SFU

SIMON FRASER UNIVERSITY

ENGAGING THE WORLD

SIMBIO

SOCIAL INNOVATION MANAGEMENT FOR BIOPLASTICS

Canadian Results Webinar
August 13, 2020

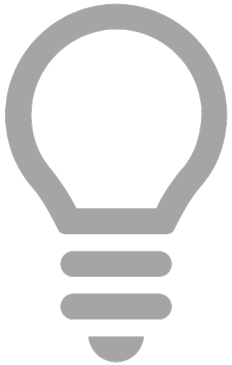
A Sustainable and Just Food System for All

FOOD SYSTEMS LAB

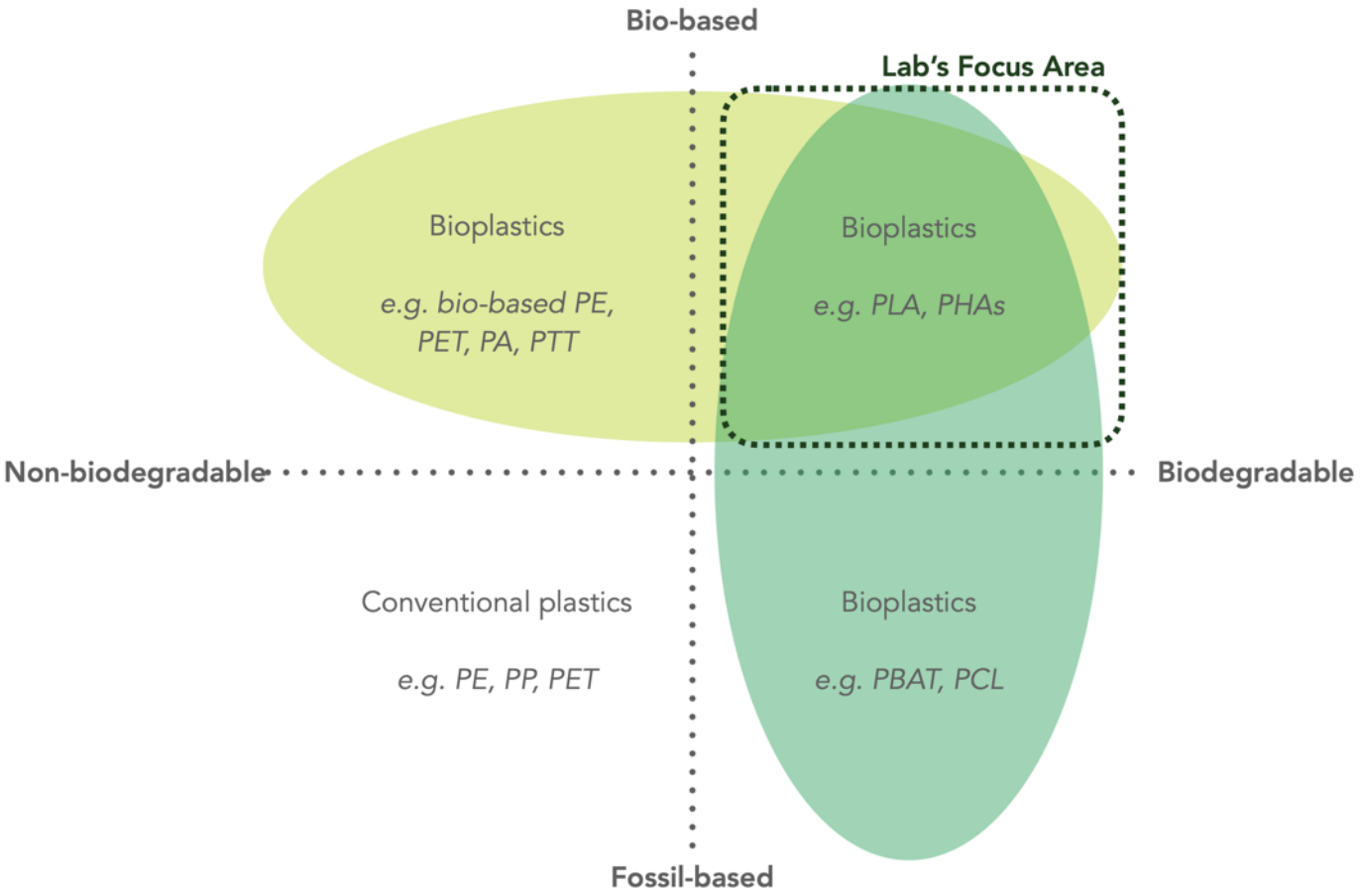
Food Systems Lab is a research and social innovation hub at Simon Fraser University. Established in 2016, we work on solutions for equitable collaboration to reduce food waste and support a sustainable food system that enhances ecosystems, conserves natural resources, and mitigates climate change.

Introduction

What are bioplastics?



Why a social innovation lab?



Definitions

- **Bio-based bioplastics** are derived or partly derived from biomass (plants) such as corn, sugarcane, or cellulose.
- **Biodegradable bioplastics** can be broken down by microorganisms in the environment and convert it into natural substances such as water, carbon dioxide, and compost without the addition of artificial additives. These plastics can be derived both from bio-based or fossil resources.
- The focus of the lab is on bio-based and biodegradable plastics; for the purposes of this report we will refer to this grouping as **bioplastics.**

Biodegradable, recyclable, or compostable?

- It is technologically possible to recycle or compost bioplastics such as PLA
- Recycling – needs dedicated material stream
- Biodegradability – dependent on the chemical nature of the polymer along with environmental factors
- Biodegradable ≠ Compostable

An emerging wicked program

- Technological innovation vs challenges from agricultural inputs to functionality and consumer usage to end of life management

Goals

- Use a social innovation approach to address the environmental and social challenges of bioplastic packaging throughout its supply chain from production to end-of-life management
- Collaborate with researchers from Brazil, Poland, and the United Kingdom over the two-year long project

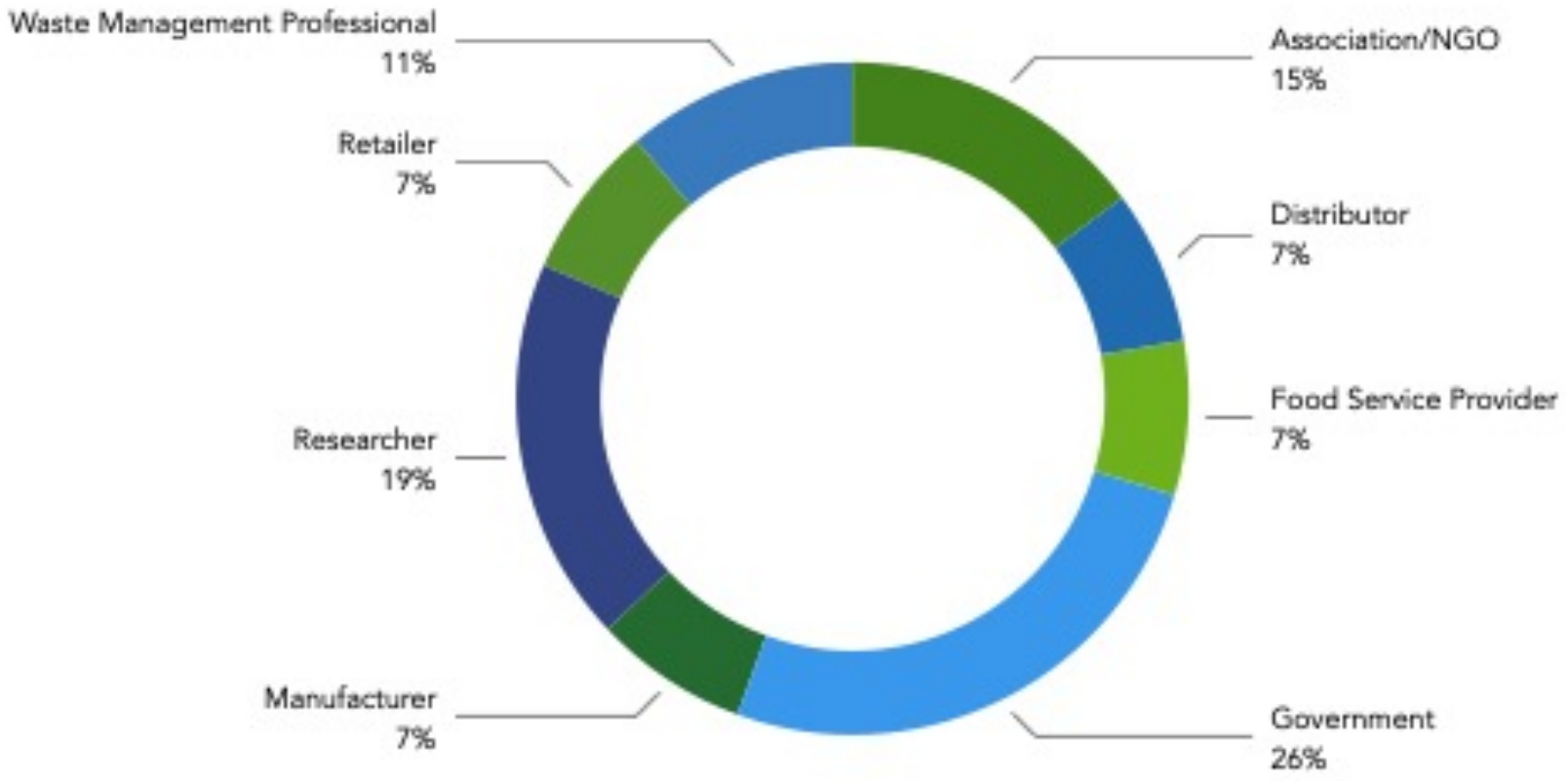
Funded by the Social Sciences and Humanities Research Council Trans-Atlantic Partnership grant

Social innovation lab methodology

- Assess the systems influencing and affected by packaging to ensure that solutions do not disproportionately negatively affect marginalized communities
- Bring together a variety of stakeholders to develop a common understanding of a problem, the stakeholders will then work together on innovative solutions through iterations of information collection, analysis, creative engagement, and prototype development

The design brief

- Literature review
- Interviews with stakeholders
- Formulating a convening question



Role of bioplastics in a circular economy

Materials

Bioplastics are not created equally; the material source matters

- “The starches need to come from somewhere. So, you have now growers that they grow for starches that is not going into food production, that’s going now into production of plastics. And those plastics don’t have any… food value or so basically so it’s kind of diverging land from producing food into producing other stuff.” -Government
- “It would have to meet the true definition of circularity and not be contributing to any environmental negative consequences. I think, essentially, it would have to come, like the bioplastic itself, would have to come from 100% post-consumer source.” -Association/NGO

Replacing conventional plastics

There may be a niche for bioplastics, but it is an uphill battle

- “I see that in the very near future everything in the food service is going to be bioplastic. Because that’s the only way that we can do a huge step forward. We cannot keep using mixed material and then just making the life of recycling facilities harder, the life of composting facilities harder, and then at the end of the day moving everything to landfill.” -Manufacturer
- “I describe compostable packaging as a solution looking for a home.” -Researcher
- “I'm not 100% dead set against bioplastics, again I don’t know enough about them to make that decision, but I think it’s something that we’re just not prepared right now to handle properly, is my understanding.” -Retailer

Cost

Bioplastics are more expensive

- “The cost of a bioplastic I want to say is one of the biggest challenges that is there. And specifically, particularly for the cost sensitive application like food packaging, because in order to motivate many customers like you have to basically provide your package at a competitive price with their current fuel-based packages.” -Manufacturer

Perpetuating single-use packaging

Are bioplastics an innovative solution or are they contributing to the problem?

- “I think one of the unintended consequences of that is it continues to foster a reliance on the single use items as opposed to investing in cyclical reuse systems.” -Government
- “And no wonder we have plastic in all the oceans of the world and the seas and marine animals are choking on it. Because we have this insatiable appetite for packaging and excessive packaging of consumer products.” -Researcher

Alternatives to bioplastics

Refilling and going package-free

- “I did grow up in a time where we went to the butcher, he cut the meat and we got it, we brought back our boxes…we went to places where they pumped the milk into our gallon [container] and…pumped it in.” -Government
- “What’s better than a compostable fork? A metal one!” -Government

Policy

Regulation to create a level playing field

- “[Create] a proper regulatory framework which weeds out the bad actors and amplifies the good ones, because right now there is no difference [between certified and uncertified products]. Like you could have the best product in the market but someone doing a terrible thing with the same green brand with its lower price point will beat out the good players.” –Researcher
- “A clear regulatory standpoint on the acceptability and definition of compostable plastics is probably the key piece, right? Either they are accepted, or they aren't. And what’s the definition of what is compostable versus not.” -Government

Biodegradability

Standardization & testing

Mismatch between the lab and field testing combined with lack of enforcement

- “Most of these tests aren’t done in actual large-scale compost facilities. They’re done in lab based field tests, so lab based tests, which is understandable because science, you know you need to separate from your environment as much as possible, but you do lose a lot of actual information when you take them out of those conditions.” -Researcher

Compost operations

Processors are feeling the burden of bioplastics

- “They [composting facilities] don’t seem to want them. Some of the ones that do accept them they’re usually either bleeding it into their products and it’s creating a lower quality product than what they would have if they didn’t have those bioplastics in their mix, or they’re just not accepting them all together.” -Waste Management Professional
- “When we talk to the composters, they tell us that they screen out all materials including compostable plastics and send it to disposal. And most of the businesses that are accepting compostable plastics are pretty shocked to hear that.” -Government

Environmental impact

Potential for long-term contamination

- “If you can’t create a compost… it has to be sold as what’s called a non-agriculturally sourced material, NASM, and you’ve got to essentially pay farmers to put this contaminated soil on their land.” -Waste Management Professional

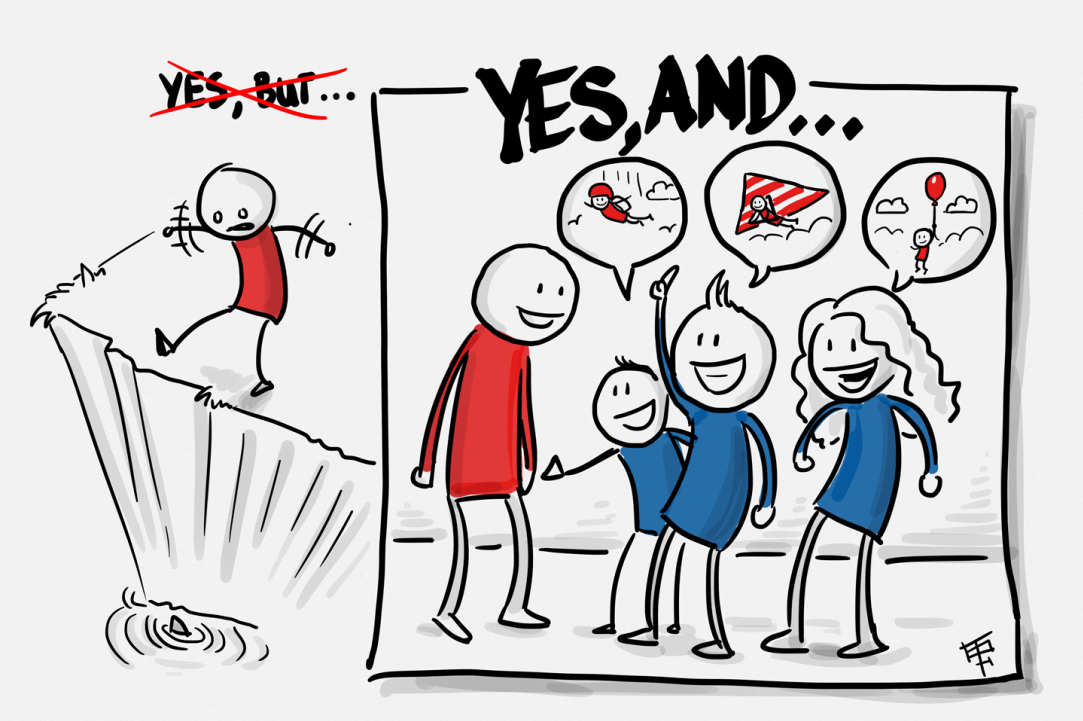
Horns of the Dilemma

Based on these polarities, what should be the convening question(s) of the Social Innovation Lab?

How can we…	While…
Reduce reliance on fossil fuels to make plastics by using bio-based raw materials	Ensuring land and resources needed for food production are preserved for food security
Make bioplastics cost competitive with fossil fuel based plastics	Maintaining fair wages and working conditions, environmentally sustainable processes for raw materials and products
Divert more bioplastics to composting	Generating high-quality compost that is acceptable for use in agricultural and home gardening applications
Create a bioplastic product that has high functionality and durability	Decomposing in typical compost facility and/or backyard composting conditions
Increase the market share of bioplastics	Optimizing the downstream management and capture of the products Prioritizing its use for durable reusable goods Avoiding the proliferation of single-use plastic packaging

BREAK OUT SESSION QUESTIONS

- Read the polarities shown in the 'Horns of the Dilemma’:
  - What is your initial response?
  - What do you agree with?
  - What is missing/what might you want to add?
- What are your ideas for a convening question?



What’s next

- Ongoing research
- Collect design brief feedback (Canada)
- Convening questions
- Formulate workshop structure
- Conduct workshops/sessions