Packaging Sustainability Requirements in Foreign Markets

An assessment of U.S. exporters' level of awareness and readiness to meet sustainable packaging requirements for food and beverages in overseas markets, challenges to compliance, and opportunities for U.S. industry

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Contents

Executive Summary

Packaging plays a critical role in safely delivering food and beverage products to consumers in countries around the world. At the same time, there is increased focus from stakeholders on the impact of packaging waste to the environment.

Government regulators in more than 45 export markets are moving quickly to draft and implement new regulatory requirements on sustainability and packaging standards. Regulations being adopted or explored include bans on single-use plastic packaging and requirements for reusable packaging, restrictions on the use of certain materials in packaging, recycling mandates and requirements for minimum recycled content, requirements to eliminate "problematic and unnecessary packaging", taxes under Extended Producer Responsibility schemes, and/or labeling requirements. These regulations create a complex environment for exporters to navigate due to their lack of harmonization and differing end goals.

This exporter assessment is designed to gain greater insight into the level of awareness and readiness by U.S. food and beverage exporters to meet new packaging sustainability requirements, challenges U.S. exporters face, any opportunities that U.S. exporters see in the current environment, and what support is needed from USDA/FAS as regulations evolve. Over the course of 10 weeks, interviews with 21 exporters and trade associations were held.

From the industry interviews, findings and observations are as follows:

There are large gaps in U.S. exporters' awareness of sustainable packaging requirements in export markets and most exporters are not ready to meet new requirements. Most companies have been focused more on domestic sustainable packaging regulations at the state level rather than on actions taken by foreign governments. The level of awareness amongst exporters of packaging sustainability requirements in foreign markets varies. Tools and resources to track packaging sustainability regulations are limited and most companies are just beginning to actively monitor in key markets. The European Union (EU) is a key market of concern, but other markets are also on the radar for U.S. exporters. Some packaging sustainability regulations are more front of mind than others, including minimum content requirements and bans on single use packaging. Exporter awareness and responsiveness have been driven by retailer requirements and consumer preferences just as much as, or even more so, than by government actions. Most exporters feel they have very little influence to provide stakeholder input, engage in dialogue or shape packaging sustainability requirements in foreign markets. Most exporters will face challenges and, in some cases, may not be able to comply with sustainable packaging requirements in foreign markets. This is likely more often the case for smaller exporters and those exporters that rely on flexible films and other food-grade plastics that are not easily recyclable.

Exporters indicated they are working to find the right balance for packaging that ensures food safety and adequate shelf life; can be recycled, reused, or composted; and is cost effective. However, U.S. exporters face various challenges. Requirements, standards and definitions for packaging sustainability, recycling, and reusability are complex and not harmonized, and inconsistency across markets will create ongoing challenges with compliance. Packaging alternatives that meet food safety and quality standards are severely limited. Supply of recycled material in the United States is inadequate to meet demand for packaging made with recycled content given limited feedstock due to low levels of recycling in the United States and insufficient recycling infrastructure. Reusable packaging has its own challenges, and biodegradable/compostable technology is not yet a viable option to maintain shelf life and prevent damage or waste. Timelines for compliance in overseas markets do not take into consideration lack of alternative materials and recycling infrastructure in the United States. Costs to implement sustainable packaging solutions (e.g., new packaging formats and capital equipment to retrofit or replace packaging lines) can be high. Use of sustainable packaging may require tradeoffs or lead to unintended consequences. Finally, there is concern that enforcement of packaging sustainability regulations may not always be equally applied.

While challenges are numerous and some may be insurmountable, U.S. exporters are looking to opportunities in this evolving regulatory environment. U.S. exporters welcome innovation and are pursuing new technologies and formats with their packaging suppliers and on their own. They are also collaborating with other stakeholders and see a role for greater education. U.S. exporters report increasing their efforts to implement more sustainable practices and products and highlighting their commitment to sustainability with consumers and other stakeholders. Some larger exporters see opportunities to pull away from the competition given they have been working in this space for a longer period. New regulations are spurring more companies to collaborate in innovative ways to reduce waste.

The findings support several recommendations for USDA/FAS, including additional engagement with foreign governments on packaging sustainability, ongoing education and resources for U.S. exporters, and facilitating best practices and public-private partnerships.

- Continue engagement by USDA/FAS with food regulators in foreign markets to reinforce food safety is of paramount importance to food companies and cannot be sacrificed.
- Ensure that implementation timelines are realistic and phase-in periods reflect current infrastructure and packaging innovations.
- Provide additional fora for U.S. exporters to provide input and expertise to government regulators overseas on what is achievable and when.
- Increase U.S. exporter awareness and readiness through enhanced monitoring and communication, such as multi-market GAIN reports on packaging initiatives and more regular updates, lists of materials considered problematic or required by country to support U.S. exporters sourcing strategies for packaging, a database to track current and proposed packaging sustainability requirements in foreign markets, and continued outreach to U.S. exporters, especially smaller exporters via agriculture, food, packaging and sustainability fora.

- Allocate new and additional funding to research and development for cross-sectoral sustainable packaging alternatives, similar to ongoing work to develop compostable PLU stickers.
- Provide information on what other countries are doing to support their companies and exports with respect to sustainable packaging, recycling programs, consumer education and buy in, and industry participation.
- Ensure packaging companies are part of the solution in meeting foreign countries requirements and reduce plastic packaging.

U.S. exporters provided additional suggestions related to coordination, infrastructure, technology and innovation that may be outside of the scope of USDA/FAS to take action. However, these additional insights give a comprehensive overview of support needed by U.S. exporting community.

- Limit divergences in packaging sustainability regulations in the United States to minimize complicated schemes here at home and help focus efforts on the myriad of regulations overseas.
- Increase consumer education. Consumers must be on board and participate in recycling efforts for companies to achieve compliance with minimum recycled content requirements and other regulations.
- Invest in additional recycling infrastructure in the United States. U.S. companies will require more feedstock of recycled materials, including building more locations to recycle, expanding the different types of products that can be recycled, and adding more store collection points for flexible packaging, to name a few.
- Encourage broader use of technology (such as QR codes) to include more information via the label to educate consumers on how to recycle based on their locality.

Background

Packaging plays a critical role in safely delivering food and beverage products to consumers in around the world. At the same time, there is increased focus from stakeholders on the impact of packaging waste to the environment. Consumers are calling for more environmentally friendly packaging. Retailers are demanding suppliers reduce their carbon footprint including for packaging. Government regulators and legislators are planning new requirements on sustainability and packaging standards.

Domestically, several U.S. states (including California, Colorado, Maine, Oregon) are taking steps to require reductions in packaging waste, include more information on labels regarding post-consumer use of packaging, and make contributions to extended producer responsibility (EPR) schemes. State actions vary and there is no coordinated action at the federal level on sustainable packaging requirements. Beyond the United States, government regulators in important export markets (including in the EU, Australia, Canada, Chile, Ecuador, India, Malaysia, New Zealand and Thailand, among many others) are moving quickly to draft and implement new regulatory requirements on sustainability and packaging standards.

Various types of regulations are being adopted or explored in key export markets, including:

- bans on single-use plastic packaging and requirements for reusable packaging,
- restrictions on the use of certain materials in packaging,
- recycling mandates and requirements for minimum recycled content (MRC),
- requirements to eliminate "problematic and unnecessary packaging",
- fees and taxes under Extended Producer Responsibility (EPR) schemes, and
- labeling requirements (e.g., to inform on recyclability or disclose packaging's carbon footprint).

Many of these regulations create a complex environment for exporters to navigate due to their lack of harmonization and differing end goals. For example, some regulations seek to ban only single use plastic packaging materials, whereas others, such as Germany, oppose even alternative materials if they are single use.[1] Countries are looking to export their regulations and measures. For instance, France with a ban on plastic packaging for fresh fruits and vegetables, is "mobilizing its European partners to adopt an equivalent measure."[2]
As foreign regulations on packaging sustainability evolve, the United States will need to ensure that new requirements are not trade restrictive and sufficient time and support is available to enable compliance. Absent these conditions, U.S. exporters risk losing access or market share to competitors in foreign markets.

[1] Environment Ministers' commitments on plastics. National-level visions, actions and plans announced. OECD Council. June 2022. Page 12.
[2] Reduction of plastic in fruits and vegetables. Frequently Asked Questions. Ministry of Ecological Transition, France.

More than 45 countries have existing or proposed packaging sustainability requirements. (See Annex A for Compendium of regulations as of June 2022.[3]) FAS continues to report on new and proposed packaging sustainability requirements in GAIN reports. While some sectors have been more active and aware of such regulations, there is concern that the broader U.S. food and agriculture community has not been aware of the depth and breadth of new requirements coming down the pike or under consideration.

To gain greater insights, USDA/FAS contracted to undertake an exporter assessment to:

- determine the level of awareness and readiness by U.S. food and beverage exporters to comply with new packaging sustainability requirements,
- understand the compliance challenges U.S. exporters face,
- explore whether opportunities exist for U.S. industry as a result of new requirements, and
- learn from exporters where they need support from USDA/FAS in this space.

Methodology

Working with USDA/FAS, TradeMoves identified relevant stakeholders (including USDA cooperators, industry members and companies impacted by packaging sustainability trends in export markets). The team prepared a Backgrounder on the project to circulate to stakeholders which provided an overview on the current regulatory landscape on packaging sustainability (such as types of regulations that exporters may face or soon face in foreign markets), types of questions to be posed in interviews, timing for interviews from mid-July through mid-September, and how intelligence and insights will be used. The third page of the Backgrounder provided nineteen examples of proposed or upcoming regulations in the EU, Latin America, Asia, and Oceania compiled from information shared by USDA/FAS. A larger Compendium of new and proposed packaging sustainability requirements in foreign markets was developed and shared with stakeholders. The team developed questions for interviews focused on awareness, readiness, challenges and opportunities.

On behalf of USDA/FAS, the authors conducted outreach via USAEDC, USDA cooperators and other trade association, and to its broader network of U.S. exporters to share the Backgrounder on the project and request that exporters and trade associations participate in one-hour, one-on-one interviews on sustainable packaging regulations. Stakeholders were notified that interviews were confidential, and insights shared would be aggregated into the report and not attributable to named exporters or trade associations.

TradeMoves conducted 21 interviews over the course of ten weeks representing diversity in exporter size, sector, and types of packaging used.

- Six exporters are considered small or medium sized and nine exporters are larger. Five trade associations spoke on behalf of their food sector. One trade association provided

[3] See Annex B for list of common resins and materials used in packaging and noted in the Compendium and this report.

preliminary findings as to what packaging materials will look like in ten years compiled from their survey of consumer product goods manufacturers and food companies, material manufacturers and manufacturers of food processing and packaging equipment.

- Participants represented eight different sectors: fresh and frozen produce, grains, dairy, beverages, snacks, processed products, alcohol, and pet food.
- Nearly all participant exporters shipped goods for retail consumption in retail-ready packaging. Some exporters shipped goods in bulk including in totes and other bulk containers.
- Participant companies and sectors use a variety of packaging to move goods across borders including films, plastics, paper, glass, and aluminum.
    - For retail, participants noted use of a variety of packaging types including flexible films, bottles/containers made from polyethylene terephthalate (PET/PETE), price look up (PLU) stickers, aluminum cans, glass bottles/jars, clamshells, tetrapaks, jugs made from high density polyethylene (HDPE), bags/bottles/film made from low density polyethylene (LDPE) or polypropylene (PP), polyamide casings, polyethylene vacuum seal bags, bag in box (BIB involving paper box and plastic bag with plastic cap), ring carriers, nylon mesh bags, paper and cardboard.
    - For bulk supply packaging and outer packaging, participants noted use of a variety of packaging types including tote bags, reusable totes, non-reusable totes, corrugated boxes, and shrink wrap for pallets.
- Interviews typically included multiple participants from the participant organizations. Interviewees represented a variety of functions and roles within their organizations including packaging engineering and performance, packaging procurement, international sales, sustainability and governance, legal and compliance, regulatory affairs, and global and regional government relations. In addition, CEOs of two smaller exporters were interviewed.

Findings and Observations

Findings below reflect input and insights from representatives of exporting companies and trade associations. The level of awareness amongst the U.S. exporting community varies, with larger companies having greater visibility into regulations and their impact on their operations. Smaller exporters have much lower awareness and most companies of all sizes have been focused more on U.S. domestic requirements than initiatives overseas. Level of readiness is also very low, especially for smaller exporters and exporters of all sizes that rely on flexible films and other food-grade plastics that are not easily recyclable. Challenges to implement more sustainable packaging include limited alternatives that meet food safety and quality specifications; limited feedstock and infrastructure in the United States to meet minimum content requirements; limitations of biodegradable and compostable packaging with respect to maintenance of shelf life; high costs to switch packaging technologies; and timelines for implementation of regulations are not realistic given lack of alternatives. While faced with many challenges, some exporters see some opportunities to encourage innovation and differentiate from competitors.

I. LARGE GAPS EXIST IN U.S. EXPORTERS' AWARENESS OF AND READINESS FOR NEW REQUIREMENTS ON SUSTAINABLE PACKAGING IN EXPORT MARKETS

Exporters welcomed this assessment given sustainability is of great interest to consumers, retailers, food suppliers, regulators and environmental stakeholders. Many interviewees expressed that their companies were moving in the right direction to be more sustainable and recognized that work in this area would be ongoing. Many acknowledged early sustainability initiatives have focused more on the product and processes than on packaging. The more specific focus on packaging sustainability as a regulated requirement has only recently come to the forefront. At the same time, the primary focus for U.S. companies has been on domestic regulations at the state level, over actions taken by foreign governments. Specifically, the assessment found the following:

- Level of awareness amongst exporters of packaging sustainability requirements in foreign markets varies.
- Tools and resources to track packaging sustainability regulations are limited and most companies are just beginning to actively monitor in key markets.
- The EU is a key market of concern, but other markets are also on the radar for U.S. exporters.
- Some packaging sustainability regulations are more front of mind than others, including minimum content requirements and bans on single use packaging.
- Awareness and responsiveness have been driven by retailer requirements and consumer preferences just as much as, or even more so, than by government initiatives.
- Most exporters feel they have very little influence to provide stakeholder input, engage in dialogue or shape packaging sustainability requirements in foreign markets.
- Most exporters are not ready to comply with sustainable packaging requirements in foreign markets.

More detailed descriptions, concerns and anecdotal evidence provided by exporters on each issue is outlined below.

1. *Level of awareness amongst exporters of packaging sustainability requirements in foreign markets varies.*

   There is a significant gap in awareness held by exporters. Every exporter that participated in an interview was aware to some degree of the existing and upcoming sustainable packaging regulations and the regulations' effects on their exports. Still, this level of awareness varied.

   The level of awareness largely varied based on the size, experience, and global footprint of the exporter. Many exporters were not aware of the number of countries pursuing sustainable packaging regulations or the depth and breadth of new requirements. Larger exporters had greater visibility given more resources and networks. Some exporters were unaware of some of the regulations contained in the Compendium that was shared in advance of the interviews. Some expressed surprise over certain regulations that were new to them. A few companies referenced regulations that were not contained in the Compendium. Others noted that retailers' requirements and enquiries on packaging were more front of mind than government regulations. Nearly all noted that domestic U.S. state regulations and requirements on sustainable packaging have been the priority. One company noted a "good grasp of packaging sustainability initiatives in the United States, but less so in export markets." This sentiment was echoed by many interviewees.

2. *Tools and resources to track packaging sustainability regulations are limited and most companies are just beginning to monitor in key markets.*

   Many exporters indicated that they have only begun tracking packaging sustainability regulations to expand awareness even though many regulations have been under consideration, proposed or in place for a while. For many, monitoring was initiated in only the past few years. Exporters noted various ways they track and receive information on existing and upcoming regulations with most utilizing external resources.

   Smaller or less-experienced exporters rely heavily on overseas customers (e.g., retailers and importers/distributors) or packaging suppliers to provide them with information and guidance on requirements.

   Multinationals and larger exporters with a wider export footprint noted they were monitoring regulations more closely and had a more solid understanding of the current landscape, yet in some markets, they are only tracking tangentially. Larger exporters tend to have more robust resources and noted the importance of tracking so as not to be blindsided or unable to prepare for compliance, "We can only comply with what we know." Larger exporters rely on in-market company representatives, licensees or contract manufacturers that package and distribute their product in foreign markets. These overseas operations are better positioned to monitor in-country requirements and prepare for compliance. In the case of larger exporters that have internal resources responsible for tracking packaging

sustainability requirements, this role is typically delegated to the government relations, global trade, legal/compliance or regulatory affairs functions within each company. A few companies have sustainability functions which are tracking. Some exporters have a cross-functional team to do horizon scanning, others have designated a single person to perform this function or have outsourced it if there is no expertise in-house.

Exporters that are actively monitoring packaging requirements noted there is not a central resource to track regulations in this space. Most look at various resources to track regulations including in-market contacts, trade associations, updates from USDA/FAS GAIN reports, WTO notifications and industry news sources. Two exporters, each a member of the same trade association, both noted that the trade association has been ramping up efforts in the packaging sustainability space and plans to continue on this trajectory given that this issue has recently been identified as a key priority for industry.

Many exporters are only tracking developments in a few of their key export markets. Notably, one exporter outsourced this role to a law firm in the EU after finding the task too daunting to execute in-house, and two other exporters expressed interest in outsourcing this role in the future. The exporter currently employing a law firm to track regulations noted that to keep costs manageable, the law firm only tracks developments in the European Union generally, as well as within 4 to 5 individual Member States. The exporter recognizes it will likely miss out monitoring for compliance in smaller/lower priority markets due to its inability to maintain awareness of developments worldwide.

Most exporters acknowledged they lacked the reach for insights on regulations under consideration, proposed or close to implementation without the help of USDA/FAS and industry counterparts. Several exporters and trade associations noted the invaluable work USDA/FAS is doing to educate exporters on forthcoming regulations and increase awareness to a greater number of sectors and exporters. Reliance on GAIN reports was noted by several exporters as part of their intelligence gathering. One large multinational food and beverage company with resources on the ground in multiple markets stood out as an anomaly when an interviewee stated that, “Fortunately, legislation does not usually drop overnight.” Their network of resources allow the company to pick up early intelligence and/or proposals coming down the pike.

Even in instances where exporters are tracking regulations, many expressed concerns that they may miss key proposals or changes, or learn of new requirements too late to ensure compliance. One exporter also noted that it worries about its ability to understand and correctly interpret foreign regulations due to language barriers.

3. *The EU is a key market of concern, but others are also on the radar for U.S. exporters.*

Most exporters expressed both awareness and concern over the EU Packaging and Packaging Waste Directive and the subsequent regulations being promulgated across the European Union. One trade association referred to the EU as a “canary in a coal mine,”

signaling that once the EU adopts a regulation, it is expected other markets will follow their lead. Within Europe, some exporters mentioned the UK, France, Germany, Sweden, Norway and Finland as markets to watch. Others called out Canada, Mexico, China, Japan, South Korea, Singapore, Australia, and UAE as countries they continue to monitor.

One exporter of beverages and healthy snacks cited that when exploring the viability of a new market, they routinely undertake a market assessment on whether the product formula meets standards of identity requirements. In recent years, they have added labeling to their market assessments given complexity and changes in labeling requirements. Most recently, they have added packaging sustainability to their market assessments to ensure a 360-approach to their product's ability to comply.

4. *Some packaging sustainability regulations are more front of mind than others.*

Bans on single-use plastic packaging, restrictions on certain packaging materials, and recycled content requirements were brought up more frequently by exporters than EPR schemes or labeling requirements in foreign markets, which seemed to be of less concern, at least in the near term.

Some exporters noted that they expect the layering of regulations will start having a broader impact in a few years. For instance, two multinational beverage exporters stated that they believe the focus—which is currently on consumer-facing or retail packaging—will eventually expand to include secondary and tertiary supply chain packaging such as cardboard boxes and pallets as well. A few exporters noted that they expect more labeling requirements in the future and are concerned that such requirements will not be harmonized and/or conflicting. Others noted the need for more work on labeling requirements and greater use of technology to encourage less packaging.

5. *Awareness and responsiveness have been driven by retailer requirements and consumer preferences just as much as, or even more so than, by government initiatives.*

Many exporters cite some of the changes they are responding to regarding packaging have been initiated not by foreign government regulations, but by retailer requirements or to respond to evolving consumer preferences. One exporter noted that in the past few years, "the focus from commercial buyers in grocery stores has moved from GMOs to carbon footprint," which includes looking at packaging sustainability practices. Additionally, retailers are assessing their own carbon footprints and in turn looking to their suppliers' sustainability practices, including as they pertain to packaging. A smaller exporter explained that the past year, retailers and distributors (with the UK specifically called out) have "turned up the heat" with more requirements related to carbon footprint, lifecycle assessments, and sustainable packaging. The exporter noted that these demands are making it harder to close deals.

Because retailers are focused on reducing the carbon footprint of their product offerings and enhancing their sustainability practices and reputations, one exporter expressed

concern that retailers are beginning to restrict access to already limited shelf-space to those products meeting retailers' sustainability criteria, especially when it comes to specialty retailers and grocery stores that tend to be more environmentally conscious. Ultimately, even in instances where retailers are not forcing requirements upon their suppliers, some still want to know that their suppliers are focused on taking sustainable actions and will make decisions on who they do business with accordingly. The concerns over retailer requirements led one exporter to state that even in instances where there is no applicable government regulation, if there is a stringent retailer requirement directed at packaging sustainability then "there may as well be [a government regulation]."

Some exporters report that certain retailers that have adopted requirements even more rigorous than government regulations. On this issue, one trade association surmised that retailer requirements may sometimes be more stringent than those promulgated by regulatory bodies because retailers need to be more aligned with consumer expectations. As one interviewee put it, "large retailers are the voice of consumers."

In other instances, retailer requirements align with government regulations to ensure compliance throughout their value chains. For example, one exporter mentioned that one of its customers required a signed agreement stating that it will comply with a certain foreign sustainable packaging regulation by its phase-in dates. Another explained how one of its multinational customers rejected its product in a certain Asian market after noting that the type of plastic used by the exporter for its packaging appeared on a list of difficult-to-recycle materials, raising concerns that it would possibly be banned in that market at a future date.

Many exporters indicated that they are being responsive to consumer interests by making changes to their packaging, even if the primary driving force is government regulations or retailer requirements. One multinational corporation that has transitioned to 100% recycled polyethylene terephthalate (rPET) for some of its products credited consumer demand as the predominant driving force behind the decision. This exporter provided that its rationale was that government regulations are forthcoming, but that complying early would allow it to gain credit for its sustainability efforts among consumers. At the same time, the alcoholic beverage sector noted that it is important to ensure the right balance of weight and consumer preferences. Their consumers expect premium/high-end products to be in heavier bottles over lighter weight bottles. Similarly, one exporter noted that if bottles are overly lightweighted, consumers often perceive there is less volume of the product..

6. Most exporters feel they have very little influence to provide stakeholder input, engage in dialogue or shape packaging sustainability requirements in foreign markets.

Most U.S. exporters have not engaged in foreign markets on sustainable packaging requirements in a comprehensive way. If exporters are aware of proposed regulations in a market, there is a sense that there are few opportunities to provide input into scope of sustainable packaging standards and requirements. Smaller to medium sized exporters with

no operations in market other than via imports have cited they have not engaged directly. One larger beverage exporter cited they continue to engage but have had pushback in their requests for longer phase in periods. Although it is a big challenge for any U.S. company to influence foreign regulations and requirements on sustainable packaging, large companies will be in a better position to make their views known and to obtain exemptions or extensions with respect to compliance. U.S. trade associations have cited limited ability to engage and have relied on their foreign counterparts to address concerns with sustainable packaging standards impacting domestic as well as imported products, such as fruit and vegetables.

Exporters cited that new requirements may be driven other than by clear objectives or science, and that input from industry is not taken into consideration. One beverage and snack exporter noted that some legislation only focuses on particular packaging types or is not at all science- or evidence-based. New and proposed requirements may be consumer driven or politically motivated, and one interviewee stated, "We hope that we are not pushed into a seemingly more desirable packaging format for political reasons that may not make sense from a commercial or environmental perspective." This exporter also noted they are worried about decision making that is not evidence-based, including at the international level and that they are closely watching the UN Global Treaty on Plastics Pollution. Another processed products exporter cited that governments have been pushing for smaller portion sizes at retail to advance nutrition-related goals but are not paying attention to the contradiction that smaller portion options mean greater packaging per unit. Processed products exporters would like to see more opportunities for dialogue to ensure requirements recognize current and future state of capacity and packaging technologies.

One interviewee noted learning of a new regulation in Spain and was able to respond in 3 days with the help of USDA/FAS. Even if they have the time and ability to respond, exporters are concerned that reactive responses rather than proactive dialogue are limiting U.S. food and agriculture's ability to be part of the solution when it comes to sustainable packaging alternatives.

7. *Most exporters are not ready to comply with sustainable packaging requirements in foreign markets.*

Some exporters are more prepared than others, but most expressed that they need more time to prepare and comply with new requirements in export markets. The level of readiness is higher for larger companies that have the flexibility to tailor a solution for a priority market or work with their importing units, distributors or licensees to prepare. Smaller exporters have indicated they have much more homework to do, for example, a small exporter of spreadable snacks is responding to more near term and urgent requests from potential customers in Europe as to their carbon footprint and life-cycle assessment, rather than focused only on packaging. One fruit-related trade association stated that its entire industry needs time to adopt new practices.

Many reported that keeping up with disparate regulations in the United States as well as foreign regulations has been difficult and that energy is going first into readiness for the domestic U.S. market, with overseas markets important but somewhat more complex.

Although business-to-business enterprises and other exporters that do not use consumer-level packaging may not be as immediately impacted, one exporter that sells and processes commodities indicated that it has been caught by surprise in the past. A few interviewees speculated other U.S. exporters that are not consumer facing may not be as ready as they should be, and the definition of packaging included in the EU Packaging and Packaging Waste Directive includes primary, secondary, and tertiary packaging was cited as one example.

II. U.S. EXPORTERS FACE MYRIAD OF CHALLENGES TO PREPARE FOR AND COMPLY WITH NEW REQUIREMENTS ON SUSTAINABLE PACKAGING IN FOREIGN MARKETS

Exporters interviewed indicated they are working to find the right balance for packaging that ensures food safety and adequate shelf life; enables recyclability, reusability or compostability, if feasible; provides a structured, merchandisable packaging format appealing to retailers and consumers; and is cost-effective. Some exporters noted that they undertake reviews of packaging options on a periodic basis, (e.g., one to two times a year) to assess alternatives to and reductions in plastic packaging. Exporters interviewed outlined various challenges with packaging sustainability requirements in overseas markets including:

- Requirements, standards and definitions for packaging sustainability, recycling, and reusability are not harmonized.
- Availability of packaging alternatives that meet food safety and quality standards is limited.
- Supply of recycled material in the United States is inadequate to meet demand for packaging made with recycled content.
- Reusable packaging has its own challenges, and biodegradable/compostable technology is not yet a viable option.
- Timelines for compliance in overseas markets do not take into consideration lack of alternative materials and recycling infrastructure in the United States.
- Costs for compliance can be high.
- Implementing sustainable packaging may require tradeoffs or lead to unintended consequences.
- There is concern that enforcement of sustainable packaging regulations may not always be equally applied.

More detailed descriptions, concerns and anecdotal evidence provided by exporters on each issue are outlined below.

1. *Requirements, standards and definitions are not harmonized making compliance more complex.*

Exporters expressed an appreciation for the need to reduce packaging waste and welcomed opportunities to work on solutions to meet that objective. At the same time, the plethora, depth and breadth of foreign regulations that exporters must navigate was commonly cited as a point of frustration. Government agencies may not always understand the technical aspects of manufacturing processes and therefore tend to overlook whether viable sustainable packaging alternatives exist. Scope, requirements, standards, definitions and timelines often vary by market and there is concern of disparities and possible conflicts that will require multiple packaging solutions and/or customized packaging for certain markets. Inconsistency of regulations in this space is problematic. One alcohol exporter noted, the

lack of harmonization for bottle weight/recycled content means different bottles will be required in different markets which can be cost prohibitive. As one interviewee stated, the company "ideally wants to produce one type of packaging that meets all requirements (related to sustainable packaging standards) for multiple markets, but that may not be possible." Exemptions, exclusions and longer phase-ins may not be applied uniformly, and smaller exporters are concerned they may be at a disadvantage as they do not have the reach or resources to engage with foreign government regulators.

Although interviews focused on existing and upcoming packaging sustainability regulations in foreign markets, many exporters also expressed concern over disparities in domestic state-level regulations. When it comes to sustainability, one exporter said that "each state acts like its own country." A few exporters noted that the issue of lack of harmonization in the United States and the patchwork of regulations raises concerns about compliance given their limited control over distribution. One snack exporter noted it "does not want to have a California-specific SKU that can only be sold in California and another for Wyoming". Another snack exporter noted, "we need either a state model that works for other states or federal intervention, with ambition to be same across national borders where feasible."

On the foreign side, these issues become even more acute. The EU's Packaging and Packaging Waste Directive was mentioned multiple times as a point of concern because it allows EU Member States to adopt different strategies to achieve the stated goals. One exporter also brought up the point that even within a foreign market, regulations may not be enforced the same at different ports or locations.

Disparities in regulations may be especially challenging when they differ in how they define terms or provisions as well as determine metrics. For example, one multinational expressed concern that some regulations look at the entirety of a company's SKUs collectively for the purpose of measuring the percentage of recycled content used whereas others look at each SKU individually. Similarly, one business-to-business enterprise stated that it has run into difficulties because of differing packaging specifications, which may contradict based on customers' various goals (e.g., some focus on carbon footprint, whereas others are honed-in on ensuring packaging is reusable, returnable, or compostable). Given the many different requirements related to what packaging is acceptable and which is not, one exporter has asked for assistance from its trade association to help identify which materials are problematic in which markets.

Lack of harmonization in labeling requirements related to sustainability can also be particularly problematic for exporters. One exporter, which uses the same packaging with multiple languages for different markets (e.g., SKU sharing) noted that additional labeling requirements related to sustainability and recycling jeopardize its ability to continue to do so. It added that it would like to avoid separate labels to meet different and, at times conflicting, requirements, especially considering the expense and time needed to create new artwork and change packaging lines to accommodate new label requirements. This same exporter raised a unique point about labeling in the context of making a switch to

sustainable packaging alternatives. The company developed an innovative sustainable packaging solution, but rollout of the product in the new packaging has been delayed given concerns that new labeling requirements may be coming down the pike in certain markets. The team did not want to roll out a new and costly packaging alternative only to need to change the labels shortly after.

2. *Availability of packaging alternatives that meet food safety and quality standards is limited.*

While interviewees did not address differences in regulatory approval for recycling technologies between the U.S. Food and Drug Administration and foreign markets, concerns over the quality of packaging alternatives and ability to ensure food safety was a predominant theme throughout interviews. Nearly all exporters focused on the food safety and the sanitary/phyto-sanitary (SPS) elements of packaging alternatives. For many, quality and food safety are the decisive factor in assessing the overall feasibility of packaging alternatives. Ultimately, some exporters' plastic packaging relies on specialized materials that may not have clear alternatives at this time.

Concerns about food safety/SPS and quality issues were commonly raised in the context of using post-consumer recycled/resin (PCR) plastic packaging. One interviewee from a multinational stated that "no packaging alternatives can perform the same as traditional packaging for shelf-life purposes." Exporters indicated that it is difficult to use PCR material in a food-safe environment because the PCR material needs to be clean and meet food grade and toxicology requirements. PCR material should also match the shelf-life provided by traditional plastic packaging and be able to handle the same moisture content. One exporter noted that flexible packaging "does a lot of work" as it weighs very little and can protect the company's product for up to two years, whereas PCR would degrade in a fraction of that time. One exporter determined that it loses 50% of its product's shelf life when the product is packaged with PCR material, and that food safety concerns are ultimately hindering its ability to comply with new retailer requirements on packaging. The concerns around shortened shelf life can be a bigger issue for exports because of the need for additional transportation time to get the product to the retail shelf. This could put U.S. products at a disadvantage to local production in foreign markets that have unreasonable packaging regulations.

Mandating minimum levels of PCR materials also raises quality concerns. For example, one exporter cited research that plastic and corrugated packaging have a maximum level of PCR material that can be used without running into quality issues (for example, up to 30% PCR material is the maximum for flexible film). Another exporter – which uses a hot fill process for its beverages – brought up a unique challenge it faces because of its manufacturing process. Namely, there is a limit on how much recycled content can be used in a plastic bottle without it becoming unsafe to handle the heat used in the hot fill process. Although the company's packaging team is testing bottles with various amounts of recycled content, it has found thus far that 30% is the cap on feasibility for the hot fill process. Certain regulations, however, will require that packaging use as much as 50% recycled content.

Another issue raised was packaging alternative's susceptibility to damage, which may result in the package being rejected by either the exporter or its customer. Two grain exporters that were interviewed expressed concern that packaging alternatives are not as durable as current packaging solutions. Specifically, plastic packaging is effective in reducing breakage and keeping water from infiltrating the product. Unfortunately, the more durable woven plastic tote sacks are not as recyclable as alternatives. This sentiment was echoed by a trade association, which noted that alternatives like cotton sacks are not sturdy enough for exports like produce, as well as another produce company currently deciding between using plastic clamshells or plastic bags to package lettuce. This company noted that plastic bags do not protect the produce as well as clamshells, which ultimately use more plastic. For the alcohol beverage sector, lightweighting bottles (reducing the amount of glass in a bottle through design changes) and changing size or format of fiber partitions are a few ways companies can reduce the amount of packaging. However, for exports, more stable packaging is required to ensure integrity of bottles during shipment.

Exporters are also facing difficulty finding alternative packaging materials for movement of bulk products. One exporter looked into shipping in flexible intermediate bulk container (FIBC) bags as opposed to plastic containers but ran into issues with mold. Another exporter said it is unable to move away from shipping in plastic containers because plastic is the only material that can be properly sanitized, as it is the only material that prevents hazards from growing; cardboard or wood boxes will not perform adequately. A different exporter noted that it needs to use a qualified seal to package its containers to ensure quality and food safety, and at this point in time no other material besides plastic achieves this. Ultimately, packaging alternatives do not necessarily work for certain products or in certain scenarios. Another company indicated they are looking to switch from cardboard boxes to food safe reusable plastic containers (RPCs) for movement of harvested produce but have experienced issues with suppliers not wanting the RPCs to leave the United States. As a result, they are continuing to use cardboard boxes which requires recycling or composting by the exporter.

One exporter expressed that COVID has had a tremendous impact on the extent to which consumers expect items to be packaged.

3. *There is inadequate supply of recycled material in the United States to meet demand for packaging made with recycled content.*

Many exporters expressed concern that there is an inadequate supply of post-consumer recycled plastics available in the United States. Some companies are having difficulty sourcing PCR material or rPET in the quantities required for current packaging formats. (Those exporters that use glass bottles noted a similar shortage of recycled glass in the United States.) One exporter uses flex film for nut packaging. Flex film with recycled content does not exist in the quantity that the company needs. They cited purchase of $10 million

worth of flex film in 2019 and cannot source that amount using 100% recycled content. Exporters cited several challenges:

- There is a finite number of suppliers that provide recycled packaging or other innovative/ alternative packaging solutions.
- U.S. consumers are not recycling at high enough levels required to provide the plastic feedstock for PCR materials. The U.S. Environmental Protection Agency reports that less than 9% of the 35.7 million tons of plastic produced in the United States in 2018 was recycled.[4]
- U.S. recycling infrastructure is inadequate to support greater supply and there is no incentive to make additional investments in infrastructure. Regulations, policies, and initiatives should support increased supply of feedstock through increased recycling efforts. One larger company noted their current target is 50% minimum recycled content by 2030 and believe it is an achievable target so long as supply exists, and governments help to make supply available.
- Other countries (Canada specifically mentioned) are sourcing U.S. recyclables to meet their own domestic demand for PCR materials.
- Some foreign regulations (Chile and Australia specifically mentioned) appear to require that exporters purchase recycled material from those respective countries which, if applied, creates new logistical challenges and may raise questions about consistency with international trade rules.

In the future, some exporters expect shortages will only be exacerbated once more regulations require the use of greater amounts of recycled material. One relatively large exporter noted larger users will likely have easier access as more recycled material become available while others "may be out of luck" when it comes to sourcing the necessary alternative packaging resources. Another smaller exporter reiterated this concern, stating that there is not a lot of food-grade PCR around, and larger companies secure most of the supply. A different exporter noted there is additional competition for PCR beyond the food and beverage space, and that industry should get priority in receiving recycled food grade materials for packaging. For example, clothing companies are taking quality packaging-grade PCR material and turning into clothing, which is not recyclable and essentially results in exporters needing to buy more virgin resin. One exporter expressed hope that the supply of PCR materials and packaging will improve as more exporters request them.

Various exporters expressed concern over the real or perceived impossibility of recycling flexible film packaging, which is considered a difficult-to-recycle material that is consequently trashed. Although each layer contained in multilayer flexible packaging is individually recyclable, they cannot be easily separated once melded together for instance as a pouch. More than one exporter expressed the opinion that advanced recycling will have to be a necessary part of the solution for food grade materials, including film.

[4] Facts & Figures about Materials, Waste and Recycling. Plastics: Material-Specific Data. U.S. Environmental Protection Agency.

There is an absence of consistent nationwide collection and recycling options for flexible packaging. Mechanical recycling does not work, and infrastructure is nascent for advanced (chemical) recycling – which converts post-use plastics back into their original polymers for reuse. While advanced recycling may provide some solutions in the future, there are concerns from some environmental groups that such technologies may harm the environment. Another exporter noted that it is easier to build out recycling streams for materials like PET/PETE, glass, and aluminum, which are valuable commodities for recyclers. In contrast, there is no end market for flexible films, and they are therefore not prioritized for collection or recycling.

Even if a packaging material is technically recyclable, it does not mean that it is recycled in practice. For example, one company noted that even if something properly goes into a recycling bin, only 20% goes anywhere of value. One exporter cited the recycling rate for flexible packaging, even where it is collected via a store drop-off point model, is only about 4%. Another exporter used aluminum as an example, noting that certain grades of aluminum should not be mixed with aluminum beverage cans in the recycling process. Another noted that polystyrene is technically recyclable, but it is not recycled in the United States.

Even if materials can be recycled, the subsequent packaging may not be as high-quality as the original. One trade association, whose members use a significant amount of glass bottles, noted that even though glass can be recycled indefinitely, the quality of the bottles could decrease as more products are recycled. One exporter noted as an example that if ceramic is processed with glass in the recycle stock it could create bubbles in the glass impacting structural integrity.

Contamination and cleanliness are also major issues when it comes to recycling, often as a result of wish-cycling, or consumers' assumption that someone further down the recycling stream will clean or otherwise make the packaging recycle-ready. For example, one exporter uses a film that is technically recycle-ready, but food contamination makes it so it cannot be recycled. Another large multinational exporter stated that film material needs to return to a petroleum product to be safe for food.

Consumers often cannot distinguish one type of plastic from another, and incorrectly sorting products can pose a serious problem to the recycling stream. One exporter explained that if even one PLA bottle (which is made from renewable organic sources, is classified as a #7 plastic, and is meant to be biodegradable and compostable) is recycled with a batch of bottles made from PET/PETE resin (which is #1 plastic), then the PET/PETE material becomes unusable and must be landfilled.

4. *Reusable packaging has its own challenges, and biodegradable/compostable technology is not yet a viable option for all sectors.*

One exporter noted that reuse mandates are difficult to comply with because of their need to clean the packaging prior to refilling it with product, which is no small undertaking, especially if the packaging is ultimately being refilled with a different product. One processed products exporter noted its glass supplier has concerns that returnable/reusable bottles or jars could have the structural integrity for reuse. Furthermore, reusing packaging often requires that the labels be changed.

A reuse scheme may also be difficult or counterproductive from a transportation standpoint. Long distance freight of used packaging materials can ultimately negate the environmental benefits intended to be reaped through a reuse scheme. One trade association provided its finding that refilling glass bottles is unsustainable in instances where the bottle must travel more than 260 km to be refilled. One company noted that, even if a packaging product is 100% recyclable, the amount of fossil fuel it takes to get to the recycling station may counteract any environmental benefits of recyclability.

Food-grade biodegradable and compostable solutions for food manufacturers that rely on plastic are not widely available but new technologies are being explored and assessed.

- Compostable bioplastic packaging does not currently provide a sufficient barrier against oxygen or water, which is required for the packaging of many types of food and beverages. Paper-based packaging frequently needs a plastic layer for an oxygen or water barrier.
- One snack exporter noted there are no alternatives to flex films available right now. For a product like potato chips, the film is key to protect the products from light and moisture. A fiber-based solution is not workable.
- PLU stickers allow for easy scanning of produce at point-of-sale. There is currently no compostable PLU produce stickers that can adhere to all types of produce. (Other alternatives have challenges. Laser etching is scannable/readable only if the produce is a uniform color. A one-inch paper band that goes around produce is gaining popularity in Europe, although it involves using additional packaging material and ink.) A biodegradable alternative is being developed with an expected timeline of five years until the alternative is market-ready
- Examples of new technologies under exploration include starch bags and potato skin films. However, they may not be able to hold up to heating, freezing or long shelf life. One small exporter noted there is no alternative bio-plastic that can withstand the cooking and freezing process that the current packaging undergoes for their frozen product.
- One larger exporter that sells consumer goods as well as food products cited that with limited food-grade alternative packaging options (whether recycled or compostable), greater attention and resources have been dedicated to sourcing packaging alternatives for its consumer goods SKUs.

- One snack exporter noted there is an evolution in Europe where paper is being used as a replacement for plastic film. European competitors are using paper substrate for their products. Although commercialized in Europe, the packaging and capability is not yet available in the United States. Cost to import will be 5 times higher than current packaging, and carbon footprint for sourcing the paper substrate material from abroad outweighs the benefit.

5. *Timelines for compliance in overseas markets do not take into consideration lack of alternative materials and recycling infrastructure in the United States*

Most U.S. exporters expressed the need for more lead time to prepare for sustainable packaging requirements. Insufficient lead time to ensure compliance with regulations was brought up numerous times by interviewees. As one exporter expressed, "industry is not opposed to regulations, but timing poses an issue". Another interviewee, who expressed that their company is ahead of their competitors and has been exploring possible solutions for a while, stated that even their company needs additional lead time to ensure compliance with foreign requirements.

- Fresh fruit and vegetable exporters noted it could take up to 5 years to develop a biodegradable alternative to the PLU sticker.
- One exporter noted their goal is 100% rPET beverage bottles by 2025 for certain SKUs, which is ahead of regulatory requirements for some countries. How quickly they can get there is dependent on technology and supply of recycled content.
- One petfood exporter noted that significant time is required to test new packaging before it can be integrated into their production line. Companies cannot make changes overnight in response to new packaging regulations and requirements.
- A medium-sized commodity exporter noted because minimum order quantities can be high for packaging and purchasing 2 to 3 years' worth of packaging is standard practice for their company, they will need time to utilize their existing plastic packaging inventory for multiple SKUs before making the switch to any alternatives.
- One exporter of commodities sold in bulk and at retail noted that paper was the dominant and more cost-effective packaging 20 years ago. The sector only transitioned to plastic 10 years ago, which is now dominant and more cost effective. Alternative packaging solutions that are durable and compostable are being explored but will need to be cost-effective for some low margin sectors to transition to new packaging and may take a few more years to be adopted.
- An experienced dairy exporter noted their company would like to be one of the first to implement new packaging solutions as it aligns with their premium branding and estimate it will "probably take 5 to 10 years because there isn't anything out there yet".

6. *Cost for compliance can be high.*

Exporters frequently raised concerns over various costs associated with compliance, including sourcing alternative packaging and managing existing inventory, changes to or retrofitting manufacturing lines, new labor costs and/or job losses, and contributions to EPR schemes that may not recycle their type of packaging. At least two exporters noted they have paid fines as they are not able to comply at this time.

Sourcing alternative packaging can be a significantly high cost for many companies.

- The type of food product and whether branded or a commodity is one factor in whether an exporter can warrant higher costs for alternative packaging materials. As one example, commodity exporters noted that alternatives may be cost prohibitive due to the lower margins for such goods. Basic commodities are typically packaged in lower cost packaging such as thin, one-time use, plastic bags. One commodity exporter noted that for their retail packages (1 to 5 lb. bags), the cost for alternative packaging ranges from two to five times the cost of current packaging. With low margin goods, a 500% increase in the cost of the packaging is significant compared to the cost of the good.
- Inflationary pressures are making changes to costlier packaging harder to justify.
- One dairy exporter noted that they have identified a bio-resin alternative, but is cost prohibitive at this time.
- Another exporter cited the need for more research on options and consumer preferences is needed prior to switching to new packaging formats. One initiative to switch from a flexible film bag to a higher cost compostable bag for a snack line was rejected by consumers because it crinkled too loudly.
- One exporter conceded that it will not have the liberty to decide if an alternative is cost effective if the alternative is mandated.
- Some exporters are hopeful that eventually alternatives will be more widely available and affordable, but making the switch is not economically feasible in the current market. Another company approached this from another angle, that "there could be downward movement in terms of costs" if enough companies move to implement more sustainable packaging and drive increased demand.

Several exporters cited that changes to or retrofitting lines for new/alternative packaging will incur substantial investment. While most exporters did not provide cost estimates, ranges noted hundreds of thousands of dollars for small and newer-to-export companies to millions of dollars in capital equipment for larger companies with multiple locations.

- One large exporter noted it is retrofitting its packaging and bottling systems in the United States based on what has worked in its overseas operations.
- Another exporter noted they had to modify a whole bottling line in order to switch to rPET bottles and anticipate having to make modifications to other lines in the future (i.e., for certain snack products).
- An alcoholic beverage exporter noted it would like to reverse the order of filling a case with fiber partitions first followed by bottles to filling the case first with bottles followed by fiber partitions as such a change would use less partitions once the bottles are

already in the case. However, such a change to filling lines and packaging formats is estimated to cost millions.

- There appears to be more focus on changes in the beverage space as some food exporters explained they are reticent to make capital investments while packaging requirements in the United States and around the world are in flux, alternatives are not in commercial supply, and consumers may not accept the packaging alternative.
- One smaller exporter of processed vegetables indicated upcoming investment in new machinery and film to move from vacuum seal to thermoform technology to reduce amount of plastic packaging used for their frozen products. Cost is expected at "hundreds of thousands of dollars" to make the transition. As early adopters, they believe this transition now is important to minimize packaging waste and be more responsive to their consumers. At the same time, they acknowledge the new equipment is costly and their packaging will still require use of plastic to cook, freeze, store and transport their product as no alternatives are available at the present time.

There were some additional labor costs cited by a few exporters. One exporter requires additional in-house resources to track and prepare for regulations. A dairy exporter recently hired a packaging engineer to vet packaging materials and explore new technologies. A commodity exporter noted if they were to change packaging from large plastic bags and totes to paper or hemp, they would require additional labor to minimize damage in preparing for shipments. An alcohol exporter noted the additional costs associated with having to ship products in heavier packaging to avoid breakage en route to Canada, and before distributed to the customer, repacking the goods near the border (and discarding fiber) to meet provincial government's packaging sustainability requirements. The solution to meet requirements for safe transport and less packaging leads to higher labor and packaging costs and more waste.

On the flip side, and more striking, a few exporters cited concerns about loss of U.S. jobs. One interviewee from the alcohol sector noted that jobs would be lost in United States if bottling must be moved to France under France's Reuse Policy. Another U.S. exporter of beverages and healthy snacks noted possible loss of U.S. jobs if their company had to send products in bulk for co-packing in Europe to ensure compliance. A dairy exporter is concerned that any trade restrictions due to packaging that limit or halt U.S. dairy product exports will risk loss of exporting-related jobs and reduce revenue to farmers.

Costs to contribute to Extended Producer Responsibility schemes may not benefit all contributors. EPR is "a policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products".[5] Multiple exporters are already paying into EPR schemes and support creating a circular economy. However, many expressed concerns that EPR schemes impose taxes and fees but still do not increase recyclability or fund other sustainable initiatives. One processed products exporter stated that it is "not opposed to EPR schemes as long as they

[5] Extended producer responsibility, OECD.

are funding improvements to recycling and not just going to a government's general fund." A snacks exporter noted that it pays into EPR schemes but does not see the infrastructure to support advanced recycling for flexible films and stated, "It is somewhat counterintuitive to pay into a system that gathers and recycles other plastic waste but does not offer the ability to recycle the packaging on our snack products." Another exporter of beverages in bottles and snacks in flexible film pouches noted that they are paying into schemes but have not done an in-depth analysis on whether such schemes are providing benefits for their operations (e.g,. more feedstock of recyclable materials). One large multinational food and beverage exporter that has been doing extensive work in the sustainability space noted that the optimal EPR scheme would involve using funds towards consumer education as well as infrastructure.

7. *Implementing sustainable packaging may require tradeoffs or lead to unintended consequences.*

Several exporters cited potential tradeoffs inherent in switching to alternative packaging that could impact their efforts to reduce their carbon footprint. Many of the exporters interviewed have sustainability teams in-house. Nearly all exporters discussed packaging sustainability as part of their overall sustainability initiatives and efforts to reduce their carbon footprint. Several pointed out that packaging can be a more complicated part of the equation in reducing their carbon footprint and that it is key to ensure packaging is considered through the lens of an end-to-end, or life cycle, assessment for the product.

- While rigid packaging can be more easily recycled, flexible packaging is lighter and uses less plastic. One pet food exporter cited it uses primarily flexible multi-layering packaging as their life cycle assessment determined that flexible contributed the least impact on the environment.
- Another pet food exporter noted they also need to consider the carbon footprint tradeoff when delivering packaging material to their manufacturing facility and observed that you can get more unfilled plastic pouches on a truck than aluminum cans.
- A healthy snack exporter made a similar statement, "you can get 30,000 pouches to one facility on one truck, but for paper, it would be ten times or more than that".
- A dairy exporter looked at a supplier offering 100% PCR corrugated material but found the boxes used a heavier grade of paper, which made the finished box noticeably heavier even though it was performing the same function as traditional corrugated box, and therefore adding to the company's carbon footprint.
- An alcohol beverage exporter noted that the necessity of making more bottle types for different markets is less sustainable. "We don't want to have to produce 100 plus bottle types. We want to produce one that is acceptable in all markets. That is actually the most sustainable way."

A few exporters also brought up tradeoffs related to food security, food waste and health and wellness.

- A commodity exporter noted that its traditional plastic shrink-wrap supply chain packaging ultimately reduces food waste because it is durable and prevents breakage and spillage.
- Another interviewee expressed that, "sustainability does not just mean banning single-use plastics but feeding more people with the same amount of resources, and to eliminate food waste, it is important that packaging holds up.
- As one processed products exporter put it, "making packaging more sustainable may increase food waste, spoilage, and damage, meaning the amount of carbon saved on packaging will not be worth the ten times more lost because of the product not being used as intended."
- Another snack exporter noted that with more governments focused on regulating portion sizes to advance nutrition-related objectives, the ratio of packaging to individual snack sizes is increasing. As such, companies face contradictory policies to meet health and wellbeing requirements with packaging sustainability requirements.

8. *There is concern that enforcement of sustainable packaging regulations may not always be equally applied.*

One exporter noted that they have experienced differential enforcement in some markets in the EU with more scrutiny and expectations from foreign producers over domestic producers. Another exporter noted discrepancies within the EU on enforcement of various regulations and have experienced that different ports may not enforce regulations in the same way. There is concern that differential and varying degrees of enforcement will adversely impact U.S. exports.

III. OPPORTUNITIES AND INNOVATIONS CONTINUE TO ARISE FROM NEW REQUIREMENTS ON SUSTAINABLE PACKAGING IN FOREIGN MARKETS

While challenges are numerous and some may be insurmountable, U.S. exporters are looking to opportunities in this evolving regulatory environment.

1. U.S. exporters welcome innovation to pursue new technologies and formats, and collaboration for solutions and education.

One exporter stated that even though the EU develops and implements sustainable packaging regulations, it looks to the United States to implement packaging solutions. Consequently, this creates an opportunity for U.S. food manufacturers together with packaging industry to serve as a catalyst in developing innovative solutions and ultimately creating greater level of competitiveness for U.S. products. Various exporters emphasized the ample room for innovation being created by sustainable packaging regulations.

- One processed product exporter is looking to use a mono material to create a recyclable plastic flexible packaging. Although this new product has passed product protection requirements, the exporter is hesitant to roll out the product due to concerns about disparate labeling requirements.
- One produce trade association noted its members have transitioned from traditional long, horizontal clamshells to tall, vertical clamshells as they use 30% less plastic and are structurally sound.
- A commodity trade association is working to advocate for plant-based packaging alternatives, noting that there are lots of opportunities for food-contact applications of plant-based packaging.
- A commodity exporter is exploring starch-based packaging opportunities.
- A nut exporter noted it has a working group on innovations around packaging, which R&D and innovation team is a part of with the aim, "when we are coming up with products we think of what packaging they will go in."

A few exporters noted that industry alignment and leadership is key in effectuating change. One exporter noted that intelligence is often shared amongst industry and different sectors to learn from others, including in other markets. One exporter noted that companies and environmental NGOs have a shared vision and are growing in the same direction. The same exporter noted that companies have a very important role in sharing their global expertise, for instance sharing with key stakeholders as to what a successful EPR scheme looks like, and that various stakeholders have a tremendous amount of knowledge to share and can play a role in educating consumers, legislators and regulators.

2. U.S. exporters are increasing their efforts to be more sustainable in their products and processes and highlighting their commitment to sustainability.

Many exporters are working to connect with consumers to showcase their commitment and efforts towards sustainable sourcing and production through the value chain. This observation was evident even before interviews, by gleaning the exporters' websites, which almost always contain a page discussing sustainability goals and initiatives. These pages

typically focused on carbon footprint, but sometimes also discussed packaging. This observation was corroborated during the interviews, when most exporters noted that they highlight sustainability as part of their branding. It is something they want to be able to present on their products' labels.

- One processed products exporter shared that if they could identify and implement viable sustainable packaging alternatives, "that would position the company well for our overall vision and story."
- A dairy exporter noted that it wants to be the first in the industry to come up with a sustainable packaging solution that is cost-effective and maintains shelf life as sustainable packaging aligns nicely with the company's premium branding.
- One smaller frozen produce company noted that sustainable packaging is part of the whole package with their products and see it as part of their identity. The same exporter is reducing plastic waste through its forthcoming thermoform line and has reached out to a new overseas packaging supplier to offer their company and product as a pilot to use film made from potato skins to see how it can be used within their operations. They welcome new regulations that spur them on to do more.
- One exporter of premium beverage products noted that because its consumers are already willing to pay more for its product, they are therefore likely willing to pay more for a sustainable product with more sustainable packaging.
- A small processed products exporter noted that because it is unable to change its packaging, it is asking "what else can we change?". They already source locally and have consequently amped up recycling efforts and moved to digital recordkeeping.
- A snack exporter noted their first-ever sustainability report coming out this year.

3. *Some exporters see opportunities to pull away from the competition.*

While some U.S. exporters expressed concern over falling behind their competition, some felt they were well-positioned relative to their competitors. One noted its advantage is that it already has a strong presence in Europe and can therefore stay on top of the changing regulatory framework through its network and European operations. Another exporter stated that it feels ahead of competition because bottled water is among its many exports. The company has been aware of sustainable packaging regulations for a long time as water bottles are often one of the first targets. This exporter also indicated that its goal is to be 100% recyclable by 2025, which is ahead of the regulatory environment and allows it to position itself as a leader in the sustainable packaging space.

4. *More companies are collaborating in innovative ways to reduce waste.*

U.S. companies are taking steps to encourage and accelerate recycling for PCR feedstock, implement new technologies, and eliminate plastic where it can. Most of the work is domestically focused but provides potential feedstock for recycling and opportunities to spur more participation by consumers to reduce waste.

- Exporters in the alcohol sector are working with eco-organizations and innovative recycling companies to come up with solutions to their packaging challenges.

- One pet food exporter formed a partnership with a recycling company that handles difficult to recycle material such as flexible packaging. Through this partnership, consumers can send their used, branded packaging to the recycling company for processing.
- Other exporters are actively looking to work with retailers to see how collection can be driven, such as by establishing store drop off points. While an opportunity, exporters acknowledge low rates (4%) of recycling of flexible films via retail drop off points. One exporter looking into this solution indicated that a store drop-off poses a win-win because it may drive consumers back to the storefront to drop off their used packaging and buy more while they are there, as opposed to buying online. Another exporter that uses a similar scheme emphasized that it is not a long-term solution but does provide another avenue to help consumers reduce plastic waste.
- One company noted that its current packaging uses 40% less plastic than others, but at the end of the day, it's still plastic. It asked, "Is it truly better for the environment, or is it just less bad?" It also stated that ramping up the supply of PCR is important, but at less than 100% PCR, demand will continue for virgin plastic. This company much prefers looking for compostable solutions, especially when considering it eliminates the need to transfer the packaging at its end-of-life. The interviewee said, "even if the package falls off a truck and into the street or a field, eventually it will just break down."

Recommendations and Next Steps

The findings support several recommendations for USDA/FAS, including additional engagement with foreign governments on packaging sustainability regulations, increased education and new resources for U.S. exporters, and more public-private partnerships and reviews of what other countries are doing in this space.

Engagement with foreign governments

- Ongoing engagement by USDA/FAS and other government stakeholders with food regulators in foreign markets to reinforce the message that food safety is of paramount importance to food companies and cannot be sacrificed. Through its interactions with foreign governments, USDA/FAS needs to emphasize this point over and over. Regulations and rules promulgated for the purpose of achieving sustainability, environmental or other goals must take into consideration food safety requirements. This conversation needs to occur at the front end of any proposal to change packaging regulations.

- Ensure that implementation timelines are realistic and phase-in periods reflect current infrastructure and packaging innovations. Most exporters noted food-grade alternatives are not available in commercial quantities and reasonable cost. Packaging suppliers need time to innovate and bring new technologies to market — three years minimum, although most exporters noted at least five years especially for flexible films. Encouraging regulators in overseas markets to engage with industry and reassess the packaging landscape on a periodic basis – for instance, every two years – could help provide more predictability on what is achievable and when.

- Provide additional fora for exporters to provide input, expertise, and best practices and engage with government regulators overseas. Successful development and implementation of sustainable packaging requirements calls for engagement and collaboration between foreign regulators, private sector and other key stakeholders. Including the private sector can provide greater insights on the current landscape including challenges and timelines for availability of packaging solutions, stimulate innovation, better identify sustainable technologies, and foster investment accordingly. One exporter noted that new requirements can be an opportunity to level the playing field, and that well-designed regulations with stakeholder input are needed to ensure better environmental outcomes. The food and beverage "industry is part of the solution and should have a seat at the table. There are some that would prefer (the food and beverage) industry not be part of the debate, but it is hard to envision a future state of recycling or sustainable packaging where decisions are made without the primary actors engaged." Several exporters requested that they or their trade associations have a seat at the table in exploring and developing sustainable packaging standards and requirements so that they can give an industry perspective. USDA/FAS does such work on other issues, for example, providing outreach and engagement with regulators to ensure U.S. industry perspective and best practices are taken into consideration in formulating requirements around food additives.

Education and resources for U.S. exporters

- Increase U.S. exporter awareness and readiness through enhanced monitoring and communication. Large multinational companies indicated they have more resources, presence, and operations to keep on top of foreign regulations. Smaller companies/exporters are less likely to have a foreign presence, are more likely to be shipping product from the United States that is packaged for final/retail sale and have found themselves caught off guard and underprepared. The work done thus far by USDA/FAS to reach out to exporters and provide intelligence via GAIN reports is very much welcomed. Exporters would like to see more resources in this space. USDA/FAS should focus efforts to ensure smaller and medium-sized U.S. exporters are informed.
  - Building on reporting done in individual market GAIN reports, periodic updates on status of new and proposed requirements (including implementation and enforcement) in a multi-market report would be beneficial and help provide a one-stop resource to exporters and trade associations.
  - A GAIN newsletter by subscription containing easy to read updates on packaging sustainability requirements and proposals would be helpful.
  - Development of a list to track packaging materials that are considered problematic or required by country would help exporters in with their sourcing strategies.
  - A database that provides up to date information on the status of government regulations on sustainable packaging that are implemented, proposed or under consideration could provide helpful information in real time. Similar databases already exist for MRLs and pesticides. Another database is under development to track front-of-pack nutritional labeling and eco-labeling requirements in foreign markets.
  - Continue outreach via USDA's Agriculture Trade Advisory Committees (ATACs) and Agriculture Policy Advisory Committee (APAC), the National Association of State Departments of Agriculture (NASDA), the four State and Regional Trade Groups (SRTGs), USDA Cooperators, and other food and beverage trade associations, relevant export-focused and sustainability events to inform and alert of new and pending regulations.

Public-private partnerships and best practices

- Allocate new and additional funding to research and development for cross-sectoral sustainable packaging alternatives. USDA has allocated funding to support research and development of compostable PLU stickers for fresh fruits and vegetables. USDA/FAS and other stakeholders should work to identify barriers in other sectors and explore ways that USDA can spur innovation in reducing plastic waste and increasing options for compostable packaging and labeling. U.S. exporters have heard from customers overseas that they expect the United States to be the leader in innovation on packaging. U.S. Government funds to support additional innovation for sustainable, food grade packaging will help U.S. companies meet this demand.

- Consider examining what other countries are doing to support their companies and exports with respect to sustainable packaging. Many participants commented that several other countries are ahead of the United States with respect to recycling programs, consumer education and buy in, and industry participation. Canada and the EU (Belgium) were among

those cited. An assessment of practices that can be duplicated here in the United States, either in terms of a government role or cooperation with the private sector, could help quickly level up U.S. readiness and compliance.

Ensure packaging companies are part of the solution. With overlapping concerns of ability to implement packaging solutions, lack of investment in recycling infrastructure, and need for more innovation, packaging companies together with food and beverage manufacturers, government and other stakeholders need to be actively exploring how to address reduction in plastic packaging to ensure U.S. competitiveness. If packaging suppliers are not able to produce packaging materials that meet the requirements in foreign markets, there is concern that U.S. growers, farmers and processors of food and beverages will not be able to compete in foreign markets and lose out on export sales. USDA/FAS along with other U.S. Government agencies can facilitate greater awareness within the U.S. packaging industry of the emerging foreign requirements that are being imposed on U.S. exporters of food and beverages. Engagement with groups that are working on packaging needs and equipment for the U.S. domestic market, such as PMMI -- The Association for Packaging and Processing Technologies, is needed to ensure they are also preparing for foreign requirements to support U.S. exports.

Coordination, infrastructure, technology and innovation

U.S. exporters provided additional suggestions that may be outside of the scope of USDA/FAS to take action. Nevertheless, we have included additional recommendations below to provide comprehensive overview of exporters' asks as they look to find new packaging solutions and comply with new and upcoming regulations on sustainable packaging in foreign markets.

- Limit divergences in packaging sustainability regulations in the United States. A number of companies said they would welcome federal rules, legislation, and leadership in bringing order to the issues around sustainable packaging and related issues in the United States. U.S. exporters would appreciate efforts to minimize complicated schemes here at home and help focus efforts on the myriad of regulations overseas.

- Increase consumer education. Consumers must be on board and participate in recycling efforts for companies to achieve compliance with minimum recycled content requirements and other regulations. Although inadequate recycling infrastructure poses a major issue for exporters, so does inadequate consumer engagement. As one exporter stated, "it is one thing to build recycling infrastructure, but another to ensure that the consumer knows what to do with their recyclable packaging." Additional support from the U.S. Government for public-private partnerships to increase consumer education on recyclability is required. Consumers are part of the solution to ensure greater volumes of usable materials make it into the recycling stream. Without greater education on what is recyclable, what is not, how to recycle and where, U.S. packaging industry loses out on more feedstock to develop more packaging solutions products with recycled content.

- Invest in additional recycling infrastructure in the United States. To comply with overseas requirements for minimum recycled content, U.S. companies will require more feedstock of recycled materials, including building more locations to recycle, expanding the different types of product that can be recycled, and adding more store collection points for flexible packaging, to name a few.
- Encourage broader use of technology to include more information via the label to educate consumers. Innovations such as QR codes on labels tagged to location to provide specific information to consumers such as how to recycle based on their locality may be necessary as regulations are requiring more information made available to the consumer (such as transparency on inputs, greater nutritional information, recycling information, carbon footprint information).

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The authors would like to thank USDA/FAS for undertaking this important assessment to hear from U.S. exporters. Participants in the assessment cited their appreciation for the outreach USDA/FAS is undertaking to increase awareness of foreign requirements on packaging sustainability and catalog the challenges and opportunities facing U.S. food and beverage exporters. We welcomed the information shared by USDA/FAS on the status of current and proposed requirements surrounding packaging sustainability in export markets around the world. The intelligence provided was used to develop the Compendium included as Annex A, and many exporters commented on this important resource for their own planning and monitoring. We would like to recognize Andrew Stephens, Senior Policy Advisor for Processed Products in Trade Policy and Geographic Affairs at USDA/FAS, who has played a leading role in the ongoing outreach, information sharing and coordination on this project and with the exporting community, suppliers, and stakeholders working on packaging sustainability issues and solutions.

The authors would also like to thank all the participants in the exporter assessment. Their candid responses on the current state of packaging, alternatives and solutions, technology and infrastructure, regulations and policy were enlightening and underscored the need for users and suppliers of packaging to have a seat at the table in developing requirements going forward. Participants acknowledged ongoing work to be done in this space, that U.S. food and beverage companies want to be part of the solution, and that U.S. exporters welcome opportunities to work with regulators and stakeholders to find ways to ensure they continue to compete in foreign markets. We appreciate the time and insights they have shared with us and USDA/FAS.

Annex A
Compendium of Current and Proposed Regulations Related to Packaging Sustainability

Bans on Single Use Plastics

Bangladesh: Goal of phasing out targeted single-use plastic by 90% by 2026.

Burundi: Banned the use and marketing of plastic materials in August 2018. Burundi allowed for an 18-month period to allow consumers and retailers to diminish their existing stock, though it is unclear if the law has been fully enforced.

Cameroon: Placed a ban on the importation, production, and sale of non-biodegradable plastics smaller than 60 microns in 2014, but it is not enforced.

Canada: Certain single-use plastic items, including ring carriers, will be banned starting December 2023.

Colombia: Congress expected to review a bill that would ban single-use plastics other than for medical purposes by 2030.

Costa Rica: Banned the importation or use of expanded polystyrene containers or packages in commercial establishments in the country, though there are exemptions. Also requires importers, producers, retailers, and distributors of single-use plastic bottles to comply with at least one of five requirements: (1) include a regulated amount of recycled resin in the bottle; (2) establish a program for recovery/reuse/recycling, etc.; (3) participate in a waste management program; (4) develop or use products that minimize the generation of waste and facilitate recovery; or (5) establish strategic alliances with at least one municipality to improve waste collection and management.

France: Ban on all single-use plastic packaging for fresh fruit and vegetables by 2026 and ban on the use of PLU stickers on fresh fruits and vegetables unless home-compostable.

Germany: Implemented EU Directive 2019/904 in 2021, banning products including oxo-degradable plastic. In the future, certain single-use plastic products for which environmentally friendly alternatives already exist are to be banned. Beginning July 2024, single-use plastic beverage containers can only be placed on the market if their plastic closures and lids remain attached to the containers during the period of use.

Haiti: Banned polymers of styrene (polystyrene and expanded polystyrene), polyethylene plastic containers with a density equal to or over 0.94, and polyethylene with density below 0.94 in 2012.

Ivory Coast: Implemented ban on plastic alcohol sachets in 2016.

Malaysia: Ban on single-use plastics by 2030.

New Zealand: Phasing out expanded polystyrene food and beverage packaging and oxo- and photo-degradable plastic products by October 2022; plastic produce bags by mid-2023; and all other PVC and polystyrene food and beverage packaging by mid-2025.

Philippines: House of Representatives passed a bill in 2021 seeking to phase out within one-year single-use plastic items such as candy sticks and packaging less than 10 microns thick and within four years single-use plastic items such as film wraps, packaging less than 50 microns thick, sachets and pouches, oxo-degradable plastics, and polystyrene food and beverage containers. The Senate counterpart measure remains pending at the committee level.

Romania: Imposing a ban on single-use plastics in accordance with the EU Directive 2019/904. Some provisions have already been implemented, while others will take effect at a later date in accordance with the Directive.

Senegal: Effectuated ban on single-use plastics in April 2020, including water sachets and coffee cups 2020. Ban has not been enforced, in part due to COVID-19.

South Korea: Bans hard-to-recycle-plastic materials for food and beverage packaging, including PVC/PVDC, colored PET/PETE bottles and general adhesive PET/PETE bottle labels. There is an exception for PVC when used as a packaging material for certain items due to the unavailability of suitable alternatives.

Tanzania: Banned the import, manufacture, sale, and consumption of plastic alcohol sachets in 2017.

Thailand: Reduction leading to ban on single-use plastics between 2023–2026.

Tuvalu: Bans the import, manufacture, sale, and distribution of certain single-use plastic and foam items in 2019, including plastic water bottles, egg cartons, plastic water pouches and plastic ice block bags, and plastic sheets used for food wrapping.

UAE: Manufacture and import of non-biodegradable semi-rigid plastic packaging for food, shrink wrap, pallet wrap, and other disposables is banned.

Vanuatu: Banned certain single use plastic items, including fruit packaging materials such as nylon mesh horticultural nets and styrofoam trays as well as polyethylene egg cartons in December 2019.

Uganda: Banned the consumption and sale of alcohol in plastic sachets in 2019.

Vietnam: Draft decree has proposed a partial ban on the production and import of single-use plastic and bio-persistent plastic packaging commencing on January 1, 2026, and a nationwide ban by 2030.

Zimbabwe: Banned the manufacture for use within Zimbabwe, commercial distribution or importation of plastic packaging with thickness less than 30 micrometers in 2010. Bread packaging is exempt, although it must have a thickness of 25 micrometers.

Recycle/Reuse Mandates and Requirements for Minimum Recycled Content (MRC)

Bangladesh: Target to recycle 50% of plastics by 2025 and reduce virgin material consumption by 50% by 2030.

Brazil: Goal to reduce amount of recyclables that unnecessarily go to landfill by 2031 by 45%.

Colombia: Target 100% of single-use plastic on the market is reusable, recyclable or compostable by 2030. As of 2018, businesses must submit annual reports to the Ministry of Environment and Development regarding their use, disposal and recycling plans for paper, cardboard, plastic, glass and metal packages to ensure that 30% of containers and packaging materials on the market are reused by 2030.

Chile: Mandating 15% minimum recycled plastic content of Chilean origin on ready-to-drink products by 2025. By August 2024, at least 30% of bottles displayed in supermarkets must be returnable for recycling.

Ecuador: Law adopted in 2020 mandating that within two years, the manufacture and importation for consumption, distribution, marketing, delivery and use of containers and glasses that come from polystyrene for food and beverage for human consumption must contain a minimum percentage of post-consumer recycled material or will be prohibited. Within three years, the same for single-use plastic wrappers. Packaging for bulk food of animal origin and plastic materials needed in food containers or for wet ingredients prepared according to technical standards will be exempt.

EU: Member States must produce PET drink bottles with at least 25% of recycled plastic by 2025, and at least 30% by 2030.

Fiji: Producers required to have a plastic bottle permit to manufacture or import plastic bottles as of 2007. Application for permit must include measures taken to collect and recycle bottles.

Germany: Draft law expected to mandate that all PET/PETE beverage bottles consist of at least 25% recycled plastic, beginning in 2025. From 2030, this quota will increase to at least 30% and apply to all single-use plastic bottles, except for bottles where the body of the bottle is made of glass or metal and only the cap, lids, labels, stickers, or wrappers are made of plastic.

India: Mandating for producers and brand owners that 50% (rising to as much as 80%) of plastic packaging is recycled in India and incorporate minimum percentages of recycled plastic in their packaging.

Kenya: Goal of recycling 80% of plastic waste by 2030.

Malaysia: Setting minimum threshold of recycled content for plastic packaging by 2026.

Peru: Manufacturers required to use at least 15% post-consumer recycled material in PET/PETE bottles since December 2021.

France: Requirement that 10% of all food and non-food packaging be reusable/refillable instead of recyclable by 2027; possible early phasing of reusable packaging requirements for wine bottles.

Serbia: Packaging must be designed and manufactured so that when it becomes waste it enables the cycling of materials used in its production in a certain mass percentage, as determined based on the packaging material.

South Korea: Aims to reduce its plastic waste by 50% and recycle 70% of it by 2030.

Thailand: Plastic in use must be 100% recyclable by 2027 phased 20% each year until then.

Requirements to Eliminate Excessive Packaging and Restrictions on Use of Certain Materials

Examples of problematic and unnecessary materials can be found here with additional information here, and include intentionally added per- and polyfluoroalkyl substances (PFAS); non-detectable pigments such as carbon black; opaque or pigmented PET (any color other than transparent blue or green); oxo-degradable additives, including oxo-biodegradable additives); PETG in rigid packaging; problematic label constructions including adhesives, inks and certain materials like PETG, PVC, PLA, and paper); polystyrene and expanded polystyrene; and PVC.

Australia: Phasing out certain non-compostable plastic packaging products containing additive fragmentable technology (July 2022), PVC packaging labels (Dec 2022), expanded polystyrene in loose fill and molded consumer packaging (July 2022) and in food/beverage containers (Dec 2022).

EU: Directive on Packaging and Packaging Waste currently being revised and expected to be published summer or fall 2022, imposing more restrictions that will be adopted by key Member States (Germany, Italy, Netherlands, Belgium, Ireland, and Sweden).

Liechtenstein: Packaging must be designed and manufactured to limit the volume and weight to the minimum necessary to ensure hygiene and safety while also ensuring the material can be recycled or reused.

Maldives: Water packaged in plastic bottles to be banned effective September 2022 for bottles below 500 milliliters and by 2024 for plastic bottles 1 liter and below.

Netherlands: Stepped up enforcement in 2020 of a long-standing regulation that prohibits excessive packaging. Imposes fines on whiskey importers citing certain types of whiskey bottles were unnecessarily heavy in weight; fines could potentially be applied to wine bottles in the future.

Saudi Arabia: Announced a phased approach in 2017. Phase 1 requires that disposable sheet rolls be oxo-biodegradable and is in effect. Phase 2 (requiring that stretch films, overwraps, shrink films, cling films, and packaging for bread, nuts, sweets, and bakery items be oxo-biodegradable) and Phase 3 (requiring that plastic liners used for cartons, plastic bags used for seedlings, and food packaging bags be oxo-biodegradable) are on hold indefinitely.

Senegal: Producers are responsible for reducing at the source the quantity of waste that can result from their activities and put on the market products that are susceptible to being recycled or otherwise recovered in conditions that respect the environment. When it is technically and economically viable, producers must integrate recycled plastic into new products they put on the market. Law enacted in April 2020 but unclear as to the extent it is being enforced.

Zimbabwe: Banned the use of polystyrene in 2017.

Labeling Requirements

Australia: At least 80% of supermarket products to display Australasian Recycling Label.

Belgium: Bans fruit & vegetable labels unless label is functional, has legally required information or is certified as home compostable as of 2021.

Germany: Adopted an Ordinance aligned with EU Directive 2019/904, requiring that certain containers listed in Part D of the Annex to the Directive, including certain single-use plastic products, are only placed on the market if they bare a special marking on the product or packaging.

Israel: Beverage containers that require a deposit must have a label containing the words “owe deposit” or are prohibited.

Japan: Requires that recycling identification labels be displayed directly on each container and item of packaging according to the type of material used.

New Zealand: Phasing out PLU labels by 2023 unless home compostable.

Saudi Arabia: Information indicating type of plastic used in packaging must be written on packaging

labels. All degradable plastic products imported or locally manufactured as a final product must bear the Saudi Standards, Metrology and Quality Organization (SASO) "oxo-biodegradable" logo.

South Korea: Multiple recycling symbols that food and beverage manufacturers are required to include on their packaging, depending on type of material used. Draft regulations announced in 2021 propose additional instructional notes and larger sizing for all recycling symbols to be included on food and beverage packaging

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Taxes/Fees on Plastic Packaging under Extended Producer Responsibility (EPR) Schemes

Albania: Imposes an excise tax for plastic packaging at higher rates than for glass and other packaging.

Benin: Imposes an eco-tax on disposable plastic packaging.

Bosnia and Herzegovina: Companies are obliged to ensure proper management of packaging waste (including paper, plastic bottle, plastic wraps, metal, glass, hazardous materials, and multi-material (tetra-packs)), if in a calendar year the quantity of packaging for packed goods placed on the market exceeds certain parameters determined by material type (e.g., 80 kg for plastic; 300 kg for glass).

Chile: EPR applicable to producers which intend to introduce packaged consumer goods into the national market and whose packaging is either plastic, glass, paper, cardboard, metal or a liquid packaging carton.

Croatia: Refund fee to be paid by producers that place packaged drinks on the market, to be used for taking back used beverage packaging, and waste management fee to cover collection and processing of waste packaging.

Denmark: Imposes levy on certain packaging, including beverage packaging.

Estonia: Imposes excise duty for plastic packaging.

EU: Member States required to impose EPR Schemes for all packaging types by Dec 2024.

Finland: Imposes excise duty on retail containers of alcoholic beverages and soft drinks, with exemption for containers that are included in a deposit return system and which can be refilled or used for raw material recovery.

Germany: Mandatory deposit on disposable beverage packaging, with exception of beverage packaging with a filling volume of less than 0.1 or more than 3 liters, certain types of packaging and packaging for certain alcoholic beverages, juices, and milk products. A draft law nearing the end of the legislative process, however, is expected to impose a deposit on all beverage containers beginning in 2022, though milk or milk products will be subject to a transitional period until 2024.

Hong Kong: Developing EPR schemes for beverage containers. Regulations expected to require manufactures and importers engaged in distributing glass and plastic-bottled beverages to register as suppliers and pay a container recycling levy for every one-liter bottle sold. Fee estimated at USD 0.13/l glass beverage container and <USD 0.10/l plastic beverage container. No specific timeframe but expected that the EPR scheme for glass beverage containers will be implemented first, in 2023.

India:

- Imposes excise tax at higher rates for plastic packaging and single-use products relative to glass, wood, and tin packaging.
- Plastic packaging waste must be collected and managed in an environmentally sustainable way through the EPR of the Producer, Importer, and Brand Owner (PIBO).

Italy:

- Importers of goods from non-EU countries will be taxed for single-use plastic items and semi-finished products (including preforms, sheets, plugs, bottles, and films) beginning Jan 2023.
- Imposes environmental contribution towards waste collection, recovery, reuse, and recycling, based on total quantity, weight, and type of packaging placed on the national market.

Kenya: Offers corporate tax breaks to incentivize recycling efforts, e.g., value-added tax exemption for products made from recycled materials.

Lithuania: Applies pollution tax for products and/or packaging waste.

Malaysia: Manufacturers will be responsible for treating and disposing of their plastic waste considering design components and use of recycled

resins under its EPR scheme (expected to be mandatory by 2026).

Marshall Islands: Deposit beverage container fee imposed on each beverage container manufactured or imported into the country.

Mexico: EPR scheme proposed by Senate in 2019; if approved as written, manufacturers would be responsible for organizing, developing, and financing the comprehensive management of waste generated due to the consumption of their products.

Norway: Importers of foreign packaged goods are required to pay a license fee for the relevant packaging material(s) to Norway's central packaging organization. The importer is also responsible for the recycling of the packaging material.

Palau: Deposit beverage container fee imposed on manufacturers and importers of filled deposit beverage containers.

Romania: Revised targets for waste collection in 2021, imposing provisions under which business operators must recover part of their packaging materials for recycling. Starting in October 2022, Romania is implementing a guarantee-return system for non-reusable primary packaging, concerning the recycling of plastic, metal, or glass packaging ranging from 0.1 liters to 3. Liters. The system is mandatory for all traders and producers which place domestic or imported products on the market.

Rwanda: Environmental levy to be imposed on imported goods packaged in plastic materials or single-use products (not yet enacted).

Senegal: Created a deposit-refund system for plastic bottles in which producers are responsible for putting into place collection points for reuse, recycle and all other recovering operations. Producers who put plastic products on the market are also responsible for the waste generated and must comply with requirements issued by the Minister of the Environment. Tax to be established for products made from non-recyclable plastic. Law enacted in 2020 but unclear to what extent it is being enforced.

Singapore: EPR scheme to be implemented no later than 2025, making companies responsible for the take-back, recycling, and disposal of packaging. As a lead-up, manufacturers, importers, brand owners, and retailers with gross annual revenues above S$10 million are currently required to report information on the type and amount of packaging they use.

Spain: Importers of goods from non-EU countries will be taxed for single-use plastic items and semi-finished products (including preforms, sheets, plugs, bottles & films) beginning Jan 2023.

UK: Tax of £200/ton for manufacturers and importers of plastic packaging components which contain <30% recycled plastic as of April 2022.

Venezuela: Began imposing EPR scheme in 2021, requiring producers of packaging made from single-use paper, plastics, and glass to register with the Ministry of Ecosocialism, submit individual or collective EPR plans, and begin paying fees to the Ministry based on the quantity and types of packaging materials put onto the market.

Vietnam: Certain packaging with a recycled value must be recycled by their manufacturers/importers or the manufacturers/importers must make a financial contribution to the Vietnam Environmental Protection Fund to support recycling as of January 1, 2022. This measure encompasses food and beverage packaging, including paper packaging with a content volume of more than 100 ml and packaging containers made from metal, plastic, and glass with a content volume of more than 300 ml.

Opportunities and Innovations

Australia: Working with the textile and whitegoods sectors on an industry-led phase-in of microfiber filters on new residential and commercial washing machines by July 2030.

South Korea: Focusing on eco-friendly packaging development as part of its 2030 Food Industry Vision.

Annex B
List of Certain Resins and Plastic Packaging Materials Cited in the Report

Abbreviation	Type of Resin/Material	Description and Example of Material Uses
PET/PETE	Polyethylene terephthalate	Clear, strong, and lightweight plastic, noted as plastic resin ID code 1 *Water bottles, soda bottles, some clear clamshells*
HDPE	High-density polyethylene	Light weight, strong, thermoplastic polymer made from petroleum, noted as plastic resin ID code 2 *Milk jugs*
PVC	Polyvinyl chloride	Common thermoplastic used in construction and generally known for its hardness, noted as plastic resin ID code 3 *Vinyl siding, pipes, car oil bottles*
LDPE	Low density polyethylene	Soft, flexible, lightweight plastic material, noted as plastic resin ID code 4 *Frozen food bags, bread bags, plastic bags, six-pack rings*
PP	Polypropylene	Tough, rigid, and crystalline thermoplastic, noted as plastic resin ID code 5 *Yogurt containers, water bottle caps*
PS	Polystyrene	Hard, stiff, brilliantly transparent synthetic resin, noted as plastic resin ID code 6 *To go containers, hot cups*
PLA	Polylactic acid	Thermoplastic monomer derived from renewable, organic sources such as corn starch or sugar cane, noted as plastic resin ID code 7 *3D printing feedstock, plastic films, bottles, and biodegradable medical devices*
PLU	Price/Produce look up, as in PLU sticker	A system of numbers that uniquely identify bulk produce sold in grocery stores and supermarkets *Produce stickers*
PETG	Polyethylene terephthalate glycol	Clear thermoplastic that can be formed into a number of shapes, noted as plastic resin ID code 1 *Food and beverage packaging, especially convenience-sized bottles (water and soda)*
PFAS	per- and polyfluoroalkyl substances	A group of chemicals used to make fluoropolymer coatings and products that resist heat, oil, stains, grease, and water *Nonstick pans, waterproof jackets, cleaning products, paints*
	Flex film	Any package or part of a package whose shape can readily be changed when filled or during use. Different materials are used for different packaging solutions depending upon their characteristics including strength, durability, clarity, portability etc. These films are usually noted as plastic resin ID code 2, 4, or 5. *Food packages - especially single-serving and microwavable foods - liners, pouches, seals, sample packets, chip and candy bags*