



CHALLENGE HANDBOOK

INTRODUCTION

Each year, about 8 million tons of plastic waste enters our oceans, equivalent to five full trash bags along every inch of coastline worldwide. An estimated 60% of ocean plastics is a result of mismanaged waste from five Asian nations. For this reason, many leaders recognize that optimizing land-based plastic waste management across this region is an impactful first step to ending the crisis. However, as the layers are peeled back, an important ingredient is missing: data.

Data on plastic production and waste management across South and Southeast Asia is missing, inconsistent, or unreliable because the region's complex plastics value chains are fragmented and reliant on the informal economy. The result is limited visibility and transparency as well as an inability to effectively track, monitor, forecast, or optimize material flows and reduce ocean leakage. Technologies, models and data science being applied in other complex systems can be adopted into plastic waste management and revolutionize Asia's circular economy.

OPPORTUNITY

From agriculture, energy and insurance to public health and even human trafficking, data technologies are the foundation to develop models that help manage complex systems and drive transformational change. By leveraging such solutions to fill the data gap, **The Plastics Data Challenge** will catalyse the growth of a new sector of technology that will play a crucial role in reducing mismanaged plastic waste while adding more transparency, predictability and profit to the circular economy.

Our goal is to source, support, and scale innovative solutions and working prototypes that leverage data to understand and address the leakage of plastic waste into the environment and to facilitate their entry into markets across South and Southeast Asia.

ABOUT THE CHALLENGE

The challenge invites all innovators including academic institutions, startups, companies, and data scientists from around the globe to develop advanced solutions to be applied across plastic waste management and recycling value chains in South and Southeast Asia.

The Plastics Data Challenge will select a cohort of up to 10 semifinalists. **Semifinalists** are eligible to receive...

- An invitation, including paid travel and accommodation, to **attend the in-person Innovation Summit** in May 2020 in Singapore
- A customized combination of **mentorship, pilot-readiness and market entry support** through a six-week virtual program
- **Media and communication support** including storytelling material, global outreach platforms and media exposure
- **Access to investor and philanthropic capital networks**

Out of this cohort, three (3) **finalists** will be selected to receive...

- **Cash Prize** of up to \$10,000 USD*
 - 1st Place: \$10,000 USD
 - 2nd Place: \$7,500 USD
 - 3rd Place: \$5,000 USD
- *Cash prize value subject to increase based on pending fundraising efforts
- **Pro-bono legal and/or technical assistance** from network partners to improve technologies and find the most effective market entry pathways
- Technical support from The Incubation Network to **design and implement a pilot** in a market within South and Southeast Asia

Participation in the Plastics Data Challenge is free. Application window runs from December 19th, 2019 until March 13th, 2020. Semi-finalists will be announced in mid-April, 2020 and finalists in July 2020.



SOLUTIONS & TECHNOLOGIES

Specifically, the challenge aims to identify solutions and prototypes developed by individuals and organizations worldwide that...

- may leverage data sources such as government-released open data, satellite imagery, mobile network data, anonymized private sector data, social media data, surveys, among others;
- may be any kind of data-driven solution including, but not limited to, web, desktop, mobile device, console, SMS or any software platform broadly available to the public;
- may be a combination of traditional and new or unconventional data sources;
- may be an API, methodology and algorithm;
- may incorporate open source or proprietary technology.

We are looking to source innovative data solutions, technologies and methodologies in any one, or a combination of, the following areas:

- Data Science
- Artificial Intelligence
- Machine Learning
- Blockchain
- Crowdsourced data applications
- Dynamic visualization
- Geospatial analysis
- Drones and Satellite Imagery
- Predictive analytics on existing datasets or through combinations of datasets to generate insights, information or new data
- Data capture and/or management software applications
- Hardware applications that generate and capture plastics-related data
- Innovative data collection methodologies, that can collect data from hard to access populations in more scalable, reliable and valid ways.

Each submission must be at minimum a working prototype that leverages or creates some type of data.

- **Solutions** – have been tested or validated at a basic level and be able to demonstrate this.
- **Prototypes** – functional prototypes that are yet to be validated; Applicants must be able to justify value of concept through written documentation, supporting data, videos, or other relevant media.

Challenge Area 1: Improved Visibility of Plastic Waste Generation and Material Flows

Context & Key Facts:

Countries in South and Southeast Asia often suffer from poor and inadequate municipal waste collection and disposal systems. Existing systems are complex, often fragmented, and heavily reliant on the informal economy. As a result, countries in Southeast Asia have some of the highest shares of mismanaged plastic waste, with just five Asian countries contributing up to 60 percent of plastic waste entering the oceans.ⁱ For example, Indonesia and Vietnam are reported to mismanage 81% and 86% of plastic waste respectively.ⁱⁱ

Due to poor waste management systems, there is a lack of visibility and transparency on plastic waste generation patterns as well as plastic waste material flows. Without this information, the region – especially at the country and community level – is unable to effectively track, monitor, forecast, or optimize waste management operations for material flows.

Challenge Statement:

The challenge seeks to identify innovative data solutions and working prototypes that improve the understanding, awareness and forecasting of plastic waste generation and material flows across South and Southeast Asia.

These solutions address questions including, but not limited to...

- How might we better track and understand where plastic waste comes from and where does it go?
- How might we better understand waste generation based on its quality (type, cleanliness, etc) and source (urban/rural, commercial/household, community-level/country-level, etc)?
- How might we better understand and predict the consumer attitudes and behaviours to identify potential channels of influence on plastics?

Example Solutions:

- Crowdsourcing data collection tool to map local plastic waste flows and stakeholders
- Data visualization tool to provide insights and forecasting on plastic waste flows
- A photo-sharing app that gathers location information on waste generation, aggregation centers and markets
- A sensor technology that collects data on community-level waste disposal volumes and/or directional flows
- Image recognition technology that verifies waste volumes through photo capture
- Waste-shed modeling tools
- Data collection software and hardware that measures real-time community-level plastic waste generation
- Data analysis and visualization of product-specific data (including packaging materials) from brands, FMCG companies, and distribution networks to accurately capture plastic sources
- Data analysis which links retail consumption and producer's plastic generation data with plastic waste disposal data to understand behavioral aspects and identify opportunities for intervention
- An innovative labelling technology (ex, QR code) that improve waste collection and recycling

Challenge Area 2: Optimization of Circular Supply Chains for Plastics

Context & Key Facts:

In today's economy, the majority of plastic packaging value is lost after just one short life cycle. Globally, only 9 percent of all plastic is recycled and Asia is no exception. In Southeast Asia, national averages for the collected-for-recycling rate of PET (one of the highest recycled household plastic material in the region) are estimated to be only at 26 percent.ⁱⁱⁱ Nevertheless, Southeast Asian countries currently import more plastic waste than any other region in the world. With global consumption and production of plastics on the rise globally, and with Asia being one of the fastest-growing markets, the plastics supply chain requires innovation to keep pace.

Asia's current plastics supply chain's shortfalls have many roots, including:

- Insufficient pricing of post-consumer materials and/or lack of visibility of post-consumer materials pricing for informal sector waste collection
- Lack of value creation mechanisms in the local supply chains
- Poor and short-term plastic waste collection efforts resulting in insufficient supply of quality, clean plastic feedstock
- Lack of new delivery models that rethink the way we bring products to people without the need for low-value packaging

Challenge Statement:

The challenge seeks to identify innovative data solutions and working prototypes that improve the visibility, efficiency and value creation across circular supply chains for plastics in South and Southeast Asia.

These solutions address questions including, but not limited to...

- How might we incentivize responsible plastic use and waste management?
- How might we enhance the visibility, connectivity, and efficiency of informal sector waste collectors and aggregators?
- How might we improve visibility of pricing?
- How might we better track and improve value generation across the supply chain?
- How might we best identify and improve awareness of existing gender and power dynamics across the value chain?

Example Solutions:

- A data solution that allows informal waste pickers to access market data in exchange for sale information
- Predictive analytics on plastics pricing data that leverage a mix of local and global market datasets
- A mobile alert system to inform informal waste pickers and aggregators of local market information and pricing changes related to specific resin types
- A data solution that allows decision makers to see if/how gender impacts variables along the value chain like pricing, and the interplay between gender and power
- Analytics that help identify and/or demonstrate correlations between gendered issues (e.g. gender-based violence), risk and returns
- Machine-learning and/or sensory hardware to measure and capture real-time data on plastic flows by quantity and resin types
- An application that awards incentives for responsible disposal, recycling or reuse of plastics
- A modelling tool that predicts the impact of certain interventions (ex, improved packaging design, new recycling technology) on local plastic value chains (ex, reduced leakage, increased recycling or reuse rates)

Challenge Area 3: Identification & Prevention of Plastic Waste Leakage

Context & Key Facts:

Recent research by the United Nations estimates that approximately 80 percent of ocean plastics comes from land-based sources, and the remaining 20 percent from marine sources. Furthermore, estimates also show that between 1.15 and 2.41 million tonnes of plastic waste currently enters the world's ocean every year from rivers, with a startling 86 percent of river plastic pollution originating from Asia. Additionally, due to weather patterns, 74 percent of global river pollution occur between May and October.^{iv}

While there are many reports quantifying land-based inputs from coastal populations, assessment of contributions to ocean pollution from inland populations through riverine systems has been less frequent. Through advanced data solutions and technologies, we may be able to better map, monitor, understand, and forecast plastic leakage into the environment.

Challenge Statement:

The challenge seeks to identify innovative data solutions and working prototypes that identify and prevent the leakage of plastic waste into waterways across South and Southeast Asia.

These solutions address questions including, but not limited to...

- How might we map and monitor plastic leakage entering waterways?
- How might we better understand and address how plastic leakage relates to external factors (landfill location, waste storage, socioeconomic factors, etc)?

Example Solutions:

- Data analysis which heat maps leakage points by layering various datasets
- Prediction systems to correlate weather patterns and plastic flows, and identify priority intervention spots
- RFID-based sample tracking and mapping of plastic waste across wasteshed
- Aerial drone mapping of plastic debris density along riverways and coastal areas

JUDGING CRITERIA AND CALENDAR

Judging Criteria:

- Relevance of challenge to focus areas and region (35%)
- Team background & capabilities (25%)
- Technical feasibility (25%)
- Potential to scale (15%)

SUBMISSION INFORMATION & FAQs

- Applicants may submit more than one solution or prototype, but solutions must not be substantially similar to other submission(s) by the same applicant.
- Submissions must be in English. If in a language other than English, the submission must be accompanied by an English translation of the full text.
- The Incubation Network may at its sole discretion disqualify submissions that:
 - are illegal under applicable laws;
 - depict hatred, defame, abuse, harass, stalk, threaten a specific person or community in the society
 - can incite violence or conflict, or otherwise violate the legal rights (such as rights of privacy and publicity) of others;
 - contain any infringing, obscene, indecent, or unlawful material or information. Submission must: a) be original; b) be solely owned by Applicant, who represents that no other party has any rights or interest, whether known or unknown; and c) not violate the Intellectual Property or privacy rights of other parties. Intellectual property rights of submitted Applications will be owned by the Applicants. The Incubation Network disclaims any liability for infringements or other violations of intellectual property rights based on claims of ownership by Applicant; Applicant, by entering the Challenge, agrees to hold harmless and indemnify The Incubation Network against any third party claims.
- All semi-finalist and finalist Submissions may be linked to The Incubation Network's website. By submitting a solution, you grant The Incubation Network and its founding partners a non-exclusive, royalty-free right to use your solution for promotion, public display, informational, educational or awareness purposes.
- Submissions will initially be screened by The Incubation Network team to verify they meet eligibility criteria. All submissions that pass this screening will be judged by a review panel including members of the Plastics Data Challenge's Advisory Council. Decisions of the judges are final and not subject to negotiations or appeal. The Incubation Network is under no obligation to discuss or disclose its deliberations or rankings and results.

ⁱ The Ocean Conservancy (2017)

ⁱⁱ Jambeck (2015)

ⁱⁱⁱ GA Circular (2019)

^{iv} Lebreton, L., van der Zwet, J., Damsteeg, (2017)