

Industry	Consumer foods
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Challenge 1

<p>A. Challenge Statement/Title: Recyclable alternative for packaging meat and processed meat products</p>
<p>B. Background of the Problem: The packaging of meat and processed meat products includes many considerations and must ensure, among other factors, the quality and safety of the product throughout its shelf life. The packaging material has several functions beyond being a container for the product and these include presenting a barrier to moisture migration and gas flow, added protection from oxidation and microbial spoilage, etc. The non-recyclable material used at present is a LDPE-Nylon multilayer material which comes in the form of bags and reels and the product is packed using the thermoforming vacuum packaging machine. The company is looking for an alternative material which is recyclable and can meet all the technical and commercial viability related considerations listed below.</p> <ul style="list-style-type: none"> ● Environmental Impact: The use of LDPE-Nylon multi-layer material for meat packaging contributes to plastic waste, causing environmental harm through pollution and posing a threat to ecosystems and wildlife. The company seeks to minimize plastic usage and adopt more eco-friendly options. ● Packaging Material Identification: Identifying suitable recyclable or compostable materials to replace the LDPE-Nylon multi-layer material is a significant challenge. The alternative materials must maintain product integrity, safety, and quality while being eco-friendly. ● Functional Requirements: The sustainable packaging solution must meet specific functional requirements, such as ensuring product freshness, leak resistance, and barrier properties to protect the processed meat products during storage and transportation. ● Recycling or Composting Infrastructure: Ensuring that appropriate recycling or composting facilities or programs are available to handle the used sustainable packaging materials is crucial to maximize their environmental benefits. ● Compatibility with Export Regulations: The chosen sustainable packaging solution must adhere to export regulations of target markets, ensuring smooth export operations and compliance. ● Cost and Feasibility: The company needs to find a sustainable packaging solution that is economically viable and does not significantly impact the overall packaging expenses or product pricing.
<p>C. Technical Requirements / Performance Criteria: Recyclable alternative to LDPE-Nylon vacuum packed pouches Needs to be recyclable through standard recycling streams.</p> <p>a. Barrier properties -</p>

Gas (Oxygen), Aroma, water (moisture), stable during frozen condition (< - 18⁰ C)

b. Film specifications

Thickness, -

Nylon 15 mic/ LLDPE 70 mic

25 mic Nylon/ 60 mic LLDPE

Nylon 15 mic/ LLDPE 85 mic

G.S.M of the laminate (g / square meter) 86.6 +/- 3 %

Peel strength (N/15mm): 6

Seal strength (N/ 10 mm): 15

Odour test: satisfactory

Sniff test: Satisfactory

Robinson test: Satisfactory

D. Cost target of the product/solution:

10 rupees per average size pouch (depend on size of the pouch)

E. Timeframe for development of the product/solution:

Year 2025

F. Potential market / business opportunity for the product/solution:

1. Given, the sustainability related goals of the company and the upcoming regulations of Sri Lanka (NAPPWM) a recyclable solution is desirable. Through the implementation of the NAPPWM, the government of Sri Lanka is looking to increase recycling of plastics from 4% to 15% by 2025.
2. Manufacturing recycled plastic products: There is a growing demand for eco-friendly products made from recycled materials. Business opportunities can include manufacturing recycled plastic furniture, home decor items, packaging materials, and even construction materials.
3. Plastic pellet production: Establish a business where recycled polyethene is converted into plastic pellets. These pellets can then be sold to manufacturers for use in various plastic products.
4. Eco-friendly packaging business: With the increasing focus on sustainable packaging, there is an opportunity to start a business that produces and sells eco-friendly packaging solutions made from recycled polyethene.
5. Customized recycled plastic products: Offer customization services for recycled plastic products, such as manufacturing promotional merchandise made from recycled polyethene for companies and organizations.
6. Upcycling business: Start a business that upcycles polyethene into new and innovative products. This can involve transforming plastic waste into fashion accessories, household items, or even art pieces.

7. Plastic recycling equipment: Develop and sell specialized machinery and equipment used in the recycling process of polyethene. This can include shredders, granulators, separators, and sorting machines.

8. Resources that will be provided to support solution development:

Off cuts generated as waste in packing process can be given as raw materials.

Need to establish a mechanism to collect the waste pouches generated in consumer end

Challenge 2

<p>A. Challenge Statement/Title: Recycling process for offcuts of LDPE-Nylon multilayer packaging material</p>
<p>B. Background of the Problem: A famous convenience foods company in Sri Lanka faces the challenge of effectively recycling the offcuts generated during the packaging process using LDPE-Nylon multi-layer material. Currently, these offcuts are incinerated, a process that is not environmentally friendly and contributes to pollution. The company seeks a sustainable recycling process to efficiently handle these offcuts and minimize their environmental impact.</p> <ul style="list-style-type: none">● Environmental Impact: The incineration of LDPE-Nylon multi-layer packaging offcuts contributes to air pollution and greenhouse gas emissions, posing environmental harm. The company aims to find a recycling process that reduces its carbon footprint and overall environmental impact.● Recycling Feasibility: The multi-layer composition of the packaging material makes traditional recycling processes challenging, as it requires separating the LDPE and Nylon layers. The company seeks a suitable recycling method that can efficiently handle this complex composition.● Scalability and Efficiency: The recycling process must be scalable to handle the volume of offcuts generated during packaging production and be efficient to make the recycling operation viable and cost-effective.● Regulatory Compliance: The chosen recycling process must comply with local environmental regulations and standards to ensure its sustainability and legal compliance.
<p>C. Technical Requirements / Performance Criteria: Recyclable alternative to LDPE-Nylon vacuum packed pouches Needs to be recyclable through standard recycling streams.</p> <ol style="list-style-type: none">a. Barrier properties - Gas (Oxygen), Aroma, water (moisture), stable during frozen condition (< - 18⁰ C)b. Film specificationsc. (Thickness, - 180 micrond. Tensile strength, - >300 kg / cm³e. Elongation at break - > 450 %f. Heat seal strength, - 20 N / 25 mmg. Bond strength, etc.) - N/ 25mm strip <p>Thermoforming ability (forming temperature 130 - 135⁰ C)</p>
<p>D. Cost target of the product/solution: 50 rupees per meter</p>
<p>E. Timeframe for development of the product/solution: Year 2025</p>
<p>F. Potential market / business opportunity for the product/solution:</p>

1. Given, the sustainability related goals of the company and the upcoming regulations of Sri Lanka (NAPPWM) a recyclable solution is desirable. Through the implementation of the NAPPWM, the government of Sri Lanka is looking to increase recycling of plastics from 4% to 15% by 2025.
2. Manufacturing recycled plastic products: There is a growing demand for eco-friendly products made from recycled materials. Business opportunities can include manufacturing recycled plastic furniture, home decor items, packaging materials, and even construction materials.
3. Plastic pellet production: Establish a business where recycled polyethene is converted into plastic pellets. These pellets can then be sold to manufacturers for use in various plastic products.
4. Eco-friendly packaging business: With the increasing focus on sustainable packaging, there is an opportunity to start a business that produces and sells eco-friendly packaging solutions made from recycled polyethene.
5. Customized recycled plastic products: Offer customization services for recycled plastic products, such as manufacturing promotional merchandise made from recycled polyethene for companies and organizations.
6. Upcycling business: Start a business that upcycles polyethene into new and innovative products. This can involve transforming plastic waste into fashion accessories, household items, or even art pieces.
7. Plastic recycling equipment: Develop and sell specialized machinery and equipment used in the recycling process of polyethene. This can include shredders, granulators, separators, and sorting machines.

G. Resources that will be provided to support solution development:

Off cuts generated as waste in packing process can be given as raw materials.

Need to establish a mechanism to collect the waste packs generated in consumer end

Challenge 3

A. Challenge Statement/Title:

Alternative use for cellulose sausage casing which are disposed after usage.

B. Background of the Problem:

The famous convenience foods company in Sri Lanka is seeking an environmentally friendly process to reuse cellulose sausage casing for some other useful product rather than resorting to incineration. As the company produces a significant quantity of cellulose-based sausage casings as part of its convenience food products, it aims to find a sustainable and practical approach for repurposing these casings, minimizing waste, and promoting circular economy practices.

- **Material Repurposing:** Finding a suitable and viable process to repurpose cellulose sausage casings for some other useful product is a complex challenge, as the material's characteristics and composition require specialized handling.
- **Quality and Integrity:** Ensuring that the repurposed cellulose material retains its quality, integrity, and safety to be utilized in a new product effectively.
- **Logistics and Infrastructure:** Establishing an efficient system to collect, process, and integrate the cellulose sausage casings into the reuse process, including the necessary facilities and logistics.
- **Regulatory Compliance:** Ensuring that the reuse process aligns with local environmental regulations and standards, supporting its sustainability and legal compliance.

C. Technical Requirements / Performance Criteria:

1. Thicknesses to suit various types and sizes of sausages.
2. Strength and elasticity: The casing should be strong enough to withstand the stuffing process and handling during transportation and storage. It should also have good elasticity to accommodate expansion of the sausage during cooking without bursting.

Barrier properties: The casing should provide a good barrier to moisture and oxygen to prevent spoilage and maintain the freshness of the sausage
4. Breathability: The casing should allow proper smoke and moisture transfer during the smoking and cooking process, ensuring the desired flavor and texture.
5. Peelability: In some applications, especially for cooked sausages, the casing should have good Peelability to facilitate easy removal without damaging the sausage.
6. Uniformity: The casing should have consistent dimensions and thickness to ensure consistent appearance and quality of the final product.
7. Compatibility: The casing should be compatible with different types of stuffing machines and processes, including automated stuffing and linking.
8. Heat resistance: The casing should have sufficient heat resistance to withstand cooking and smoking temperatures without melting or deforming.

9. Printability: The casing should be printable to allow for branding, labeling, and code marking.

10. Compliance with regulations: The casing should meet applicable food safety and quality regulations, including being made from food-grade materials.

11.

D. Cost target of the product/solution:

500 rupees per stick

E. Timeframe for development of the product/solution:

2025

F. Potential market / business opportunity for the product/solution:

1. Sausage Manufacturers: The primary target market would be sausage manufacturers that use cellulose casing for their products. These manufacturers often produce a large volume of sausages, resulting in a significant amount of waste cellulose casing. By offering a recycling solution, you can help these manufacturers reduce waste and contribute to their sustainability goals.
2. Food Processing Plants: Food processing plants that deal with sausage production may have cellulose casing waste that they would like to dispose of responsibly. By reaching out to these plants and offering recycling services, you can tap into another potential market for your business.
3. Local Farms and Farmers' Markets: Smaller-scale sausage producers, such as local farms and those selling at farmers' markets, often use cellulose casing for their sausages. These businesses may not have access to efficient recycling facilities, making them ideal customers for your recycling service.
4. Sustainable Food Businesses: Many businesses in the food industry aim to adopt sustainable practices as part of their corporate social responsibility. By offering a cellulose casing recycling solution, you can attract sustainable food businesses that prioritize waste reduction and resource conservation.
5. Environmentally Conscious Consumers: In recent years, there has been an increase in the number of consumers who support eco-friendly and sustainable products. By promoting your cellulose casing recycling service to these environmentally conscious consumers, you can create consumer awareness and demand for your business.

G. Resources that will be provided to support solution development:

Removed casing can be provided as a raw material for recycling process.

Note: It is needed to find a proper cleaning method for removed casings as they contain trace of cooked meat

Challenge 4

A. Challenge Statement/Title:

Biodegradable alternative for the polythene cover of the paper straw.

B. Background of the Problem:

The FMCG company in Sri Lanka currently employs polythene covers for their paper-based straws used in milk and juice products. In pursuit of their sustainability objectives, the company aims to transition these products into fully or nearly biodegradable alternatives without the generation of microplastics during the degradation process.

- **Microplastic Contamination:** The existing polythene covers used for the paper-based straws may lead to the release of microplastics into the environment during the degradation process. These microplastics have adverse effects on ecosystems and can pose health risks to both wildlife and humans.
- **Sustainability Goals:** The company seeks to align its practices with sustainability goals, including reducing plastic waste and promoting environmentally friendly packaging options. However, finding suitable biodegradable materials that do not contribute to microplastic pollution poses a significant challenge.
- **Product Integrity:** The biodegradable materials chosen for the straw covers must maintain the required strength and integrity during the product's shelf life and usage to ensure a positive consumer experience. Finding materials that strike the right balance between biodegradability and functionality is essential.
- **Cost and Supply Chain:** Shifting to biodegradable alternatives may impact the overall production cost and supply chain. It is essential to identify cost-effective and readily available biodegradable materials that do not compromise the company's operational efficiency.
- **Regulatory Compliance:** The company must adhere to local and international regulations related to sustainable packaging, waste management, and product safety. The selected biodegradable materials must meet these regulatory standards.

C. Technical Requirements / Performance Criteria:

Straw packing should be compatible on high-speed straw applicator machine

Must have excellent barrier properties same as current material. Straw is made of paper and cover should be moisture proof and easlity torn off

Shouldn't have impact on sensory characters of the product

Proper sealing

Should be biodegradable

Microbiological validation if paper based

Straw is purchased from a local manufacturer and project should be agreed by the same party

1. prototype → MVP → final product though extensive testing

D. Cost target of the product/solution:

On par with current packaging.

E. Timeframe for development of the product/solution:

TBD

F. Potential market / business opportunity for the product/solution:

If the solution is viable same can be applicable to flavoured milk and fruit drinks
Also, can be implemented across all the local Tetra Pak based beverage manufacturing industries

G. Resources that will be provided to support solution development:

Product and packaging inhouse testing capability can be utilised, including shelf-life studies.
Pilot test runs can be accommodated at the co-packer's premises.
Potential volumes and related data can be provided whenever required

H. Other considerations:

Strategically very important project due to potential regulatory restrictions
This will be a good marketing tool to arrest the negative social feedback on plastic and can be capitalised on first move advantage.
IP arrangements and commercialisation to be discussed and agreed by Start-Up-Cycle team- the company -Solution provider/Inventor and co-packer once stake holders are agreed to proceed with the project.

Challenge 5

A. Challenge Statement/Title:

Alternative for the Tetra packs and PET bottles which has a shelf life of at least 4 to 6 months.

B. Background of the Problem:

In order to reduce the plastic footprint of this FMCG company in Sri Lanka, especially in the milk and soft drinks products, is a commendable goal towards sustainability and environmental conservation. In achieving this objective, the company can adopt several strategies and make changes in its packaging, production, and waste management processes. The company seeks the entrepreneurs and innovators to come up with innovative and cost-effective solutions for these challenges.

- **Biodegradable Packaging:** The company can switch from traditional plastic packaging to biodegradable materials. For instance, instead of PET bottles, the company seeks to explore using biodegradable plastics made from renewable sources like cornstarch or sugarcane or converting PET to biodegradable which doesn't produce microplastics during degradation process. Additionally, for milk products and fruit juice based drinks, the company consider using alternative packaging materials in place of Tetra pack.
- **Innovative Packaging Solutions:** Innovative packaging solutions that are both sustainable and cost-effective. This could involve collaborations with packaging experts and institutions to develop cutting-edge biodegradable or compostable materials.
- **Reduced Packaging:** Optimize packaging design to use minimal materials without compromising on product safety and quality. This can lead to significant reductions in plastic usage.

C. Technical Requirements / Performance Criteria:

Bottles should be compatible on high-speed bottling/blow moulding machine.

Must have excellent barrier properties same as PET (there is an internal pressure due to carbonation)

Shouldn't have impact on sensory characters of the product.

Should have adequate load bearing strength (stacking)

Proper sealing with the Cap

Microbiological validation if paper based

Should be biodegradable

prototype MVP-- final product though extensive testing

D. Cost target of the product/solution:

On par with current packaging

E. Timeframe for development of the product/solution:

TBD

F. Potential market / business opportunity for the product/solution:

If the solution is viable entire company's PET can be converted to new solution

Also, can be implemented across all the CSD industries.

If Tetra alternative is viable, same above will be applicable

G. Resources that will be provided to support solution development:

Product and packaging inhouse testing capability can be utilised, including shelf-life studies.

Pilot test runs can be accommodated at the company.

Potential volumes and related data can be provided whenever required.

H. Other considerations:

Strategically very important project due to potential regulatory restrictions

This will be a good marketing tool to arrest the negative social feedback on plastic/PET and can be capitalised on first move advantage.

Multinational companies are also working on this area.

IP arrangements and commercialisation to be discussed and agreed by Start-Up-Cycle- the company -Solution provider/Inventor once stake holders are agreed to proceed with the project.