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Material Substitutes to Address Marine Plastic Pollution and Support a Circular Economy: Issues and Options for Trade Policymakers

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Acronyms and abbreviations

APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
ASTM	ASTM International (former American Society for Testing and Materials)
DIN	Deutsches Institut für Normung
EEP	environmentally preferable product
EGA	environmental goods agreement
FAO	Food and Agriculture Organization of the United Nations
FTA	free trade agreement
GATS	general agreement on trade in services
GATT	general agreement on tariffs and trade
GHG	greenhouse gas
GSP	Generalized System of Preferences
GSTP	Global System of Trade Preferences
HFJU	Intergovernmental Group on Jute, Kenaf and Allied Fibres
HS	Harmonized System
ISO	International Organization for Standardization
ITC	International Trade Centre
JACKS	jute, abaca, coir, kenaf and sisal
LDC	least developed country
LDPE	low-density polyethylene
MFN	most favoured nation
OECD	Organization for Economic Cooperation and Development
PBAT	poly (butylene adipate-co-terephthalate)
PHA	polyhydroxyalkanoates
PLA	polylactic acid
REACH	registration, evaluation, authorisation and restriction of chemicals
RTA	regional trade agreement
SDG	sustainable development goal
SNIS	Swiss Network of International Studies
SPS	sanitary and phytosanitary measures
TiSA	Trade in Services Agreement
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
VAT	value added tax
WCO	World Customs Organization
WTO	World Trade Organization

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Executive summary

The growing challenge of plastic waste worldwide, including its impact on vulnerable marine and terrestrial ecosystems, has spurred the quest for viable alternatives to replace plastic as part of a range of solutions to deal with the crisis. This is challenging given some of the inherent flexibility, versatility and low production costs of plastics. Techno-economic factors and evaluation of health and environmental including overall life-cycle impacts will determine whether substitution of plastic would be preferable to other solutions (such as better waste collection and disposal). Particularly problematic plastic pollution sources such as single-use plastic bags and other items are areas where substitution would be highly desirable.

Substitutes for plastic can be broadly categorized into two. Traditional materials are based on naturally occurring polymers of plant and animal origin as well as non-renewable mineral substances found in nature. On the other hand, bio-based polymers are derived from natural polymers, but undergo extensive physical, chemical and abiotic transformations. Many bio-based polymers are only compostable under specific industrial composting conditions and, for this reason, are not a solution in places where such facilities are few or non-existent, particularly in developing countries. Developing countries could, therefore, explore various traditional materials where they may already enjoy inherent production and export-related advantages as substitutes for plastic. Many natural fibres and value-added products, particularly jute, abaca, coir, kenaf and sisal (JACKS fibres), for example, are produced and exported by several developing countries thereby benefiting smallholder farmers. Others include widespread traditional materials that are biodegradable such as bamboo and cotton as well as mineral-based ones such as glass and aluminum that can be easily recycled.

Trade policy initiatives such as lowering tariffs and non-tariff barriers for plastic substitutes such as JACKS fibres could provide incentives for scaling-up their production and deployment. Import tariffs on value-added products are often high in many large developing countries, and hence lowering them could encourage greater South–South trade in plastic substitutes. Such market access initiatives could be pursued unilaterally, bilaterally, regionally, plurilaterally as well as multilaterally under the World Trade Organization (WTO) through liberalization initiatives including as part of a broader environmental goods liberalization package such as an Environmental Goods Agreement (EGA). At the same time, given that many developing countries are also major exporters of conventional plastic materials, consideration should be given to economic and livelihood impacts in these sectors. Addressing fossil-fuel subsidies that keep prices of plastic low would also help in the uptake of substitutes.

Other trade-related supportive initiatives for the scale-up and diffusion of environmental-friendly plastic substitutes include: (i) reviewing and amending the Harmonised System (HS) to enable their greater visibility; (ii) pursuing trade and investment initiatives related to end-of-life management and disposal of both conventional plastics as well as substitutes; (iii) attracting foreign investment in the plastic substitutes sector particularly in developing countries; and (iv) pursuing technical and technology co-operation, assistance and capacity building measures to build supply-side capacities and introducing appropriate regulatory frameworks. All these measures are essential building blocks in the creation of a circular economy.

1. INTRODUCTION

Plastics are ubiquitous in modern life. They are used in a vast diversity of products, ranging from consumer durables such as televisions, toys and clothes, to construction materials, vehicles, clothing and packaging for food and beverages (Barrowclough and Birkbeck, 2020). In addition to health end-uses, such as protective clothing against infectious viruses and for various single-use medical devices, plastics are deployed for a range of environmental end-uses, including the use of plastic sheets to prevent soil erosion or leaching of chemicals from waste sites. Plastics are also used to preserve food, helping to reduce food-waste, and they can help reduce fuel consumption over long distances when used as lightweight materials for vehicles or transportation containers (OECD, 2018). In many markets, plastics have displaced traditional materials such as metal, wood, concrete paper, natural fibres and glass due to their versatility and useful properties, including high strength-to-weight ratio, high malleability into a diversity of shapes, impermeability to liquids, insulation properties and resistance to physical and chemical degradation and, critically, their relatively low cost (OECD, 2018).

However, the negative environmental impact of plastic pollution, especially in the world's oceans, is widely recognized and acknowledged. To date, the focus of efforts to reduce plastic pollution has been largely on minimizing marine pollution as well as on 'end of life' disposal and clean-up solutions. There is, however, growing recognition of the need to focus on upstream part of the plastics life cycle, including measures to reduce production and use of conventional polymers.

The United Nations Sustainable Development Goals (SDGs), 2015 provide a broader mandate for efforts to tackle plastics pollution (United Nations, 2015). SDG 12 calls for efforts to "ensure sustainable production and consumption." SDG Target 12.4 sets the goal by 2020 to "...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…" This target continues to be relevant today. SDG Target 12.5 sets the goal by 2030 to "...substantially reduce waste generation through prevention, reduction, recycling and reuse." In addition, SDG 14 calls upon countries to "conserve and sustainably use the oceans, seas and marine resources" for sustainable development. SDG Target 14.1 aims by 2025 to "... prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution…"

Some attention was paid to the plastics pollution aspect as part of the 2017 Declaration of the United Nations Ocean Conference *Our Ocean, Our Future: Call for Action* (UNGA, 2017). The Declaration makes reference to the need to address consumption patterns and their impact on marine pollution, including mentioning plastics and micro-plastics. Among others, it also called on countries to: (i) "promote waste prevention and minimization, develop sustainable consumption and production patterns, adopt the 3Rs – reduce, reuse and recycle – including through incentivizing market-based solutions to reduce waste and its generation, improving mechanisms for environmentally-sound waste management, disposal and recycling, and developing substitutes such as reusable or recyclable products, or products biodegradable under natural conditions; and (ii) Implement long-term and robust strategies to reduce the use of plastics and micro plastics, particularly plastic bags and single use plastic."

Recognizing both the advantages of plastics as well as the negative environmental impacts linked to the production, use and disposal of plastics, two essential questions to ask are:

a. is the use of plastics for a particular application useful, justified and appropriate?
b. is the use of plastic for a particular application useful and convenient, but inappropriate?

Plastic substitutes are best developed in cases where the answer is affirmative in the case of (b) (UNEP, 2017).

This paper explores options that exist to promote plastic substitutes along with the issues, challenges and considerations that policymakers are likely to face, particularly from a trade and sustainable development perspective. Section II provides a categorization of the plastic substitutes. Section III explores conceptual and definitional issues, particularly around the concept of biodegradability, and sets out some key criteria that could be used to evaluate the merits and demerits of various types of plastic substitutes. Section IV provides a preliminary assessment of market and trade-related trends in selected examples of plastic substitutes

with an emphasis on natural fibres of export interest to developing countries. Section V examines some of the main tariff and non-tariff measures affecting market access for select plastic substitutes. Section VI explores what could be some short, medium, and long-term trade policy initiatives that could be pursued to support the scale-up of plastic substitutes, as well as some additional considerations for policymakers as catalysts for trade-led action. Section VII concludes the discussion with some observations and also identifies a few knowledge gaps that might need to be addressed in future so as to constructively inform policymaking initiatives on plastic substitutes.