

Center for Sustainable Business

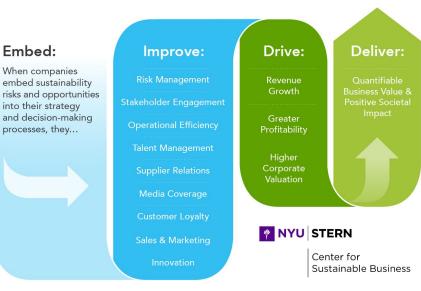
Adopting Sustainable Packaging Solutions: Proposed Benefits & Monetization Methods

April 2023



Return on Sustainability Investment (ROSI[™]) Framework

Sustainability Drivers of Financial Performance & Competitive Advantage



By embedding ESG risk and opportunities within core business strategy, the return on sustainable investment can be quantified, delivering the possibility of both financial value and positive societal impact.

Overview of Food & Agriculture Framework

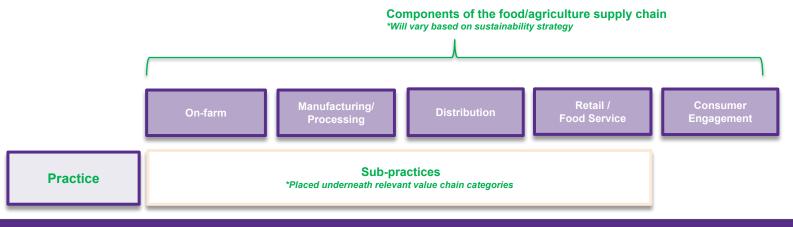
NYU Stern CSB is developing a ROSI[™] framework for food & agriculture with publicly available monetization tools to help the industry understand where and how sustainability can unlock financial value.

Based on research, experience, and engagement with industry leaders, we have identified the following sustainability strategies* used by the industry to include in the framework:

Water stewardship	Soil health	Climate change	Chemical management	
Biodiversity and ecosystem conservation	Animal stewardship	Food waste management	Sustainable sourcing	
Food safety and nutrition	Sustainable packaging	Employee and supplier well-being	Brand marketing and communications	

Identified Sustainability Practices and Sub-Practices Framework Layout

- Through our research, we identified key sustainability practices and sub-practices food and agriculture supply chains are implementing to achieve their sustainability strategies
- Each strategy includes sub-practices which are mapped under the relevant components of the food/agriculture supply chain, (if not relevant to a part of the supply chain, it is excluded)
- There are some benefits that are referenced across multiple strategies
- Compliance / enforcement practices are not explicitly listed in this framework but should be considered when implementing the twelve strategies
- Please see diagram below of the framework layout, which is illustrated for each strategy in the subsequent slides



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Adopting Sustainable Packaging Solutions

Adopting Sustainable Packaging Solutions

	On-farm	Manufacturing/ Processing	Distribution	Retail/ Food Service	Consumer Engagement			
Reduce Packaging	Introduce reusability into existing packaging	Improve recyclabil Elimination of single-use p Use lightweight/space Use reusable packaging, pro						
			Invest in research and innovations which reduce amount of packaging material e.g. concentrated versions of end product, use of compression injection technology					
		Substitute more sustainable packaging for petro-based (e.g., bio based, compostable) and source sustainable packaging materials and include certifications where possible						
	Replace	how to handle each category of packaging (recycled,						
Improve circularity of packaging		recyclable and reusable)						
	Im	cularity programs						
		cling infrastructure						

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Monetization Approach

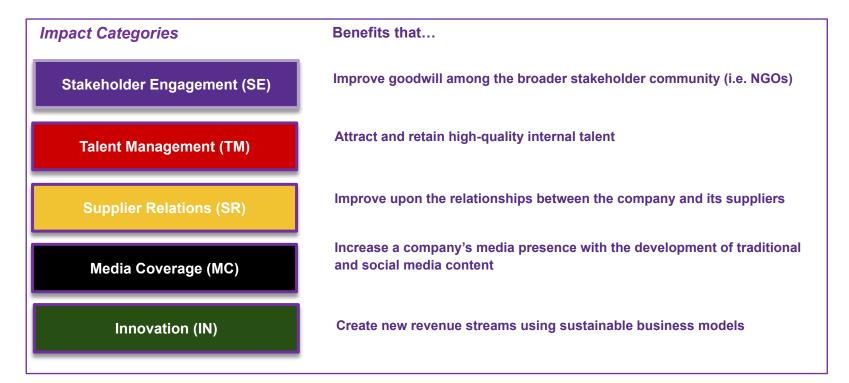
Adopting Sustainable Packaging Solutions Overview of Sustainability Strategy and Impact Categories

In the following slides, we will be focusing on benefits from the *Sustainable Packaging* strategy , which are categorized based on the impact categories highlighted below

Sustainability Strategy Definition Adopting Sustainable Packaging Solutions	Food and Agriculture supply chains are innovating to reduce packaging and incorporating circularity principles across many parts of their value chain - from new packaging design and material substitution to creating infrastructure that supports take-back programs.				
Impact Categories	Benefits that				
Operational Efficiency (OE)	Optimize corporate and supply chain efficiencies to lower cost and increase profits				
Sales and Marketing (SM)	Increase volume of sales through brand and marketing policies				
Customer Loyalty (CL)	Attract an increasing community of conscious buyers & consumers, while reducing retention costs				
Risk Management (RM)	Encourage risk mitigation and resilience within the value chain				

Adopting Sustainable Packaging Solutions Overview of Sustainability Strategy and Impact Categories

In the following slides, we will be focusing on benefits from the *Sustainable Packaging* sustainability strategy, which are categorized based on the impact categories highlighted below



Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods	
		SP-1	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in packaging costs	OE	Compare packaging material costs per unit of product before and after material replacement. Consider any impact due to weight reduction/increase in transportation and storage costs	
Reduce packaging	Introduce reusability into existing packaging	SP-2	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in costs such as capital investments in machinery etc.,	OE	Consider any additional expenses relating to new machinery purchased or repurposing existing machinery to accommodate the material replacement/other changes as applicable. Calculate the depreciation changes as a result	
		SP-3		Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in regulatory tax/fee payments.	RM	Compare regulatory fees (recycling, in-country and local and other taxes applicable on the use of single use plastic) before material replacement to post material replacement

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods
Reduce	Introduce reusability into existing	SP-4	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in their environmental impact (avoided costs of carbon emissions)	RM	Undertake a Life Cycle Assessment (LCA) of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost
Раскадінд	ackaging packaging	SP-5	Farmers /producers/growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see a revenue lift driven by sustainability conscious customers	SM	Compare sales volume before and after implementation of the practice and multiply by average price per unit of product

Investing in Sustainable Packaging Materials, ON FARM Overview of Benefits and Monetization Methods

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods
		SP-1	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in packaging costs	OE	Compare packaging material costs per unit of product before and after material replacement. Consider any impact due to weight reduction/increase in transportation and storage costs
	Substitute bio based plastic packaging for petro based	SP-2	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in costs such as capital investments in machinery etc.,	OE	Consider any additional expenses relating to new machinery purchased or repurposing existing machinery to accommodate the material replacement/other changes as applicable. Calculate the depreciation changes as a result
Use Sustainable Packaging	and Source	SP-3	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in regulatory tax/fee payments.	RM	Compare regulatory fees (recycling, in-country and local and other taxes applicable on the use of single use plastic) before material replacement to post material replacement
pack materi incl certific	sustainable packaging materials and include certifications where possible	SP-4	Growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see changes in their environmental impact (avoided costs of carbon emissions)	RM	Undertake a Life Cycle Assessment (LCA) of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost
		SP-5	Farmers /producers/growers that follow some or all of these practices for materials used in primary/secondary/tertiary packaging are likely to see a revenue lift driven by sustainability conscious customers	SM	Compare sales volume before and after implementation of the practice and multiply by average price per unit of product

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods
	Improving	SP-6	Companies that follow these practices for materials used in primary/ secondary/tertiary packaging are likely to see changes in packaging costs	OE	Compare quantity of packaging material consumed per unit of end product and multiply quantity by average price of packaging material before and after material replacement. Consider incidental impacts such as higher volume discounts by suppliers due to larger order size , fixed price and or longer term contracts , local sourcing instead of import of material etc.
Reduce Packaging	multi-material to	SP-7	Companies that follow these practices for materials used in primary/ secondary/tertiary packaging are likely to see changes in costs associated with research and development, capital investments in machinery etc.,	OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result
		eliminating non capital investments in machinery etc.,		OE	Compare compliance costs such as recycling/taxes/fees payable before and after material replacement/other changes as applicable.

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods
Reduce	Improving recyclability of packaging (eg. shifting from multi-material to	SP-9	Companies that follow these practices for materials used in primary/ secondary/tertiary packaging may see changes in safety and durability of the food item being packaged	OE, RM	Compare instances of food/product recalls relating to packaging defects, impacts on product shelf life before and after implementing the initiative
Packaging	multi-material to single-material, eliminating non recyclable material etc.,)	Companies that follow these practices for materials used in primary/ secondary/tertiary packaging are likely to experience a change in environmental impact such as GhG emissions associated with Scope 1/2/3 emission calculations	RM	Undertake a Life Cycle Assessment of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost	

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods							
	Reduce Elimination of single	SP-7 some or all of thes practices are likely	SP-7 Companies that follow some or all of these practices are likely to see		Companies that follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs, safety and durability in life of	Companies that follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs, safety and durability in life of	Companies that follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs, safety and durability in life of	SP-7 Companies that follow some or all of these practices are likely to see	P-6	SP-6	OE	Compare quantity of packaging material consumed per unit of end product and multiply quantity by average price of packaging material before and after material replacement. Consider incidental impacts such as higher volume discounts by suppliers due to larger order size , fixed price and or longer term contracts , local sourcing instead of import of material etc.
				SP-7 so pr					OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result		
		SP-8	costs, research and development costs and investments, end of life recycling costs, safety and	SP-8 development costs and investments, end of life recycling costs, safety and durability in life of packaged item and associated carbon emissions				OE	Compare compliance costs such as recycling/taxes/fees payable before and after material replacement/other changes as applicable.			
		associated carbon			OE, RM	Compare instances of food/product recalls relating to packaging defects, impacts on product shelf life before and after implementing the initiative						
		SP-10										RM

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods
	Elimination of single	SP-11	Companies that eliminate single use plastic film in primary/secondary/tertiary packaging are likely to avoid regulatory taxes and fines	RM	Compare regulatory fines/penalties/taxes (in-country and other taxes applicable on the use of single use plastic) before and after material elimination
Reduce Packaging	use plastic material	SP-12	Avoided cost of either having to address new standards within a short time period (lost sales due to production delays, additional labor and/or higher ingredient costs, etc)	RM	Estimate the cost of production delay by multiplying the amount of days unable to produce products that meet the new standard by the average sales volume per day. Add additional labor and/or higher ingredient costs by multiplying the premium price by the volume required for each. Less associated costs of transitioning to single use plastic in advance of regulation
	Transition to light weight/space efficient materials to decrease product weight and increase shipping volume	SP-13	Companies that transition to light weight/space efficient materials that decrease overall product weight are likely to see change in transportation costs	OE	Compare transportation cost per unit of product before and after material replacement.

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods						
	Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Packaging Reduce Reduce Packaging Reduce Packaging Reduce Reduce Reduce Reduce Packaging Reduce Reduce Reduce Reduce Reduce Reduce Packaging Reduce Redu	SP-6	Companies that follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs,	OE	Compare quantity of packaging material consumed per unit of end product and multiply quantity by average price of packaging material before and after material replacement. Consider incidental impacts such as higher volume discounts by suppliers due to larger order size , fixed price and or longer term contracts , local sourcing instead of import of material etc.						
		SP-7		OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result						
		SP-8		research and development costs and investments, end of life recycling costs,	research and development costs and investments, end of life recycling costs,	research and development costs and investments, end of life recycling costs,	research and development costs and investments, end of life recycling costs,	research and development costs and investments, end of life recycling costs,	research and development costs and investments, end of life recycling costs,	research and development costs and investments, end of life recycling costs,	development costs and investments, end
	SP-9	life of packaged item and associated carbon emissions	OE, RM	Compare instances of food/product recalls relating to packaging defects, impacts on product shelf life before and after implementing the initiative							
		SP-10			RM	Undertake a Life Cycle Assessment of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost					

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods				
		SP-6		OE	Compare quantity of packaging material consumed per unit of end product and multiply quantity by average price of packaging material before and after material replacement. Consider incidental impacts such as higher volume discounts by suppliers due to larger order size , fixed price and or longer term contracts , local sourcing instead of import of material etc.				
	Reduce Packaging	SP-7	Companies that follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs, safety and durability in life of packaged item, associated	follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs, safety and durability in life of packaged item, associated	follow some or all of these practices are likely to see changes in packaging costs, research and development costs and investments, end of life recycling costs, safety and durability in life of packaged item, associated	OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result		
		SP-8				OE	Compare compliance costs such as recycling/taxes/fees payable before and after material replacement/other changes as applicable.		
product, use of compression injection technology etc.,	SP-9	safety and durability in life of packaged item, associated				in life of packaged item, associated	in life of packaged item, associated	in life of packaged item, associated	in life of packaged item, associated
	etc.,	carbon emissions and transportation costs SP-10	RM	Undertake a Life Cycle Assessment of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost					
		SP-13	SP-13					OE	Compare transportation cost per unit of product before and after material replacement.

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Category	Suggested Monetization Methods
	Invest in research and innovations which reduce the amount of	SP-14	Companies that follow some or all of these practices are likely to see a sales lift due to adding on more customer segments e.g., price sensitive and/or sustainably conscious customers	SM	Compare sales volume before and after launch of the initiative and multiply by average price per unit of product
Reduce Packaging	packaging material required e.g. concentrated versions of end product, use of compression injection technology etc.,		Companies that follow some or all of these practices are likely to see a change in sales driven by repeat/less frequent purchases and enhanced customer stickiness/loyalty due to brand value enhancement	CL	Compare sales volume per customer before and after launch of the initiative and multiply by average price per unit of product and number of customers

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods		
Improve circularity of packaging	Substitute more sustainable packaging for petro based (eg. bio based, compostable etc.) and source sustainable packaging materials and include certifications where possible	SP-6	Companies that follow	OE	Compare quantity of packaging material consumed per unit of end product and multiply quantity by average price of packaging material before and after material replacement. Consider incidental impacts such as higher volume discounts by suppliers due to larger order size , fixed price and or longer term contracts , local sourcing instead of import of material etc.		
		SP-7	ubstitute more practice ainable packaging SP-7 chang petro based (eg. cost	SP-7some or all of these practices are likely to see changes in packaging costs, research and development expenses and investments, end of life recycling costs, safety and durability in life of packaged item, associated carbon emissions, transportation	OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result	
		SP-8	life recycling costs, safety and durability in life of packaged item, associated carbon emissions, transportation costs, sales and customer loyalty.		D-8 life recycling costs, safety and durability in	OE	Compare compliance costs such as recycling/taxes/fees payable before and after material replacement/other changes as applicable.
		certifications where			OE, RM	Compare instances of food/product recalls relating to packaging defects, impacts on product shelf life before and after implementing the initiative	
				RM	Undertake a Life Cycle Assessment of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost		
				RM	Compare regulatory fines/penalties/taxes (in-country and other taxes applicable on the use of single use plastic) before and after material elimination		

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods
	Substitute more	SP-13	Companies that transition to light weight/space efficient materials that decrease overall product weight are likely to see change in transportation costs	OE	Compare transportation cost per unit of product before and after material replacement.
Improve circularity of packaging	e rity sustainable packaging for petro based (eg. bio based, compostable etc.) and source sustainable packaging	SP-14	Companies that follow these practices are likely to see a sales lift due to adding on more customer segments e.g., price sensitive and/or sustainably conscious customers	SM	Compare sales volume before and after launch of the initiative and multiply by average price per unit of product
		SS-16, SS-17	Companies that include certifications and or make packaging related claims may experience a change in sale volumes driven by changing consumer perceptions	SM,CL	Compare sales volume per customer before and after the labelling/certification/claim and multiply by average price per unit of product and number of customers

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods
		SP-6		OE Compare quantity of packaging material consumed per unit of end pro and multiply quantity by average price of packaging material before ar material replacement. Consider incidental impacts such as higher volu discounts by suppliers due to larger order size , fixed price and or long contracts , local sourcing instead of import of material etc.	
Improve circularity of packaging	circularity with recyclable of plastic/paper in	SP-7	Companies that follow some or all of these practices are likely to see a change in packaging costs, change in research & development costs and capital investment, changes in recycling costs and lastly change in Ghg emissions	OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result
		SP-8	associated with Scope 1/2 and 3 calculations	OE	Compare compliance costs such as recycling/taxes/fees payable before and after material replacement/other changes as applicable.
		SP-10		RM	Undertake a Life Cycle Assessment of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods
	nprove ircularityReduce non recyclable content in packaging material and/or 		OE	Compare quantity of packaging material consumed per unit of end product and multiply quantity by average price of packaging material before and after material replacement. Consider incidental impacts such as higher volume discounts by suppliers due to larger order size , fixed price and or longer term contracts , local sourcing instead of import of material etc.	
Improve circularity of packaging		SP-7	development costs and capital investment, changes in recycling costs and lastly change in Ghg emissions associated with Scope 1/2 and 3 SP-8 calculations	OE	Consider if there are additional research and development costs incurred relating to the material testing and replacement, any new machinery purchased or repurposing of existing machinery to accommodate the material replacement/other changes as applicable. Consider changes to depreciation charge as a result
	to increase recyclability	SP-8		OE	Compare compliance costs such as recycling/taxes/fees payable before and after material replacement/other changes as applicable.
		SP-10		RM	Undertake a Life Cycle Assessment of different packaging material or refer to academic case studies available to estimate changes in their environmental impact. Multiply Co2 emissions (MT) with social cost per MT of carbon to calculate the total change in carbon emissions cost

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods
Improve circularity of packaging	Raise customer/consumer awareness about recycled, recyclable and reusable packaging and how to handle each category	MC-7	Increase in sales based on consumer engagement from marketing campaigns	SM	Calculate incremental profit attributed to promoting sustainability by comparing sales revenue before and after launch of a campaign

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods
Improve circularity of packaging	Implement packaging capture for proper disposal/recycling/cir cularity programs	SP-16	Farms that ensure proper disposal of packaging are likely to reduce their risk of fines for improper disposal being levied by local authorities	OE	Assess the risk associated with fines issued for improper packaging waste disposal and multiply by the severity of the fine. This is a cost avoidance benefit.

Practice	Sub-Practice	Metric #	Proposed Benefits	Impact Categ.	Suggested Monetization Methods	
	Implement packaging	SP-16	Companies that follow any of these practices are likely to see a change in cost relating to set up of a packaging capture infrastructure	OE	Compare quantity of packaging material consumed per unit of end product and multiply by price of packaging material before and after the initiative. Include any costs incurred with setting up of a packaging capture infrastructure	
Improve circularity	capture for proper disposal/recycling/circul arity programs Implement packaging capture for proper disposal/recycling/circul arity programs	SP-17	Companies that follow any of these practices are likely to incur a cost representing payment against returnables	OE	Compare quantity of returnable packaging material and multiply by the credit given to customer per quantity of material. Reduce this credit from the sales to estimate impact to sales.	
of packaging Improve circularity of packaging		SP-18	Companies that follow any of these practices are likely to realize additional revenue from charging for a packing bag or selling a new replacement product (e.g., longer lasting cloth, jute shopping bag)	OE	Ascertain new sales volume of the new 'packaging replacement product' and multiply by average margin per unit of product	
	Working in partnership with industry, governments and NGOs to improve local recycling infrastructure	SP-19	Companies that follow any of these practices are likely to create goodwill among consumers positively impacting its brand value	MC	Consider if any free media coverage was received as a result of these initiatives. Number of instances of free media coverage times the average cost per campaign.	



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