposal of plastics and other wastes. It is recommended that these are utilised as key partners in spreading messages, and that they are financially supported wherever possible to undertake events and provide other communications to the public and businesses. There is also the potential to develop annual awards for sustainable packaging solutions and innovative alternatives to SUP in Lao PDR, providing publicity and promoting champions.

Table 17 Education and Awareness Raising and Marketing

Advantages in Lao PDR	Implementation challenges in Lao PDR
Research and Data	
• Data is critical in providing a better understanding of the magnitude of SUP-related challenges, opportunities and progress. • Data enables sound priority-setting and the development of evidence-based policy.	• Domestic capacity in research and development might be insufficient, international collaboration needed. • Might be challenging to make companies report data on their plastics use, due to commercial sensitivities.

Advantages in Lao PDR	Implementation challenges in Lao PDR
Education and Awareness Campaigns	
• Changes in approaches to waste and materials use amongst all parts of society (manufacturers/ retailers/ consumers) requires long-term cultural change. • Can be used to focus on specific parts of society (e.g., children). • Opportunities to use social media and alternative ways to reach wider audiences (e.g., celebrities; local champions). • Strong NGO presence in Lao PDR can facilitate wider awareness-raising.	• Awareness alone is unlikely to reduce SUPs. If alternatives are not available or services are in place for collection of recyclables, then there are limitations over what people can actually do. • Education and awareness campaigns require ongoing support and budgets. • Campaigns need to be driven by Lao people.
Annual Awards	
• An awards scheme could help promote the good work being undertaken by certain manufacturers/ retailers/ hospitality and tourism sector. • Can help create awareness. • Cheap to initiate.	• Requires an independent body to administer the awards and a limited budget.

10.11 Summary Assessment of Individual Policies

The following table assesses each individual policy against key criteria. This is a generic subjective assessment; a more comprehensive cost-benefit analysis would be required for each policy considered. The timeframes, costs, and enforcement requirements relate to the agency responsible for the development and implementation of the policy (as opposed to the costs to other parties, including consumers). Costs of policy development and implementation in this regard are not related to a specific amount, since the full cost will depend upon the actual nature of the policy option and the products that are included. All of the ratings are designated purely to give a comparison across the different policy options.

Table 18 Assessment of Individual Policy Options

Policy	Agent	Reduction in SUP	Social Acceptance	Timeframe to Develop Policy	Enforcement Requirement	Costs	Suitability for Lao PDR
National Ban	Government	H	L	Medium	H	H	L
Voluntary Local Ban	Government/ business	M	M	Short	L	L	H
Levy on Carrier Bags	Government	H	L	Medium	M	L	M
Manufacturing Tax	Government	M	L	Medium	H	M	M
Import Tax	Government	M	L	Medium	H	M	M
Penalties	Government	L	L	Short	H	H	L
Landfill Levy	Government	H	L	Medium	H	H	L
Subsidies and Tax Beaks	Government	H	H	Medium	L	H	M

Policy	Agent	Reduction in SUP	Social Acceptance	Timeframe to Develop Policy	Enforcement Requirement	Costs	Suitability for Lao PDR
Design Standards	Government	M	M	Long	H	M	M
Guidelines	Government/ Private Sector/ NGOs	M	H	Medium	L	L	H
Labelling (on-product)	Government/ Private Sector/ NGOs	L	H	Medium	L	M	M
Labelling (store)	Government/ Private Sector/ NGOs	L	H	Short	L	L	H
Improved Collection of Recyclables	Government/ Private Sector/ Informal Sector	L	M	Short	L	M	H
Pre-processing Recyclables	Government/ Private Sector/ Informal Sector	L	M	Short to Medium	L	M	H
Container Deposit Scheme	Private Sector/ Government/ NGOs	L	H	Medium	L	H	M
Take Back/ Refill Schemes	Government/ Private Sector	H	H	Medium	L	M	H
National Plastics Platform	Government/ Private Sector/ NGOs	H	H	Short	L	L	H
Government Procurement	Government/ Private Sector	H	H	Medium	L	L	H
Scaling Up Alternatives	Government/ Private Sector/ NGOs	H	H	Long	L	M	H
Research and Data	Government/ Educational Institutions/ Private Sector/ NGOs	L	H	Ongoing	L	M	M
Education and Awareness	Government/ Educational Institutions/ Private Sector/ NGOs	M	H	Ongoing	L	M	H
Awards	Government/ Private Sector/ NGOs	L	H	Ongoing	L	L	H

Key: H - High; M - Medium; L - Low

10.12 The Policy Suite

In addition to determining the individual policies, it is vital that the blend and timing of the policies work harmoniously to successfully achieve the policy aims and objectives. The following table is an initial suggestion. The final blend should be agreed through workshops and consultations with key stakeholders and organisations currently providing policy support to the Lao PDR Government on Single-Use Plastics, such as the World Bank.

Table 19 Example of 10-Year National Plastics Action Plan

Year	1 2021	2 2022	3 2023	4 2024	5 2025	6 2026	7 2027	8 2028	9 2029	10 2030
Product Stewardship/ EPR	Establishment of National Plastics Platform	Development of guidelines for business and industry		Develop Lao product labelling	Develop design standards					Assess need for mandatory schemes
Deposit Return Schemes (DRS) for Containers				Identify potential for DRS; undertake consultation		Seek investment for DRS		Establish voluntary DRS		
Takeback/ Re-fill Schemes					Identify potential for schemes; trial pilot schemes					
Waste Management	Identify potential for improving collection of recyclables Develop schemes		Roll out collection schemes							
		Develop infrastructure for pre-processing recyclables								
Regulatory Approaches	Pilot voluntary bans of carrier bags in select locations				Assess success of voluntary bans					
Economic Instruments	Develop sustainable procurement strategy for government		Implement procurement strategy			Identify potential for manufacturing/ import taxes			Introduce taxes and use revenue for subsidies	
Scaling Up Alternatives	Ongoing research and development' promotion of alternatives					Identify potential for subsidies for alternatives, including research and development			Introduce subsidies for alternatives	
Education/ Research & Development/ Data	Establishment of SEA Plastic EDU Hub	Develop data sharing protocols in government		Establish annual reporting						
Awareness Raising and Marketing	Ongoing promotion of Plastic Free Laos scheme	Promotion of plastic free locations	Promotion of recyclable collections	Develop annual awards event					Promotion of DRS	

11. CONCLUSIONS AND NEXT STEPS

11.1 Conclusions

This report has provided clear evidence and examples of how Lao PDR is experiencing increasing waste volumes and challenges in disposal, resulting in a range of environmental, social and economic impacts. A growing segment of the waste stream is plastic, particularly single-use plastics that are only designed and used for a short life-span. These plastics are typically utilised in packaging for a range of food and non-food products, carrier bags, business-to-business packaging, medical products, and in agricultural applications.

Lao PDR is experiencing changing patterns in production and consumption, as a result of urbanisation, economic development, lifestyle changes, and increases in standards of living. This is leading to the development of new marketing and retail channels, with increasing numbers of supermarkets, convenience stores, and home delivery services. These changes are impacting the volume and type of plastics that are found in Lao PDR. The COVID-19 pandemic is also having an impact on plastics use, particularly with regards to personal protective equipment as well as negative impacts on the global recycling of plastics. Although tourism has been severely affected by the pandemic, travel and tourism is likely to continue to grow in the future, which in turn will add to the challenges around waste and plastics.

Lao PDR currently has a fragmented approach to waste management from both a legislative and operational perspective, with capacity limitations and a lack of comprehensive services and infrastructure to collect, sort, and safely process post-consumer wastes. Based on current trends, it is highly likely that these waste challenges are set to worsen unless action is taken. Addressing plastics through a circular economy approach will help align Lao PDR with regional and global initiatives to combat pollution, whilst reducing the reliance on natural resources and the amount of material that is leaked out of the economy.

This report proposes a set of policy aims, objectives, and guiding principles for developing policies for reducing single-use plastics. These seek to decouple economic growth from unsustainable natural resource use, avoid and limit negative externalities from plastic use and disposal, and contribute to the health and prosperity of Lao PDR. Where possible, single-use plastics should be eliminated, either by providing reusable options or by switching to alternative materials that fit within the wider waste-management system. It is also recognised that plastics will continue to play an important role in society and people's lives, but where these materials are necessary there should be a shift to reusable options and products that can be recycled domestically or safely composted.

The study reviewed a range of policy approaches and tools that could, in principle, be applied to single-use plastics, whilst identifying policies that appear to have the potential to be the most effective in Lao PDR, considering the country's specific circumstances. There is no single solution to the complex challenge of single-use plastic. Multiple interventions, targeting different stages of the value chains will be needed over short, medium and long timeframes. In addition to the individual policies themselves, the sequencing and blend of policies is important in achieving success in reducing single-use plastics. As such, the overarching suggestion is to focus on well-coordinated participatory approaches and negotiated covenants in the short term, which can be implemented relatively easily, to build momentum prior to considering the need for mandatory, legislative instruments in the medium to long term.

Education and awareness-raising initiatives are an essential foundation for achieving successful change. This should be combined with the establishment of a **National Plastics Platform** for dialogue amongst key stakeholders, with actions that include the development of **product stewardship and extended producer responsibility schemes**, voluntary **sector-specific guidelines** and **labelling schemes**, along with **data generation and reporting** and the promotion of **alternative materials**.

As a major purchaser of goods and services, the introduction of **sustainable public procurement** across government can help alter market conditions and provide leadership. **Voluntary elimination** of certain plastic items, such as carrier bags, agreed between local authorities and private entities, should continue to be trialled before assessing the potential for enforceable mandatory bans in the future. Noting Lao PDR's location in regional supply chains, the use of **import taxes** should also be considered in the future, with revenues utilised to provide domestic **subsidies** for scaling up alternatives to single-use plastics.

Even if efforts to reduce the use of single-use plastics are successful, there will still be a need to upgrade **waste-collection services**, including the collection of source-segregated recyclables.

11.2 Next Steps

This report represents only the initial stage in addressing the problems associated with single-use plastics in Lao PDR. It is essential that the planned national strategy achieves ownership throughout government, and that tangible actions are developed within the wider society, including education and research institutions, the private sector and NGOs.

The following steps are recommended:

- MoNRE establishes the overall policy aims, objectives and guiding principles presented here. This should set the direction for the development of a National Action Plan on plastics.
- Wider consultations are undertaken across relevant government ministries and departments, in order to develop an understanding of the policy problem; the policy aims, objectives and guiding principles; and, the range of policy tools that are available.
- Agreement is reached on the overall policy strategy and the policy suite, including the timing and sequencing of individual policy options (e.g., focusing initially on well-coordinated voluntary mechanisms before introducing regulatory tools).
- In parallel to the consultations within the government, extensive stakeholder consultations are undertaken to achieve shared ownership and develop a tangible set of actions to support the policy strategy. This includes consulting with the following groups:
    - The private sector, including international brands, regional and domestic manufacturers, retailers, hospitality and tourist sectors, recyclers, waste collectors and all other stages of the waste management sector. It will be critical for these discussions to operate in a collaborative manner, whereby business needs and challenges are understood, so that actions in reducing SUPs can provide economic, social and environmental benefits.

- Industry and business networks as well as industry bodies, who play an important role in representing and involving the wider private sector, including small and medium sized enterprises.
- Non-governmental organisations/ not-for-profit organisations, who are involved in waste clean ups and plastics reduction advocacy and action. These groups will continue to play a key role in awareness raising and engaging the wider public in action.
- Education and research institutions, who can support education and awareness-raising initiatives, as well as research into innovative solutions.

Once these initial consultations have been completed, a draft National Plastics Action Plan should be developed and circulated for comments. A near-final version of the Plan is to be discussed and confirmed at the inaugural meeting of the National Plastics Platform, where participating stakeholders commit to tangible implementation actions.

12. REFERENECES

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APPENDIX 1. PARTICIPANTS

Primary data was obtained through semi-structured interviews, informal conversations, and attendance at workshops and conferences. Individuals from the following organisations provided valuable information for the development of this strategy:

Name	Type of organisation
COWI	Environmental consultancy
Delegation of the European Union to the Lao PDR	European Union
Department of Planning and Investment, MoNRE	Government
Department of Pollution Control, MoNRE	Government
District Office of Natural Resources and Environment	Government
European Chamber of Commerce and Industry in Lao PDR	Business/ industry body
Food Panda	Food delivery company
Global Green Growth Institute (GGGI)	Intergovernmental organisation
Green Vientaine	NGO
International Labour Organization	United Nations
Lao Bio Gas	Distributor of home biogas systems
Lao Consulting Group	Consultancy
Lao National Chamber of Commerce and Industry	Business/ industry body
Nahm Dong Eco Plates	Produces alternatives to plastic
National University of Laos	University
Plastic Free Lao	NGO
SEA-PLASTIC-EDU Training Hub	University project
SUSTOUR Lao	Tourism Project
United National Development Programme	United Nations
Wongpannit	Collector and seller of recyclables
World Bank	International financial institution
Zero Waste Lao	NGO

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