

Workshop 1b Summary

About Workshop 1

On October 28 the Lab team convened the second of three sessions in the “Seeing the System” Bioplastics Workshop, bringing together 18 participants. The goal of this session was to start identifying potential leverage points within the lifecycle of bioplastic packaging products that may become focus areas for solutions.

Journey of a Product: A System Mapping Exercise

In this session, the Lab team carried out a system mapping exercise to map the journeys of three bioplastic products across their entire lifecycle. Participants were divided into three groups, each of which developed a system map for one of the products. First, participants were asked to identify key steps in the journey of each product and what stakeholders were involved. Participants were then asked to consider experiences that create challenges or problems across the life cycle (e.g., quality, quantity, time, cost). Once challenges were identified, participants discussed what circumstances may trigger the challenges or problems, as well as what influences stakeholders’ behaviours. Finally, the groups identified gaps, conflicts, connections, and opportunities across their system maps.



Figure 1. Bioplastic packaging products for system mapping (e.g. pouch, cup, produce bag)

The key stakeholders that were identified at each stage of the product lifecycles are represented in Figure 2. The key challenges, associated drivers, gaps, and opportunities discussed in each systems map are summarized in Table 1.

Policy and regulation emerged as key themes across each discussion. Participants identified the need for appropriate policy and regulation to be applied across the entire lifecycle of bioplastic products. They also discussed the current gap and difficulties with enforcing existing regulations. Finally, the groups touched on the lack of coordination and harmonization between jurisdictions with respect to governance of bioplastic packaging, such as regulations and certifications.

Research was another theme that surfaced throughout the discussions and system maps. Participants talked about the role of research at each stage of the bioplastic life cycle, along with current research gaps and opportunities.

Finally, throughout the session participants engaged with the overarching tensions and questions about what the role of bioplastics should be:

- How to make bioplastics work, versus should bioplastics work?
- Single use items versus durable and reusable items?
- What are the best uses for bioplastics? For what uses are bioplastics the best option?
- Are bioplastic products adding value? If so, how?

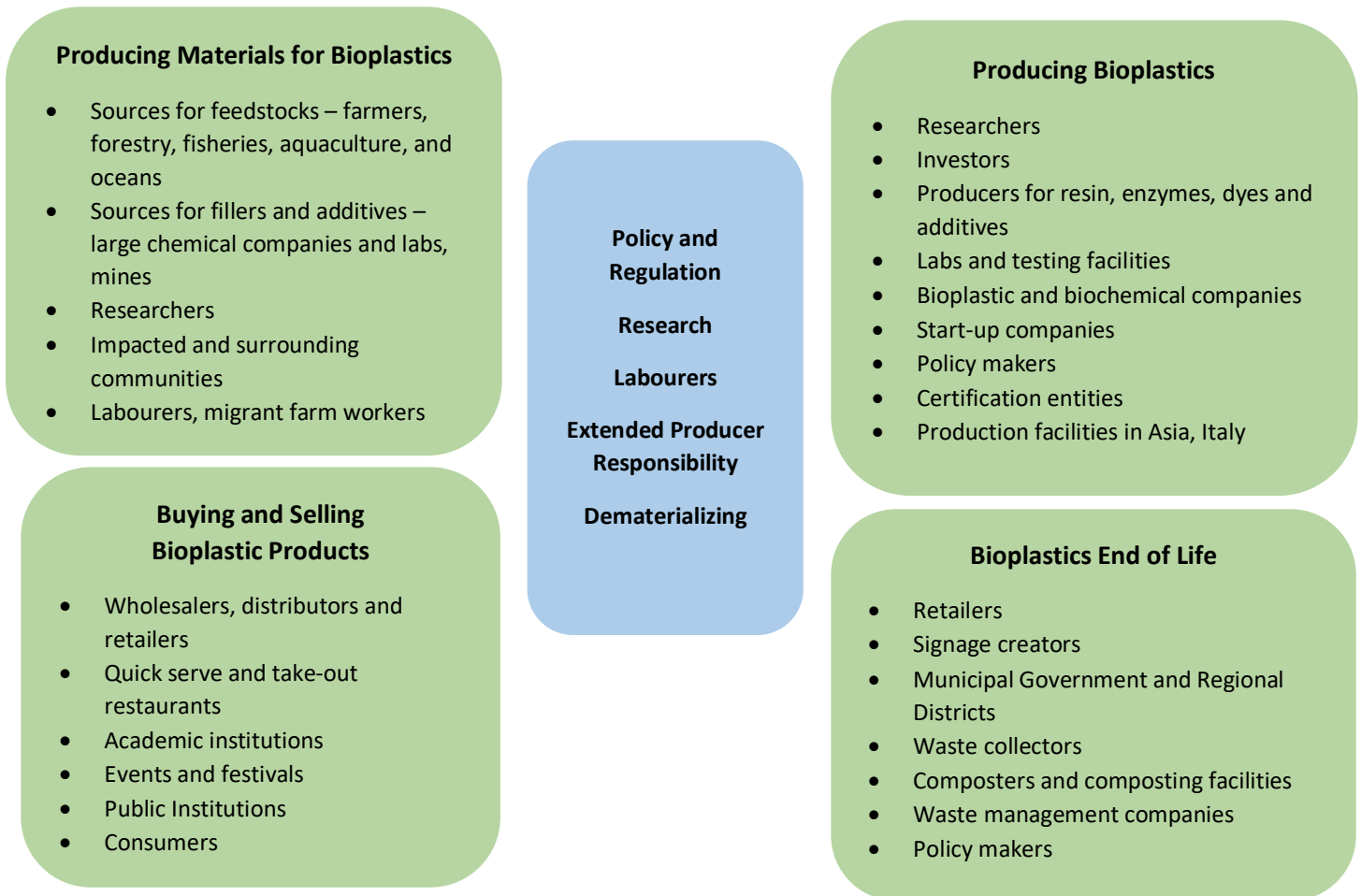


Figure 2. Bioplastic packaging product lifecycle with stakeholders and cross-cutting issues

Table 1. Summary of challenges, drivers, gaps and opportunities

Challenges	Drivers	Gaps and Opportunities
<p>Bioplastic product labelling</p> <ul style="list-style-type: none"> • Inconsistent labelling across products • Discrepancy between product labelling and end of life • Greenwashing of products 	<ul style="list-style-type: none"> • Many jurisdictions involved. There is overlap and a lack of harmonization between jurisdictions (horizontal and vertical) • Lack of regulation and/or enforcement of regulations around product labelling • Lack of transparency around labelling • Materials at the front end are not being linked to how they are processed at end of life • Competition within bioplastic industry, and industry responding to consumer demand • Marketing is prioritized over research 	<p>Gaps</p> <ul style="list-style-type: none"> • Guidelines, regulation, and enforcement • Guidelines for properly identifying what is a “bioplastic” <p>Opportunities</p> <ul style="list-style-type: none"> • New guidelines, regulations and enforcement mechanisms that promote harmonization across jurisdictions and align with end of life circumstances of bioplastic products
<p>Bioplastics research</p> <ul style="list-style-type: none"> • Need further research on bioplastics across entire lifecycle 	<ul style="list-style-type: none"> • Industry is rapidly changing and innovating. Research from five or ten years ago may no longer be applicable 	<p>Opportunities</p> <ul style="list-style-type: none"> • Research that informs the whole system – bioplastics production through end of life • Effects of bioplastics on soil and water
<p>Producing and sourcing materials for bioplastics</p> <ul style="list-style-type: none"> • Finding uses for residue (unused material) in agriculture, aquaculture, etc. • Resource management practices, sustainability and ethics in material harvesting, extraction, and production • Competing uses for bioplastic inputs (e.g. biomass energy) • Licensing requirements to produce and harvest certain inputs 	<ul style="list-style-type: none"> • Material producers are not connected to bioplastic producers • There are biological boundaries for all resource inputs, i.e. limits to what should be harvested and extracted based on considerations of resource health, biodiversity, climate change, etc. 	<p>Gaps</p> <ul style="list-style-type: none"> • Who is controlling production practices, licenses, etc.? • Who is influencing policy development? <p>Conflicts</p> <ul style="list-style-type: none"> • Needing to balance sourcing bioplastic material inputs with environmental and ethical considerations about the inputs. <p>Opportunities</p> <ul style="list-style-type: none"> • Connecting feedstock to bioplastic producers and offering a second use for residue and waste.

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<p>Producing Bioplastics</p> <ul style="list-style-type: none"> • Demand for bioplastics is exceeding supply • Risk of “locking in” to set feedstocks, resins, manufacturing processes, products • Industry volatility • Scaling new material sources 	<ul style="list-style-type: none"> • Risk • Rapidly evolving industry • Difficulty of processing bioplastics (more sensitive resin) • Difficulty sourcing inputs at reasonable price • Certification costs • Infrastructure and technology costs • Costs of failure and waste in the production • Patents 	<p>Gaps</p> <ul style="list-style-type: none"> • Who are the investors? • Product design with end of life in mind <p>Opportunities</p> <ul style="list-style-type: none"> • Connecting feedstock to bioplastic producers and offering a second use for residue and waste. • Extended Producer Responsibility
<p>Bioplastic product value</p> <ul style="list-style-type: none"> • Are bioplastic products adding value during their use? • Are bioplastic products adding value at end of life? 	<ul style="list-style-type: none"> • Many products on the market. What products are adding value? • Products not necessarily designed with end of life value in mind • Bioplastic impact on soil and compost – compost is also a marketable product 	<p>Gaps</p> <ul style="list-style-type: none"> • What are the value-added uses for both single use bioplastics and more durable bioplastics? • Lack of studies about the impact of bioplastics on soil <p>Conflicts:</p> <ul style="list-style-type: none"> • Value of single use bioplastic products versus moving away from single use items
<p>Consumers</p> <ul style="list-style-type: none"> • Consumer behaviour • Consumer confusion about bioplastics and what to do with them • Consumer disappointment 	<ul style="list-style-type: none"> • There is not always a proper waste channel for bioplastics • Misinformation and lack of knowledge about bioplastics and waste streams • It is hard to identify what is bioplastic • Social norms around single use items and waste disposal 	<p>Gaps</p> <ul style="list-style-type: none"> • Consumer education • Clear and consistent guidelines and product labelling • Harmonization between regions • Harmonization between disposal options in commercial and public spaces versus homes <p>Opportunities</p> <ul style="list-style-type: none"> • Closing the knowledge gap between the consumers, industry, and waste management sector • Redesigning waste collection and management • Designing in consumer behaviour during product design

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<p>Composting bioplastics</p> <ul style="list-style-type: none"> • Bioplastics not accepted in all facilities • Not enough composting infrastructure that can and/or is willing to process bioplastics • Bioplastics are often screened out at composting facilities and sent to landfill • Variety in bioplastic material types and ability to breakdown 	<ul style="list-style-type: none"> • Misinformation about composting process • Products not necessarily designed with consideration of end of life • Lack of regulation on composting standards for bioplastics • ASTM compostability standards are not sufficient because they do not reflect typical field conditions • Physical infrastructure costs for waste management; difficult and expensive to retrofit; "lock-in" effect • Compost is a marketable product, and not-yet-decomposed bioplastics can reduce soil marketability (e.g. visible plastics) • Variation across composting facilities: <ul style="list-style-type: none"> ○ Some facilities use dehydration and anaerobic digestion processes rather than traditional composting ○ Some facilities are not set up to handle certified compostable products 	<p>Gaps</p> <ul style="list-style-type: none"> • Regulation and realistic compostability standards • No consistent way to identify bioplastics and to sort plastics by material type • Diversity in lab testing facilities <p>Opportunities</p> <ul style="list-style-type: none"> • Composting facilities that capture all compostable products • Bioplastics having a neutral to positive impact on soil and compost • Colour coding bioplastic products to differentiate from conventional plastics • More varied lab and field testing • Extended Producer Responsibility to support responsible and effective end of life management
<p>Recycling</p> <ul style="list-style-type: none"> • Bioplastics are not currently accepted in recycling waste stream 	<ul style="list-style-type: none"> • Recycling facilities are difficult and expensive to retrofit; lock-in effect 	<p>Opportunities</p> <ul style="list-style-type: none"> • More research • Processing durable and clean bioplastics in recycling facilities

What's Next?

Session 1c is on Wednesday November 4, 9:30am-11:30am PST. In this session, we are going to delve deeper to look for leverage points that we could work on in the Lab in the designing solutions phase. From the systems mapping exercise, here are some exploratory questions in areas that we think may contain potential leverage points:

- How do we differentiate bioplastics products from each other?
- What materials should be used to make bioplastics?
- What role should bioplastics have in packaging food?
- How should these items be handled from one stage to the next in the supply chain?
- How are products being designed and brought through the innovation process/pipeline?

What do you think of these questions? Are there questions that you think should be added? Any that should be adjusted or removed? We look forward to your thoughts at this week's discussion.

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