



A Life Cycle Assessment (LCA) Approach to Reducing Loss & Waste.



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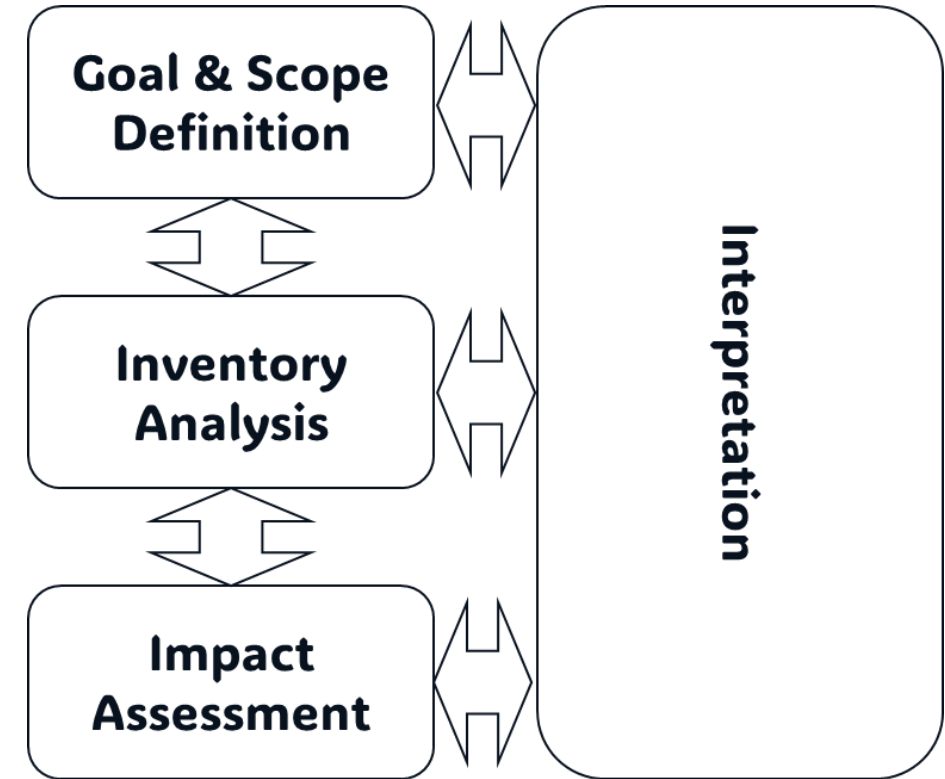
Introduction to Life Cycle Assessment (LCA)

Definition:

- Life Cycle Assessment (LCA) is a systematic method to evaluate the environmental impacts of products, processes, or services through their entire life cycle.

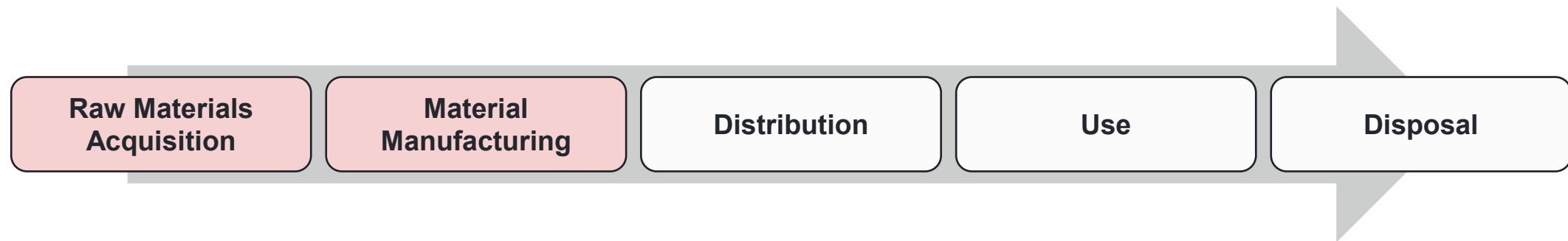
Stages of LCA:

- Goal and Scope Definition
- Inventory Analysis
- Impact Assessment
- Interpretation



General Concepts of LCA

- Life Cycle Thinking: Considers all stages from raw material extraction through materials processing, manufacturing, distribution, use, repair and maintenance, and disposal or recycling.
- Cradle-to-Grave Approach: Full life cycle from creation to disposal.
- Cradle-to-Cradle Approach: A circular approach focusing on the reuse of materials in a sustainable cycle.

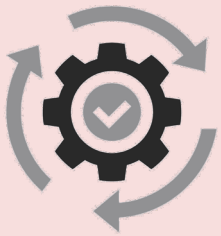


Importance of LCA in the Food Sector

A Key Tool for Sustainable Food Systems

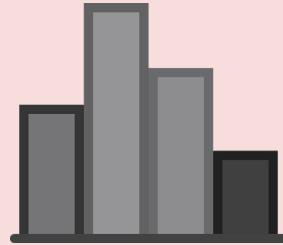
Resource Efficiency:

Identifying hotspots where resources are wasted.



Environmental Impact:

Reducing greenhouse gas emissions, water use, and energy consumption.



Economic Benefits:

Lowering costs through more efficient processes.



Consumer Awareness:

Promoting sustainable practices to end-users.



Case Study: Reducing Food Waste in Tomato Supply Chain

- **Goal and Scope Definition:**
Minimize food waste from farm to retail in the tomato supply chain.
- **Functional Unit:**
1 kg of tomatoes delivered to the consumer.



Inventory Analysis

Data Collection



Agricultural inputs

water
fertilizers
pesticides



Transportation

fuel use
emissions



Processing

energy
water use



Packaging

materials
disposal



Retail

storage
waste



Impact Assessment

Agricultural Stage:

Current Impact:

- Water Use: 200 liters/kg of tomatoes.
- Pesticide Use: 2.5 kg/ha.

Optimized Impact:

- Water Use: 150 liters/kg (25% reduction).
- Pesticide Use: 1.5 kg/ha (40% reduction).

Transportation Stage:

Current Impact:

- Fuel Consumption: 0.05 liters/km per kg of tomatoes.
- Emissions: 0.13 kg CO₂e/kg.

Optimized Impact:

- Fuel Consumption: 0.04 liters/km (20% reduction).
- Emissions: 0.10 kg CO₂e/kg (23% reduction).

Processing Stage:

Current Impact:

- Energy Use: 3.5 kWh/kg.
- Water Use: 50 liters/kg.

Optimized Impact:

- Energy Use: 2.5 kWh/kg (29% reduction).
- Water Use: 35 liters/kg (30% reduction).

Packaging Stage:

Current Impact:

- Plastic Use: 30g/kg of tomatoes.
- Waste Generation: 10g/kg.

Optimized Impact:

- Plastic Use: 20g/kg (33% reduction) using biodegradable materials.
- Waste Generation: 5g/kg (50% reduction).

Retail Stage:

Current Impact:

- Food Waste: 15% of total tomatoes.

Optimized Impact:

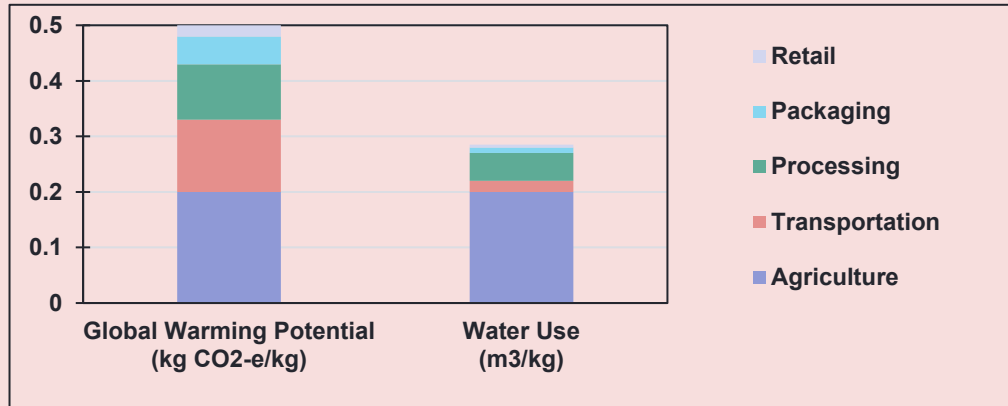
- Food Waste: 10% (33% reduction) through improved storage and inventory management.



Interpretation and Optimization

Identify Hotspots:

Where the most significant environmental impacts occur.



Implement Solutions:

- ☐ Precision agriculture techniques.
- ☐ Efficient logistics planning.
- ☐ Sustainable packaging options.
- ☐ Enhanced retail storage and inventory management.



Results



Reduction in Food Waste: Achieved through improved agricultural practices and better storage.



Environmental Benefits: Lower emissions, reduced water and energy use.



Economic Savings: Reduced costs associated with waste disposal and resource use.



Wrap up

Summary:

LCA provides a comprehensive framework to analyze and improve the sustainability of the food supply chain.

Key Takeaways:

- Importance of considering all life cycle stages.
- Potential for significant environmental and economic benefits.

Emphasizing Life Cycle Thinking:

- ***Beyond LCA:*** Embrace Life Cycle Thinking (LCT) for continuous improvement.
- ***Holistic Approach:*** Integrating LCT in business strategies leads to sustainable innovation.



Questions & Discussions

Open floor for questions and further discussion on implementing LCA and LCT in the food sector.



Thank you for your attention and participation

Feel free to contact us for future queries:

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