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State of Plastics Waste in Asia and the Pacific- Issues, Challenges and Circular Economic Opportunities

(Background Paper for Webinar III)

Final

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Executive Summary of State of Plastics Waste in Asia and the Pacific – Issues, Challenges and Circular Economic Opportunities

Introduction

Asia and the Pacific region which includes major parts of East Asia, South Asia, Southeast Asia, and Oceania (in or near the Western Pacific Ocean) has geographical area above 29 million km^2 with a population of about 4 billion.[1] The region's population is projected to rise from about 4 billion (2017) to 5.08 billion by 2050, which is about 60% of the world's total population. PR China with 1.36 billion and India with 1.31 billion people account for more than half of the total population of the region.[1] Urban population, which was about 48% of the region's population in 2017 is projected to increase to about 63% of the total by 2050.[2] The region has a significant difference in the growth of the urban population among the sub-regions, with Australia and New Zealand showing the least, (1.16% per year) while South Asia shows the largest (2.66% per year). The region has more than 242,000 km of coastline.[2] Geographically, Asia and the Pacific's coastline have multiple shore types. The region contains the world's two largest archipelagic nations (Indonesia and The Philippines) and all five of the world's nations that are entirely atolls (Kiribati, Maldives, Marshall Islands, Tokelau and Tuvalu). The Pacific islands region is located in the western, northern and central Pacific Ocean and consists of 14 independent countries and eight territories delineated into three major ethnic regions: Melanesia, Micronesia and Polynesia. The Pacific Islands region has a population of around 10.57 million that occupy just over 550,000 square kilometres of land. The unique demography, geography, climate and natural resources in the region drive its dynamic socio-economic and livelihood conditions where emerging environmental scenarios with new waste streams like plastic waste are posing major threat to its sustainable development.

Economic Profile

As per 2017 estimates, combined GDP of the major countries in the region was above 25 trillion ranging from US$ 583 to US$ 73,187 per capita. The regions economy expanded to 4.0% in 2018 and 3.3% in 2019. [5] Over the past 50 years (1970–2015), Asia and the Pacific region has experienced rapid economic growth, leading to higher incomes, poverty reduction and the emergence of a rapidly-expanding middle class. About two thirds of the regional economies, accounting for 80% of the region's GDP, achieved faster economic growth in 2017.[3] Though developed Asia-Pacific economies continued to dominate economic growth in the region, it started to decelerate during 2018 to 2020, due to uncertain economic conditions as well as COVID-19 pandemic. Developing Asia-Pacific economies grew by an estimated 5.3% in 2018, 4.3% in 2019 and are projected to grow by 3.7% in 2020. A comparison across sub-regions reveals that South-East Asia continues to lead the region's economic growth, followed by South-West Asia.[3] Manufacturing (Japan, Republic of Korea, Australia, China and India), fisheries and tourism sector are the major contributors to the economy of the region. There have been significant changes in employment in Asia and the Pacific. Agriculture employment is decreasing, while industrial and services employment is increasing.[3] Since the 1990s, the population-weighted mean Gini index, a measure of income distribution, for Asia and the Pacific rose from 33.5 to 37.5.[3] However, developing Asia and the Pacific countries are characterized by a large degree of social and economic inequality. "Across Asia and the Pacific, more than 1 billion people live just above the extreme poverty line, on more than US$ 1.25 but less than US$ 2.50 a day".[4] More than 40% of workers in the region live in extreme, moderate, or near poverty levels. Among people who have been lifted out of extreme poverty, they remain vulnerable as many of them still live on less than $3.20 or $5.50 per day. The region's growing purchasing power and the domestic private consumption has been the major economic growth driver in recent years leading to waste generation and environmental issues.

Environmental Profile

The population growth, industrialization and urbanization have led to a sharp increase in natural resource use in the region, which is both unsustainable and inefficient, and results in pollution, declining biodiversity and natural resource depletion.[5] Further, the environmental impact has increased, in part due to the shift in economic activity from very resource-efficient economies such as Japan and the Republic of Korea to the less resource efficient economies of China, India and Southeast Asia.

The region’s material consumption has increased sharply over the past four decades, accounting for more than 50% of world consumption while material productivity has not improved and is double the world average and four times the rest of the world average. Material footpring of the region indicates that it increased by 124% as compared to 29% for the rest of the world. The use of materials in the region (biomass, fossil fuels, metal ores and non-metallic minerals) increased from 26.3 billion tonnes in 2005 to 46.4 billion tonnes in 2015, an annual rate of growth of 6.1%, which is higher than the economic and population growth rates of 4.9% and 0.9% respectively.[6] Domestic material consumption per person increased from 2.9 tonnes in 1970 to 11.9 tonnes in 2015, with a high growth rate at 5.2% per annum, and has now surpassed the global average of 11.2 tonnes.[6] Energy generation continues to rely on fossil fuels and the share of renewable energy remains small despite very significant investment in renewable-energy infrastructure.[2] The region accounts for more than 50% of the world’s water use where water intensity is more than double of the world average.[2] The GHG emissions are forecasted to rise through 2050 with the current rate of domestic material consumption under business as usual scenario**.** The projected climate change in Asia and the Pacific could lead to a shortage of water resources, widespread land degradation and increased desertification.[2] Impacts of climate change in the Asia and the Pacific region include changes in natural vegetation types and associated changes in ecosystems at higher elevations and latitudes.[7] Climate change, with its impacts of increasing sea-surface temperature, ocean acidification and sea-level rise, is an increasing driver of pressures on coastal and marine eco systems particularly sea grass meadows, sea weed beds, fish migration and coral bleaching in the Asia and the Pacific region.[8] Of the ten economies in the world that are at greatest risk from climate-change impacts, six are in the Asia and the Pacific region, including low-lying Pacific island economies.[2] [8] In coastal regions of Asia, including Bangladesh and much of Southeast Asia, sea-level rise threatens the salinization of coastal aquifers, with effects on drinking water sources and coastal ecosystems.[2] [8]

Out of 28 mega-cities with more than 10 million people in the world, 15 are in Asia and the Pacific – Tokyo (37.8 million), Delhi (25 million) and Shanghai (23 million) are the three most populous cities in the world.[1] An estimated 120 000 people migrate to cities in the region every day. The proportion of people living in urban areas is likely to rise to around 3.3 billion people, by 2050. Therefore, the demographic transition to urban dwellers and environmental links with urbanisation will largely determine the sustainable development pathways of the region during the next 25 years and beyond.[1] Intensive human activities and energy consumption in urban areas will lead to the generation of increasing amounts of pollution and waste. Along with the land needs of urbanization, urban solid waste disposal through landfills and the management of industrial hazardous waste will become major concerns in the region.[9]

Plastic Waste Management

The total municipal solid waste (MSW) for Asia and the Pacific was estimated at around 870 million tonnes in 2014, with an average generation rate of 1.4 kilograms per person per day, accounting for 43% of the world total. It is projected to increase until 2030, when it could be 1.6 kilograms per person per day or around 1.4 billion tonnes a year.[10] The broad composition of municipal solid waste comprises of the organic share in (50–70%) low-income countries than (20–40%) in high-income ones. The percentage of paper is also proportional to income levels, at 23% of municipal solid waste in high income countries, 19–11% in middle-income ones and 7% in low-income countries.[10] The proportion of plastic, is around 8–12% across all the countries.[10] Considering this composition, the plastic waste generation in the region is expected to reach 140 million tonnes by 2030. Majority of plastic waste, which comes mixed with solid waste ranges from 0.02 to 0.04 tonnes per capita per year. The huge variation in waste generation can be explained by the strong correlation, which exists between per capita waste generation and the income level of a country. The higher the per capita GNI (gross national income), the higher is the per capita MSW generation.[10] Such trends also correlate to the plastic intensity of Asia and the pacific region. Similar trends have also been observed at city level.

Waste collection rates range from low to moderate in Asia and the Pacific's developing countries. In the developing countries, waste collection rates are moderate, at 40–80%, but reach almost 100% in more developed economies such as Japan, Australia, Republic of Korea and Singapore.[10] Waste separation at source is a common practice in more developed countries while in low- and middle-income countries, there has been informal waste separation with different types of waste collected separately for transfer to a facility and recycling. About 55 to 74% of the municipal solid waste is disposed off at disposal sites with zero to 26% being incinerated and 1 to 5% composted.[10] In general, recycling rates in high-income countries have increased progressively over the past 30 years, while in lower-income countries the informal sector often only achieves recycling rates of 20–30% for municipal solid waste.[11]

Top eleven countries which indicate highest mismanagement of plastic waste include China, Indonesia, The Philippines, Vietnam, Sri Lanka, Thailand, Malaysia, Bangladesh, India, Pakistan and Myanmar.[12] Broadly major hot spots of accumulated floating plastics occur in coastal waters adjacent to countries with high coastal populations and inadequate waste management.[12] Therefore, Asia and the Pacific which has a large ocean area are facing a rise in marine litter, mainly plastics waste. About 1.15 and 2.41 million tonnes of plastic currently flows from the global riverine system into the oceans every year. About 15 from the top 20 polluting rivers are located in Asia. These 20 rivers accounted for more than two thirds (67%) of the global annual input while covering 2.2% of the continental surface area and representing 21% of the global population. The Chinese Yangtze River is the largest contributing catchment, with an annual input of 0.33 (range 0.31–0.48) million tonnes of plastic discharged into the East China Sea, followed by the Ganges River catchment, between India and Bangladesh, with a computed input of 0.12 (range 0.10–0.17) million tonnes per year.[13] Estimates indicate that 1.7 to 4.6% of the total plastic waste generated on land enters the ocean and ultimately becomes marine litter.[13] Considering this hypothesis, the amount of plastic waste entering the ocean from Asia and The Pacific region ranges from 2.3 to 6.4 million tonnes in 2030.

Circular Economy and Relevance of 3R Practices

Asia and the Pacific region is the most resource-intensive region in the world, both in terms of domestic material consumption and material footprint. The Asia-Pacific region has approximately 2 Kg per US$ (domestic material consumption per dollar of economic output) in comparison to 1.2 Kg per US$ of world's average. During 1990 to 2017, the rapidly growing low- and middle-income countries in the region recorded significant increases in resource use in both absolute and per capita terms. The domestic material consumption per capita in low-income, lower-middle-income and upper middle-income countries increased by 75%, 69% and 315% respectively, while that of high-income countries decreased by 2%. In the sub regions, the Pacific has the highest per capita domestic material consumption, followed by East and North-East Asia.[3][6][8]

As per 2015 data, the plastic consumption ranges from 0.13% to 0.75% of material consumption in Asia and the Pacific region, an indicator of variation resource usage. The region is importer of fossil fuel, the feedstock for manufacturing plastics. **Figure 1** indicates that a positive correlation exist between GDP growth rate and plastic consumption in the region. It indicates that as per capita income increases, the plastic consumption also increases.

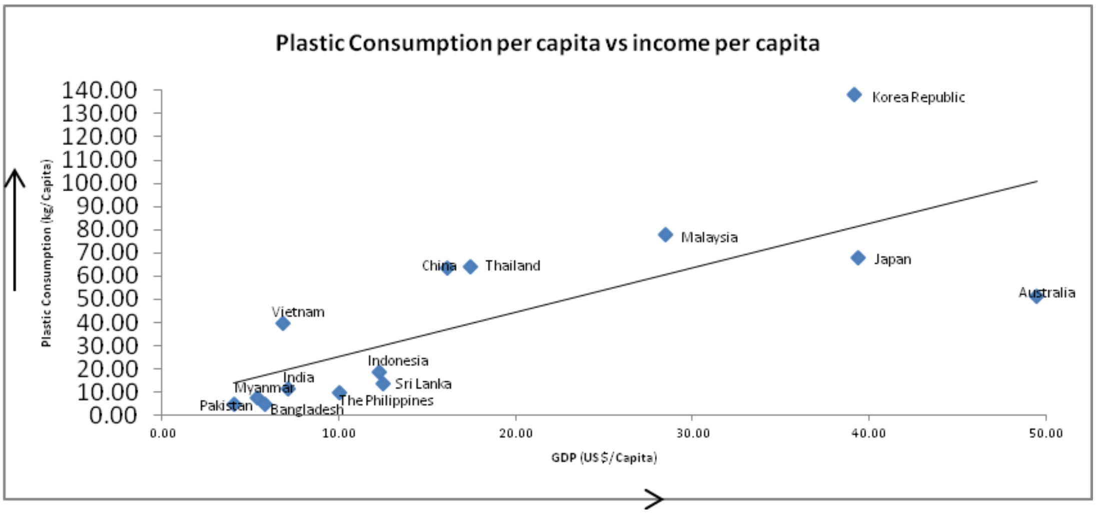

Figure 1: Plastic consumption per capita versus income per capita
Source: Amit Jain, February 2019

As per material cycle of plastics, the waste plastics, which enter the formal waste management system, they are either recycled, or disposed of in controlled landfill or incinerators (which may or may not recover electricity, heat or by-products). However, in communities where formal waste management systems do not exist, particularly in informal communities in low and middle income countries, a substantial proportion of waste plastics are disposed off in uncontrolled dumps, watercourses, or burned openly. Globally, around 14%-18% of waste plastics generation is collected for recycling.[14] Another 24% is thermally treated (e.g. by incineration, gasification or pyrolysis), while the remainder is disposed off in controlled, landfill, uncontrolled landfill, or the natural environment.[14] The partial geographical coverage of waste collection and its inefficiency in developing countries in Asia and the Pacific region results in huge amount of generation of uncollected plastic waste. A small fraction of plastic collection in both formal and informal sector goes for recycling in majority of countries in Asia and the Pacific.

Various materials from different waste streams are recycled across the Asia and the Pacific region. However, there is a wide variation in terms of the relative amounts, type of waste and technology employed in the process. Developed economies, such as Japan and Singapore have achieved high rates of plastic recycling (approximately 20% and 20% respectively) in the formal sector facilitated both through supportive institutional mechanisms and the utilization of different methodologies for the extraction/conversion of valuable resources.[15] Though the countries in Asia and the Pacific region claim more than 50% plastic recycling rate, majority of it is carried out in informal sector and focused on single use plastic recycling (majority PET, PE and PP).[16]

Environmental impacts of plastic pollution have started emerging relatively recently though uncertainty exists about the magnitude of the damages. Plastics disposed of in landfills break down over many hundreds of years, slowly emitting methane in the process while plastics disposed off in the natural environment, breakdown at slower rates and with carbon dioxide as the by-product. In both cases, the environmental impact is often underestimated because of the timescales involved. Microfibers add to the particulates in urban air environment further adding on to the existing severe air quality in major polluted cities in Asia and the pacific region. Microfibers have also been reported to pollute the soil quality thereby getting transported to its deeper layers by earthworms or other species thereby polluting ground water. Such type of impact is not documented in the context of Asia and the pacific region and requires further research. Thermal decomposition, either controlled or uncontrolled of plastics also results in GHG emissions. Plastics which has been disposed of into waterways has a range of detrimental effects on the aquatic life, including bioaccumulation, chemical leaching, prevention of transfer of oxygen and nutrients in the benthic zone. The magnitude of plastic waste generation and it’s on land mismanagement in the region offers potential threat to both land and marine environment with linkages to livelihood issues particularly in least developed and pacific islands. Therefore, it requires an overarching framework for its management, which could address multiple issue and provide common framework for sustainable development in the region. Coastal tourism a subset of cultural services in the natural capital is also affected as tourists seek to avoid beaches known to have high concentrations of plastics litter. As per UN Environment, the economic cost of these impacts has been estimated at US$ 13 billion per year. McIlgorm, Campbell and Rule, 2011 has reported that Marine plastic debris has also been estimated to account for annual losses of US$ 622 million for the tourism sector in the Asia Pacific Economic Area. Asia-Pacific Economic Cooperation (APEC) forum further estimates that the cost of ocean plastics to the tourism, fishing and shipping industries is US$ 1.3 billion in the region alone.

Under business as usual scenario, an estimated 26 billion tonnes of plastics will be produced over the next ~30 years.[14] The environmental burden associated with the production, use, and eventual disposal of these plastics will tend to increase in parallel. Reducing these burdens will require greater efficiency of plastics use. This will require a change in thinking from traditional linear economic models (i.e. manufacture-use-dispose), to more circular economic models **(Figure 2)**, whereby the use of plastics is optimised (e.g. through product redesign and light-weighting), and plastics are kept within the use cycle for longer, through reuse and recycling.

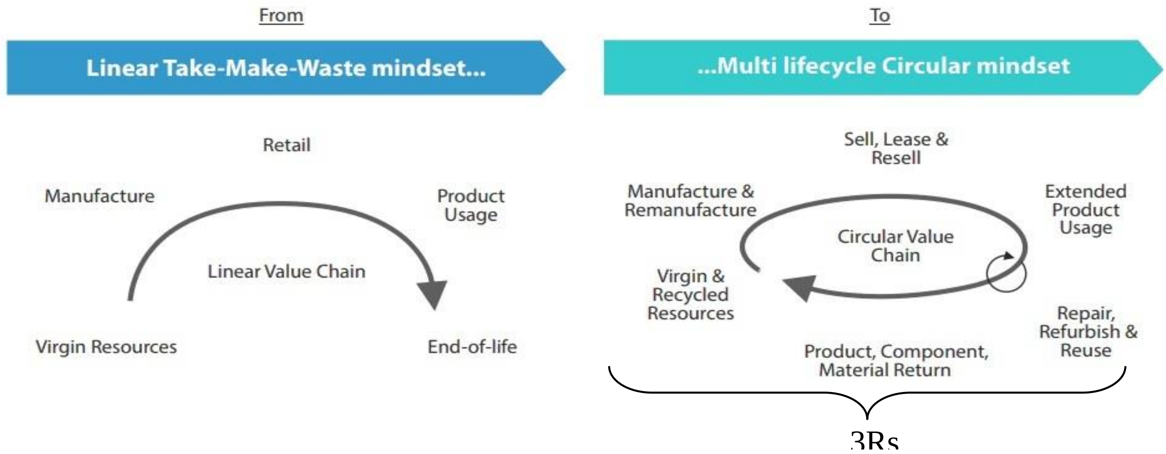

Figure 2: Adopting circular business models - a shift in mindset

Use of secondary raw material produced through recycling is an important pillar of circular mindset. An example of environmental implication of this mindset can be demonstrated through GHG reduction which can be achieved on account of energy conservation by recycling of plastics. Major GHG emissions associated with the plastics lifecycle results from the production of virgin polymer. Large amounts of energy are required to refine the fossil fuel like crude oil, crack the distilled constituents into monomers, and then synthesise the base starting materials. This process is highly energy-intensive, and was estimated to account for 400 million tonnes of greenhouse gas emissions (around 1% of the global total) in 2012. The fossil fuel feedstock used in plastics production accounts for an additional 4% of global oil and gas production.[17] Recycling of plastics avoids 80% of use energy.[18] However, recycled plastics compete in price with virgin plastics, which are much cheaper due to market volatility and policy misalignments e.g. government support for hydrocarbon inputs in different countries.

Conceptually, 3Rs being an integral part of circular mindset **(Figure 1.2)** offers a viable policy option to reduce material intensity in Asia and the Pacific region. In this regard, the implementation of Hanoi 3R Goals in the region offers significant potential to achieve resource efficiency. The status of their implementation between 2011-15 in Asia and the Pacific region indicates that total MSW generation and MSW per capita increased in most countries (Goal 1). At the same time, recycling rates in the region improved between the years 2000 and 2015, suggesting that 3R-related efforts focused on waste management are being successfully implemented by a number of countries, both in terms of legislation and policy development, as well as actions taken specifically within large cities (Goals 1 and 3). However, recycling activities in many countries are still widely conducted by the informal sector with environmentally unsound technologies. Total direct material consumption and waste generation volumes show an increasing trend across the Asia and the Pacific region (Goal 1 and 17) whilst resource productivity1 has been steadily improving in a number of countries (Goal 17). Certain countries, such as Bangladesh and India, have enacted bans on plastic carry bags to prevent flooding resulting from clogged drainage systems and maintain clean cityscapes by reducing waste at source. However, concrete actions taken at the national level remain limited in most countries (Goal 12). Several countries are advancing GHG mitigation efforts through landfill diversion and the use of intermediate waste treatment approaches (Japan, China, and Singapore). This requires a careful evaluation of different waste treatment approaches and methodologies from not only the perspective of GHG emission reduction potentials but also of other environmental, economic and social aspects

(Goal 19). Although the region saw an average reduction in resource intensity in 2010 and in 2017, this progress was not uniform across Asia and the Pacific.[15][16]

The evaluation of the intermediate waste treatment approaches will establish main linkages between economic activity, materials use and environmental pressures. A case study of India indicates that annual plastic waste generation in India is about 5.6 million tonnes. About 60% of this waste is collected by both formal and informal sector. About 46% of this waste is treated while 11% is used for energy recovery. Therefore, 40% of the uncollected waste, which is dumped into landfills offers huge opportunity for achieving environmental and socio-economic benefits. One ton of plastic recycling is expected to save about 1.7 km^2 of landfill area. Further, it can also create 1.39 million incremental jobs in plastic recycling industry.[19] Therefore, a granular approach is needed to understand which 3R policy intervention may improve resource efficiency at the sectoral level, and how major environmental consequences may be avoided in each country and the entire Asia and the Pacific region.

Implications and connectivity to SDGs and Targets

Plastic pollution can be broadly addressed under an overarching framework of Agenda 2030 and the UN Sustainable Development Goals (SDGs). SDG 12, “Sustainable Consumption and Production” identifies decoupling economic growth from resource use as one of the most critical and complex challenges facing humanity today. The effective decoupling require policies that create a conducive environment for such change, social and physical infrastructure and markets, and a profound transformation of business practices along global value chains. SDG 14, Life below water, identifies that advancing the sustainable use and conservation of the oceans continues to require effective strategies and management to combat the adverse effects of overfishing, growing ocean acidification and worsening coastal eutrophication. Global trends point to continued deterioration of coastal waters due to pollution and eutrophication. Without concerted efforts, coastal eutrophication is expected to increase in 20 per cent of large marine ecosystems by 2050.[20]

In Asia and the Pacific region, thirteen targets from five SDGs (SDG 6, 11, 12, 14 and 15) are relevant to reducing the inputs and impacts of waste plastic on terrestrial and marine ecosystem. These five SDGs cover sustainable management of water and sanitation; sustainable consumption and production; inclusive, safe, resilient and sustainable use of terrestrial and marine ecosystem while ensuring their protection, restoration and conservation. SDG target 12.4 clearly states that “By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment” Further, SDG target 12.5 complements SDG target 12.4 aiming, “By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse. SDG 14 “Life below water” in particular 14.1, 14.2, 14.7, 14.a and 14.c are important under which the framework to address marine plastic can be evolved. Target14.1 is one of the most important and aims “By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution. Other, SDG targets, which encompass the promotion of alternative to the use of conventional plastic as well as social and economic resilience include SDG 1 (1.4), SDG 8 (8.3), SDG 9 (9.3 and 9.4). These additional three SDGs cover poverty, sustained, inclusive and sustainable economic growth and employment and resilient infrastructure and inclusive and sustainable industrialization.[20] In order to demonstrate their renewed commitment to realizing a promising decade (2013-2023) of sustainable actions and measures for achieving resource efficient society and a green economy in the Asia-Pacific region through the implementation of the 3Rs, the countries in Asia and the Pacific resolved to voluntarily develop, introduce and implement policy options, programmes and projects towards realizing the thirty three sustainable 3R goals in the region. These goals were declared as the part of "Ha Noi 3R Declaration Sustainable 3R Goals for Asia and the Pacific for 2013-23" at the Fourth Regional 3R Forum in Asia held in Ha Noi, Vietnam in 2013.[21] The countries in Asia and the Pacific region reaffirmed their commitment under "Adelaide 3R Declaration" at regional 3R forum held in Adelaide, Australia in November 2016 towards the Promotion of Circular Economy in Achieving the Resource Efficient Societies by integrating the 3R and resource efficiency plans, programs and policies in the overall policy, planning and development practices at local, provincial and national level while keeping the 2030 Agenda for Sustainable Development with 17 Sustainable Goals at its core in the context of waste including plastic waste in Asia and the Pacific region.[22] In the context of plastic waste, 3R Declaration of Asian Mayors in April 2018 at Indore, India specifically stated, "Strive towards complete ban of illegal disposal of plastics in eco-sensitive or eco-fragile areas, including tourist areas close to oceans, rivers, lakes, wetlands, other water bodies and mountains, to preserve coastal, marine and mountains ecosystems and resources, keeping in mind the widespread plastic littering which affects eco-systems".[23] The declaration also focussed on sound and effective management of new emerging waste streams such as micro-plastics.[23].The Nineth Regional 3R Forum in Asia and the Pacific held in Bangkok, Thailand in 2019 with the theme of "3R as a way for moving towards sufficiency economy – Implications for SDGs" discussed and adopted the goodwill, voluntary and legally non-binding Bangkok 3R Declaration Towards Prevention of Plastic Waste Pollution through 3R and Circular Economy.[24]

The countries in Asia and the Pacific region have very high material footprint including plastic footprint. Except for Australia and Japan, this decoupling requires policies and its enforcement in majority of the countries in the region. Further, a number of companies have recognized the importance of sustainability reporting, however, the data related to their number in the region is not available. Further, majority of countries have policies and regulations to address onland plastic waste either as part of waste management rules or specific rules. Plastic waste is generally covered under the regulation of solid waste in majority of countries in the Asia and the Pacific Region. However, many countries have specific regulations related to packaging, single use plastic, plastic bags and microbeads. It majorly falls under policy and regulatory jurisdiction of nodal ministry of environment and forest in Asia and the Pacific region. However, the regulations are also implemented at the sub-national and city level respectively. A number of other institutions like private sector both formal and informal and civil society organizations are also involved in the implementation of regulations. All the stakeholders are involved at each level of policy, plan / strategy program and projects development and implementation. Therefore, a number of policy, regulatory, technological, economic and institutional issues have been identified in the region. Countries like Australia, New Zealand, Japan, Republic of Korea and Singapore have minimized these issues by institutionalizing policy, regulations, programs and plan to achieve higher recycling rate and circularity of materials. The countries in the region have also started regulation consumption and production either through mandating bans, fines, import and export controls, and market based instruments such as extended producer responsibility (EPR) based rules, fixing up recycling rates or imposition of taxes and levees. However, these are restricted to plastic bags and single use plastics.[21] The implementation of the policies and regulations as well as creation of waste plastic management infrastructure coupled with capacity building through regional knowledgebase (database, experts, indicator monitoring, information sharing and awareness) are the major challenges which need to mitigated to achieve the specific targets committed under SDGs in the region.

A number of barriers related to regulatory, economic, technology, data and information have been identified. These include Costs of collecting, sorting and processing waste plastics; Limited resilience of the sector to market shocks; Costs of collecting; sorting and processing waste plastics; Limited resilience of the sector to market shocks; Plastics contaminated and mixed with other materials; Lack of differentiated demand for recycled plastics; Poor data on the plastics recycling industry; Problematic additives; Bio-degradable plastics mixing with other plastics; Limited collection schemes and treatment technologies for thermosets.; Hazardous additives; Competition between recycling and energy from waste; Regulatory burdens of materials classified as waste; Uncontrolled dumping and burning of municipal wastes; Illegal trafficking in waste plastics; Concerns over environmental standards for recycling in emerging markets; Concerns over environmental standards for recycling in emerging markets; Limited resilience of the sector to market shock; Global markets concentrated in a small number of countries; Biodegradable plastics mixing with other plastics; Collection systems for wastes not available for a substantial proportion of the global population; Plastics contaminated and mixed with other materials; Limited collection schemes and treatment technologies for thermosets; Uncontrolled dumping and burning of municipal wastes; Poor data on the plastics recycling industry. A number of interventions have been proposed as a way forward. These include interventions broadly under (1) Regulatory; (2) Economic instruments; (3) Technology; (4) Data and information and (5) Voluntary measures by industries.

While the international community are committed to the 2030 Agenda for Sustainable Development and the SDGs, the New Urban Agenda, the Paris Climate Agreement, the Addis Ababa Action Agenda, the Nairobi Mandate, and the Sendai Framework for Disaster Reduction, among others, there is an increasing need for Asian-Pacific countries to integrate 3R and resource efficiency into their national development plans and macroeconomic policy agendas. By pursuing resource efficient and circular economic development approach, countries and cities can embark on the path of low-carbon and green growth, including realizing eco-efficient infrastructures in key development sectors such as urban design and planning, building, transport, energy, water and waste systems.

As Asia-Pacific countries industrially and economically grow, financing implementation of 3R policies, programs, including infrastructure development, will be critical to reducing the volume of all waste streams – MSW, plastics, chemicals and hazardous wastes, etc. in living environment and natural ecosystem, and in mitigating negative environmental impacts, while supporting a wide range of domestic and global priorities to improve health and environment. In moving towards zero waste societies, the countries need to explore new sources of funding to finance development of appropriate 3R infrastructures (e.g., state of art waste collection and processing facilities, resource recovery facilities, recycling industries, eco-industrial zones, science parks, etc.), to promote collaboration among key stakeholders and active participation of citizens. Moving from plastics economy to circular economy could provide an important basis for new source of funding while contributing towards achieving the SDGs, in particular SDG 9, SDG 11, SDG 12 and SDG 14.

A careful assessment of plastic economy indicates the development of applications for plastics. Plastics has focussed on the part of the plastics economy that starts with the raw material and ends either at the factory gate or upon delivery to the retail outlet or customer. This excludes the downstream costs of plastics use and an almost complete absence of the social and environmental costs of plastics. The implementation of the interventions mentioned in Table 6.1 will not only extend the plastic economy to the complete material flow of plastic but also internalize cost of plastic waste management. This is expected to boost the circularity of plastic waste as a resource and extend plastic economy to circular economy.[11]

The redefined plastic economy paradigm offers opportunities to not only deliver better system wide economic and environmental outcomes by creating an effective after-use plastics economy, thereby drastically reducing the leakage of plastics into natural systems (terrestrial & marine) in particular the air, soil, water, seas and oceans but also decoupling from fossil feedstock. Further, the new plastics economy offers an attractive opportunity for the global plastic value chain and governments to collaboratively work towards achieving the sustainable development goals. The economic recovery post COVID-19 pandemic necessitates regional cooperation and commitment to green recovery and natural resource management. On the national level, these responses can be translated to supporting measures related to SDGs and building resilient and sustainable infrastructure. In this context, Indore 3R Declaration of Asian Mayors agreed at the Eighth Regional 3R Forum in Asia and the Pacific (April'2018, India) stating complete ban of illegal disposal of plastics in eco-sensitive or eco-fragile areas, including tourist areas close to oceans, rivers, lakes, wetlands, other water bodies and mountains, to preserve coastal, marine and mountains ecosystems and resources, the Malé 3R Declaration by private resorts for the promotion of 3Rs and resource efficiency towards protection of local environment and marine ecosystem agreed at the Sixth Regional 3R Forum in Asia-Pacific (August'2015, Maldives) and the voluntary and legally non-binding Bangkok 3R Declaration for prevention of plastic waste pollution through 3R and Circular Economy agreed at the Ninth Regional 3R Forum in Asia and the Pacific (March'2019, Thailand) provide the adequate institutional mechanism and policy framework to collaboratively work towards circular economic utilization of the plastics.

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