

Circular case studies for replication



Project



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I. Introduction

The plastics project was engaged in promoting business resource efficiency, circular innovation, green finance and sustainable waste management (SWM) along the plastics value chain with the aim to improve environmental sustainability and economic performance. The overview of the project is given in Figure 1.

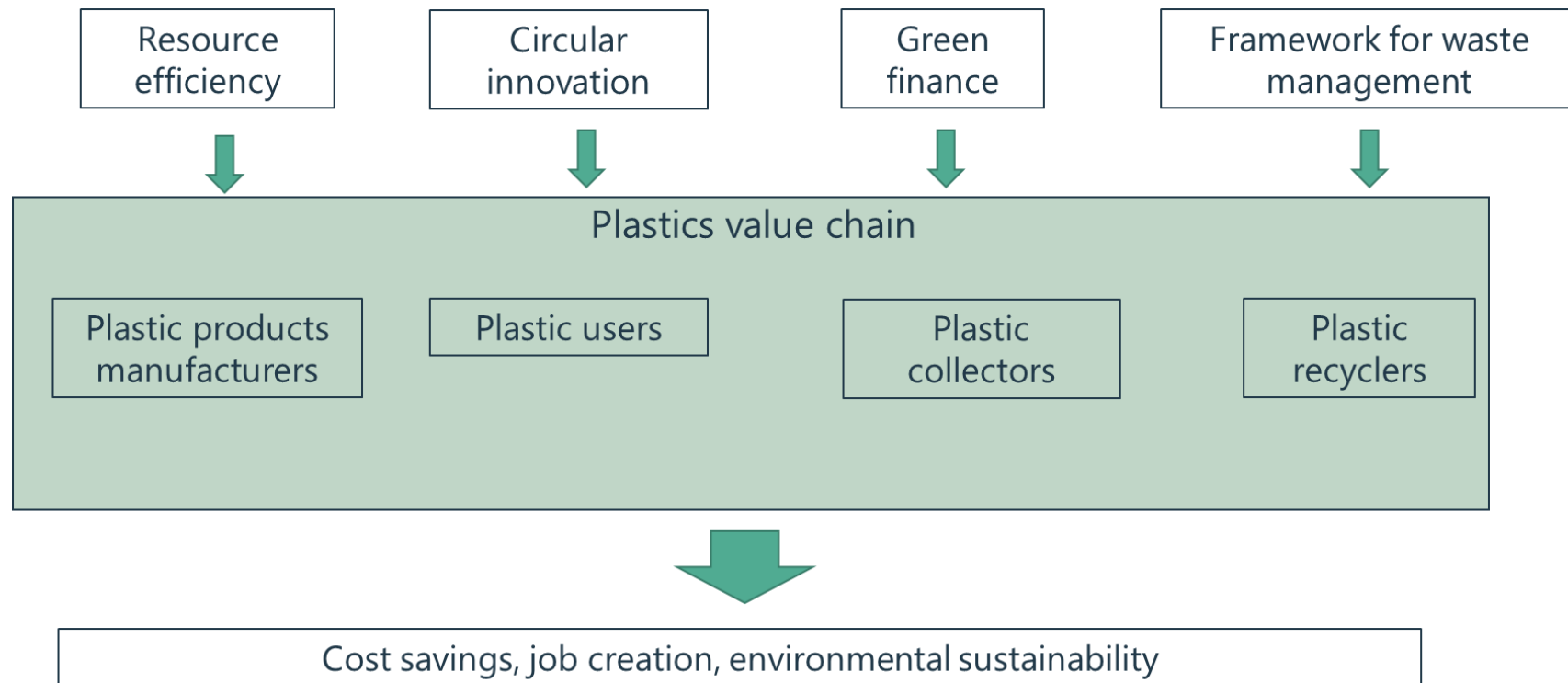


Figure 1. Plastics project overview

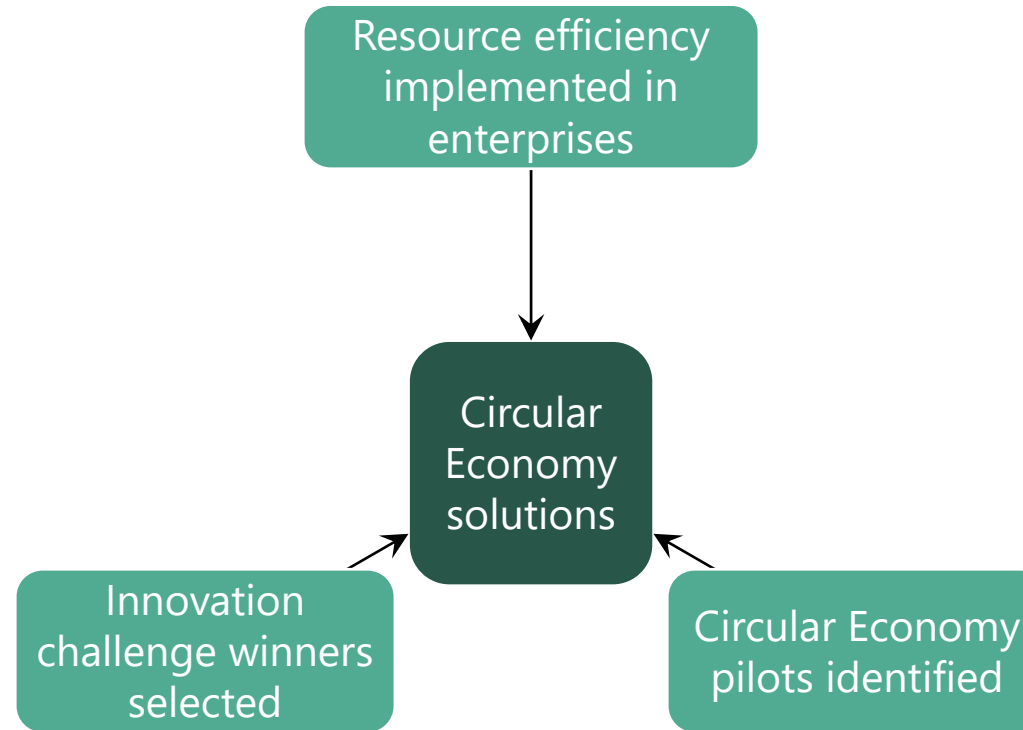


Figure 2. Circular solutions from project activities

Through the activities with resource efficiency implementation in MSMEs along the value chain, identification of circular economy pilots among large plastic users and support to innovation challenge winning entrepreneurs, various circular economy solutions were identified (Figure 2). Select solutions are compiled in the form of case studies for replication.

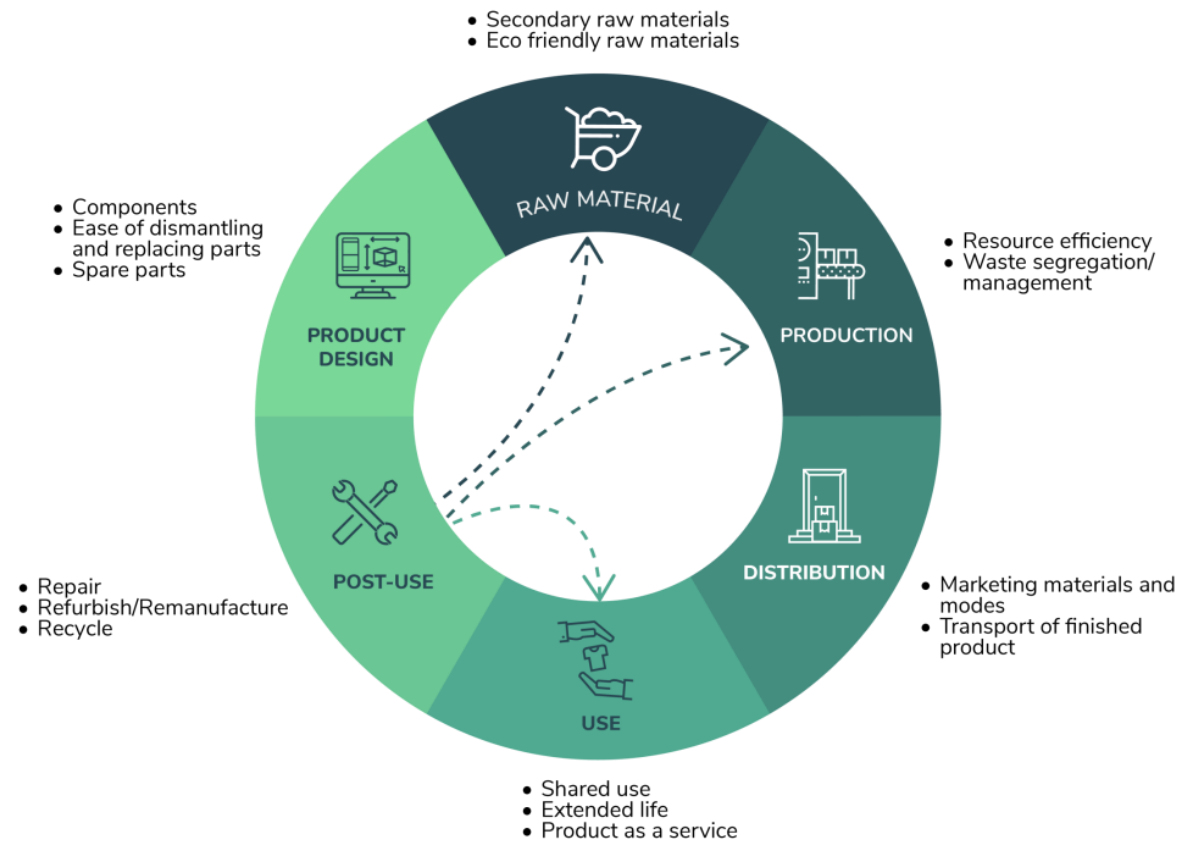


Figure 3. Circular economy themes

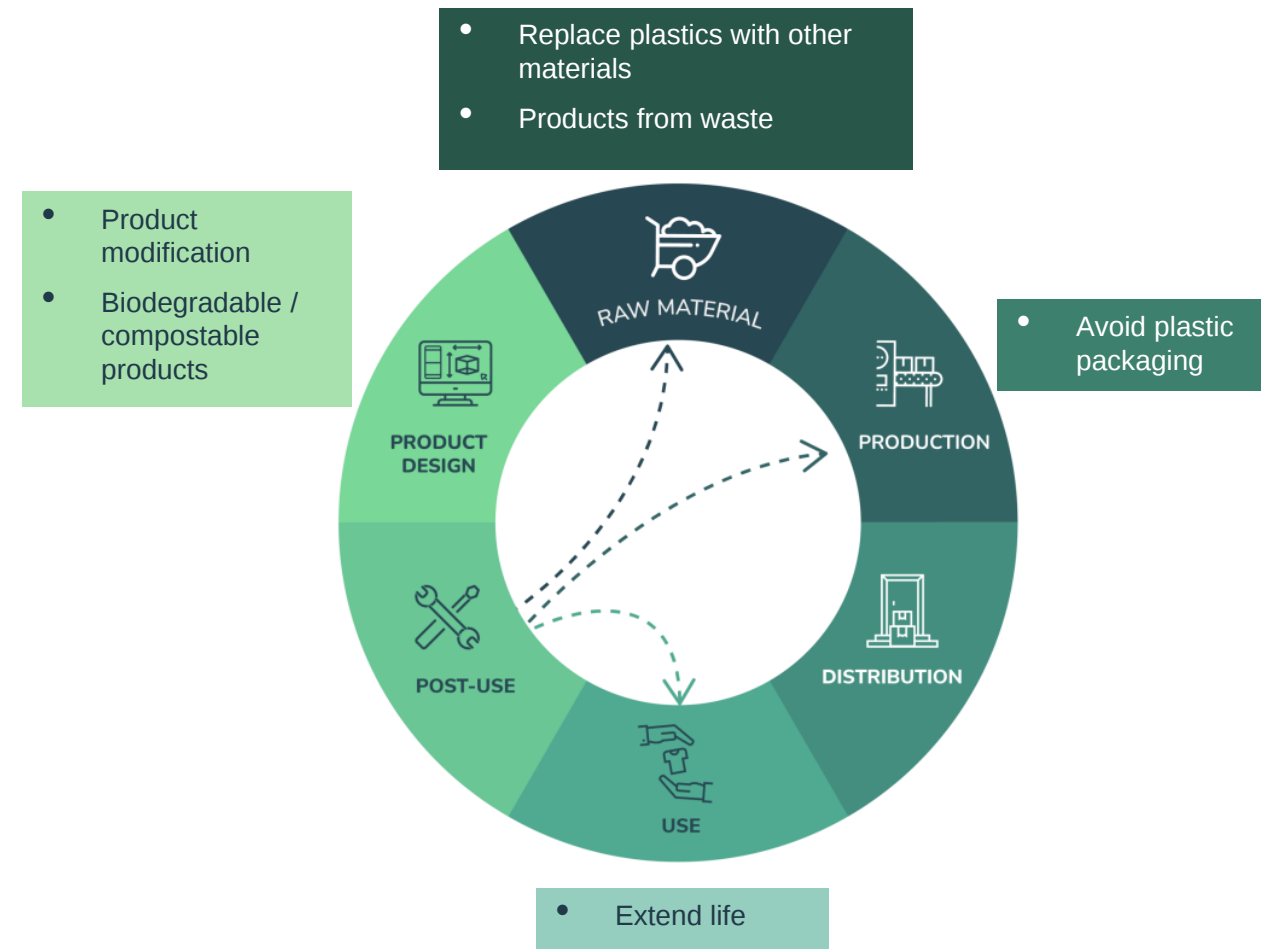


Figure 4. Circular solutions along different themes

The circular solutions include replacing plastics with other materials; avoiding plastic packaging; product modification; extending life; products from waste and biodegradable / compostable products. These fit the themes of circular economy as shown in Figures 3 and 4. The circular solutions under each of these themes are described in this document. Some of them have been implemented as part of the resource efficiency activity; some solutions are from the winners of the plastic innovation challenge which are at different stages of commercialization; some solutions are concepts developed in this project and are yet to be implemented.

II. Circular solutions

1. Replacing plastics with other materials

Plastic materials are used for many applications in the hotel and restaurant industry. Based on the application, the plastic is discarded after a single use or eventually after multiple uses. There is scope to reduce this waste by substituting the plastic with other materials which have a longer lifetime or can be recycled without deterioration in properties or generating pollutants such as micro plastics.

The solutions identified in the project include the following:

- 1.1 Alternative for plastic cling wrap
- 1.2 Alternative for PET bottles for drinking water
- 1.3 Alternative for plastic storage drum

Each of these solutions is elaborated as a case study in the following section.

Solution 1.1: Alternative for plastic cling wrap

Existing scenario

Cling wraps are used to cover food in trolleys / containers to maintain hygiene. These are single use and are disposed of after use

Solution

The plastic cling wrap can be replaced with food grade silicone wraps. These are reusable and can be used multiple times before end of life.

Main beneficiary

- Hotels and restaurants

Other beneficiaries

- Suppliers of alternatives
- Waste management sector involved in end of life management of alternatives

Barriers

- Availability of certified food grade silicone wraps and their cost
- Infrastructure for end of life management
- Consumer acceptance

Circularity

A single use product is replaced with reusable product thereby avoiding waste



RAW MATERIAL



PRODUCT DESIGN

Benefits

- Avoiding plastic waste
- Job opportunities in supply and end of life management of silicone wrap
- 5,184 kg of cling wrap reduced per year in one of the project companies

Factors for scale up / replicability

- Awareness campaigns to increase uptake
- Policy interventions related to use and disposal of cling wraps

Call to action / what next

- Are you a hotel or restaurant?:* Find suppliers and make the change
- Are you a consumer?:* Check what type of wrap is in use at the restaurant and suggest a change from single use plastic
- Are you an entrepreneur?:* Look for opportunities in the supply chain or waste management aspects of silicone alternatives

This solution has been implemented in one of the project companies

Solution 1.2: Alternative for PET bottles for drinking water

Existing scenario

In many hotels and restaurants, single use plastic PET bottles are still used for water. This leads to a large volume of waste. Even though PET is recyclable, there are issues with micro plastic generation during recycling.

Solution

Glass bottles offer a sustainable alternative since they can be cleaned and reused many times. Due to their high temperature capability, they can be sterilized as part of cleaning.

Main beneficiary

- Hotels and restaurants

Other beneficiaries

- Suppliers of glass bottles, bottled water

Barriers

- Cost
- Consumer acceptance
- Availability of water in sealed glass bottles

Circularity

Instead of individual bottles, common bottles are used and reused



Benefits

- Avoiding plastic waste
- Job opportunities in glass bottle cleaning and bottled water supply
- Implementation in around 105 hotels and restaurants in Sri Lanka, Maldives and India showed a payback period of 2.5 years and around 3 million PET bottles avoided annually

Factors for scale up / replicability

- Awareness among consumers
- Infrastructure for bottle cleaning and refilling
- Policy interventions – incentives for avoiding PET bottles

Call to action / what next

- Are you a hotel or restaurant?:* Find suppliers or create in-house facilities for change
- Are you a consumer?:* Avoid using PET bottles and ask for re-fillable alternatives or carry own bottles
- Are you an entrepreneur?:* Look for opportunities in bottled water supply chain

This solution has been implemented in several hotels and restaurants in South Asia

Solution 1.3: Alternative for plastic storage drum

Existing scenario

Plastic drums are commonly used for storing products. These are typically used for a year and then replaced with newer ones.

Solution

The plastic drum can be replaced with stainless steel drum which is safer for food items, reducing any micro plastic contamination. It also offers extended life as compared to plastic drums.

Main beneficiary

- Manufacturing companies, especially food items

Other beneficiaries

- Suppliers of stainless steel containers

Barriers

- High capital cost
- Maintenance cost (cleaning, sanitization)

Circularity

Extended life of the container



Benefits

- Reduced micro plastic contamination in the food product
- Avoiding plastic waste
- 60 kg of plastic saved annually in one of the project companies

Factors for scale up / replicability

- Awareness about food safety regulations
- Awareness about sustainable alternatives
- Policy intervention – incentives for reducing plastic consumption

Call to action / what next

- *Are you a manufacturer?:* Do you still use plastic container in your manufacturing unit? Look for sustainable alternatives
- *Are you an entrepreneur?:* Look for opportunities in alternatives for plastic container

This solution has been implemented in one of the project companies

2. Avoiding plastic packaging

Plastic packaging is very common due its low cost, convenience and other properties. However, it many cases, it is meant for single use. Packaging is one of the key contributors to plastic waste.

The solutions identified in the project include the following:

2.1 Alternative dispensing for personal care products

2.2 Alternative for packaging of toiletries in hotels

Solution 2.1: Alternative dispensing for personal care products

Existing scenario

Items such as shampoo, liquid detergents, etc. are sold in single use HDPE packaging. Once empty, the containers are discarded, contributing to plastic waste.

Solution

Vending machines can be used for bulk dispensing of personal care products. Consumers can carry their own reusable containers.

Main beneficiary

- Manufacturers
- Retail stores
- Consumers

Other beneficiaries

- Vending machine supplier

Barriers

- High capital cost
- Maintenance cost (cleaning, sanitisation)
- Shift of consumer behaviour towards bulk dispensing and carrying own reusable containers

Circularity

Bulk dispensing to avoid plastic packaging



Benefits

- Avoiding plastic packaging waste
- Adoption of reusable containers
- Reduced primary purchase cost

Factors for scale up / replicability

- Awareness about sustainable alternatives
- Nudge to consumers for carrying their own containers
- Policy intervention – incentives for reducing plastic consumption

Call to action / what next

- *Are you a consumer?:* Does your retail stores sell products in single use containers? Look for bulk dispensing alternatives and carry your own reusable containers.
- *Are you an entrepreneur?:* Get involved in bulk dispensing supply chain

This solution is available in some locations but needs to be scaled up

Solution 2.2: Alternative for packaging of toiletries in hotels

Existing scenario

The packaging used for toiletries in hotels are single use and disposed of after every use.

Solution

The single-use packaging is replaced with reusable dispensers which can be refilled after every use, thereby reducing plastic waste.

Main beneficiary

- Hotels

Other beneficiaries

- Suppliers of dispensers
- Suppliers of toiletries in bulk

Barriers

- Capital cost
- Maintenance cost (cleaning)

Circularity

Distribution and use through refillable dispensers



DISTRIBUTION



USE

Benefits

- Avoiding plastic waste
- Using refillable dispensers across 42 hotels in Sri Lanka, Maldives and India led to 0.8 million bottles avoided annually

Factors for scale up / replicability

- Awareness about sustainable alternatives
- Policy intervention – bans on certain single use packaging materials

Call to action / what next

- Are you a hotel?:* Do you still use single use plastic packaging in your hotel? Look for sustainable alternatives
- Are you an entrepreneur?:* Look for opportunities in supply chain for bulk toiletries and dispensers

This solution has been implemented in several hotels in South Asia

3. Products from waste

Large quantities of plastic and other wastes end up in landfills or as litter. The upcycling of such wastes can provide economic opportunities

The solutions identified in the project include the following:

3.1 Jewellery, clothing from waste / surplus items

3.2 Use of waste plastic in construction materials such as asphalt

Solution 3.1: Jewellery, clothing from waste / surplus items

Existing scenario

In addition to plastic waste, there are other wastes (metal, textile) that end up in landfills or as litter

Solution

These wastes can be used in a creative way to be upcycled as clothing or jewellery

Main beneficiary

- Upcyclers
- Consumers

Other beneficiaries

- Waste management sector

Barriers

- Niche market
- Availability of waste for raw material

Circularity

Use of waste as raw material and designing niche fashion products from it



RAW MATERIAL



PRODUCT DESIGN

Benefits

- Avoiding waste going to landfills
- Upcycling of waste

Factors for scale up / replicability

- Awareness about sustainable products
- Developing creative items from waste

Call to action / what next

- *Are you a consumer?*: Look for products that are sustainable.
- *Are you an entrepreneur?*: Similar business model can be adopted

This is a business model from innovation challenge winners

Solution 3.2: Use of waste plastic in construction materials such as asphalt

Existing scenario

There are several plastic products such as shopping bags that cannot be recycled. These end up as litter or in the landfill causing severe pollution.

Solution

Non-recyclable waste plastic can be used as an industrial raw material in asphalt paving for roads, highways, car parks, and yards.

Main beneficiary

- Construction sector

Other beneficiaries

- Waste management sector

Barriers

- Scattered availability of raw material
- Cost and quality concerns
- Potential environmental issues due to leaching or micro plastic generation

Circularity

Use of waste as raw material



Benefits

- Use of unrecyclable plastic waste
- Prevention of pollution from litter and landfills from unrecyclable plastic waste

Factors for scale up / replicability

- Availability of waste plastic of consistent quality
- Standards for safety and performance

Call to action / what next

- *Are you from construction sector?:* Look for products from waste that meet the environmental safety and performance standards
- *Are you an entrepreneur?:* Look for opportunities for similar products

This is a business model from an innovation challenge winner

4. Product modification

The environmental footprint of any given product can be improved by reducing product weight, increasing lifetime and minimizing packaging requirements by changing the product design or configuration.

The solutions identified in the project include the following:

4.1 Tablets, powder instead of liquid for personal care, cleaning products

4.2 Plastic with more recycled raw material content

Solution 4.1 Tablets, powder instead of liquid for personal care, cleaning products

Existing scenario

One of the main ingredients in liquid cleaning and personal care products is water. This leads to high volume, weight and packaging requirements.

Solution

By using a dry version in the form of tablet or powder which can then be reconstituted at home, the packaging requirements and transportation requirements are minimized.

Main beneficiary

- Consumers
- Hospitality industry

Other beneficiaries

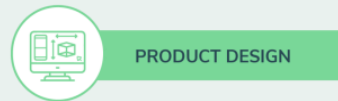
- Manufacturers of these products

Barriers

- Consumer acceptance
- Cost comparison
- Logistics for handling new packaging

Circularity

Product converted to a different form



Benefits

- Minimizing packaging requirements
- Reduced waste generation

Factors for scale up / replicability

- Awareness among consumers
- Ease of use for greater consumer acceptance
- Similar or improved quality as original liquid product

Call to action / what next

- *Are you a consumer?*: Look for products that require less packaging.
- *Are you an entrepreneur?*: Develop similar products or packaging for such products

This solution has been suggested as a pilot for Circular Economy

Solution 4.2 Plastic with more recycled raw material content

Existing scenario

Plastic product manufacturers use a certain percentage of recycled plastic to substitute virgin plastic.

Solution

The recycled content in the product can be increased based on the application. One example is that of wire manufacturer who increased recycled content from 38% to 50%.

Main beneficiary

- Plastic product manufacturer

Other beneficiaries

- Consumers of plastic parts
- Waste management sector

Barriers

- Availability of recycled plastic raw material
- Quality and cost of product with higher recycled content

Circularity

Use of waste as raw material



Benefits

- Minimizing virgin raw material use
- Around 22 tonnes of virgin plastic saved per year in one of the project companies

Factors for scale up / replicability

- Acceptance of products with recycled content
- Quality and environmental safety standards

Call to action / what next

- *Are you a consumer?:* Look for products with recycled content that meet the performance standards.
- *Are you a plastic product manufacturer?:* Look for products where recycled plastic content can be increased

This solution has been implemented in one of the project companies

5. Extending useful life

For many applications, instead of single use, the product or packaging can be kept in use longer through use, distribution and maintenance models.

The solutions identified in the project include the following:

5.1 Take back schemes (bottles, cardboard spools)

5.2 Resealable bags for reuse

Solution 5.1 Take back schemes (cardboard spools)

Existing scenario

Products such as wires, films are wound in spools and supplied to customers. These are typically discarded by the customers.

Solution

Such packaging materials can be collected and reused. This is applicable not only for spools but also other items such as boxes, crates etc.

Main beneficiary

- Manufacturers selling products in spools or other reusable packaging

Other beneficiaries

- Customers

Barriers

- Customers willing to save and return spool (or other packaging)
- Cost of collection logistics

Circularity

Extended life of the packaging



Benefits

- Avoiding packaging waste
- Around 8000 spools per year collected and reused in one of the project companies

Factors for scale up / replicability

- Awareness among customers about benefits of returning packaging
- Convenient and affordable logistics for collection

Call to action / what next

- *Are you a customer?:* Looks for options to save and return reusable packaging.
- *Are you an entrepreneur?:* Get involved in logistics for packaging collection and reuse

This solution has been implemented in one of the project companies

Solution 5.2 Resealable bags for reuse

Existing scenario

In bakeries and other related sectors, single use bags are used for storage and packaging.

Solution

Single use bags can be replaced with reusable or compostable zip lock bags.

Main beneficiary

- Bakeries and confectionaries

Other beneficiaries

- Consumers

Barriers

- Availability of suitable alternatives
- Convenient and cost effective logistics for reuse

Circularity

Extended life of packaging



Benefits

- Reducing plastic waste
- Extending life of packaging

Factors for scale up / replicability

- Awareness about sustainable alternatives
- Disposal infrastructure for alternative

Call to action / what next

- *Are you a bakery?:* Do you still use single use bags? Look for sustainable alternatives
- *Are you an entrepreneur?:* Look for manufacture of reusable and / or compostable bags

This solution has been suggested as a pilot for Circular Economy

6. Biodegradable / compostable products

Conventional plastics use raw materials derived from fossil fuel and their end of life disposal causes environmental damage. There are many bio derived materials that are compostable available or under development for various applications.

The solutions identified in the project include the following:

6.1 Packaging from natural materials such as mycelium, seaweed

6.2 Edible cutlery

6.3 Consumer items such as office products from natural materials such as coconut fiber

Solution 6.1 Packaging from natural materials such as mycelium, seaweed

Existing scenario

Plastic materials are used for a lot of packaging applications. They are often single use and cause pollution problems.

Solution

Natural materials such as mycelium and seaweed offer alternatives for packaging that can be composted. They can be designed in a way to compost even if they end up in litter.

Main beneficiary

- Multiple sectors requiring packaging

Other beneficiaries

- Manufacturers
- Consumers

Barriers

- Higher cost than conventional materials
- Certification to authenticate materials and compostability

Circularity

Packaging material designed with natural raw materials



RAW MATERIAL



PRODUCT DESIGN

Benefits

- Avoiding plastic packaging waste
- Reduced use of fossil fuel based material

Factors for scale up / replicability

- Awareness about sustainable alternatives
- Availability of alternatives at reasonable cost with reliable performance

Call to action / what next

- *Are you a consumer?*: Look for packaging from natural materials that is compostable.
- *Are you an entrepreneur?*: Look for manufacturing such alternatives

This is a business model from innovation challenge winners

Solution 6.2 Edible cutlery

Existing scenario

Plastic cutlery is often used for take away and in events. These are thrown after single use.

Solution

Edible cutlery are an alternative to single use plastic cutlery and can be eaten and thus there is no waste to be managed.

Main beneficiary

- Restaurants, event venues

Other beneficiaries

- Customer

Barriers

- Cost compared to plastic cutlery
- Storage and shelf life

Circularity

Cutlery designed with natural raw materials



RAW MATERIAL



PRODUCT DESIGN

Benefits

- Avoiding plastic waste
- Waste free alternative solution

Factors for scale up / replicability

- Awareness about sustainable alternatives
- Consumer acceptance in terms of convenience of use

Call to action / what next

- *Are you a restaurant or event venue?*: Inform consumers about these alternatives and offer them
- *Are you an entrepreneur?*: Look for manufacturing such alternatives

This is a business model from an innovation challenge winner

Solution 6.3: Consumer items such as office products from natural materials

Existing scenario

Many office and home items are made from plastic materials. Though they may be used for longer periods compared to single use plastics, they are eventually thrown and can cause pollution.

Solution

These products can be made with eco-friendly natural materials such as coconut fiber. The products will not cause any pollution when discarded after use.

Main beneficiary

- Offices, households

Other beneficiaries

- Manufacturers of products

Barriers

- Supply of raw materials
- Cost compared to plastic products

Circularity

Product designed from natural raw material



RAW MATERIAL



PRODUCT DESIGN

Benefits

- Avoiding plastic waste
- Utilizing residue from coconut processing

Factors for scale up / replicability

- Awareness about such products
- Performance and life comparable to plastic products

Call to action / what next

- *Are you a consumer?*: Look for products with natural raw materials
- *Are you an entrepreneur?*: Look for manufacturing such alternatives

This is a business model from an innovation challenge winner

III. Summary

The case studies presented offer details of the Circular Economy solutions that were implemented or proposed as part of the PLASTICS project. These solutions were disseminated and discussed among business development service providers, waste management representatives, enterprises from plastic value chain and other stakeholders. It is expected that with wider dissemination and awareness, such solutions can be replicated and contribute towards promoting circular economy and minimizing plastic pollution.



PLASTICS

Promoting Long-term Approaches for a
Sustainable, Transformative and Inclusive
Circular Economy in Sri Lanka