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European alliance for innovation training
& collaboration towards future packaging

Linking Academy to Industry.

Training program module no.2: New materials and biomaterials

Topic: **Economic and financial efficiency analysis of new biomaterias in plastic packaging industry**

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Co-funded by the
Erasmus+ Programme
of the European Union

This project has been funded with support from the European Commission.
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Financial efficiency and economic efficiency

- indicators for financial efficiency
  to evaluate the profitability of biopackaging materials
- indicators for environmental effects
- valuation of environmental effects
- cost-benefit analysis

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ECONOMIC ANALYSIS

FINANCIAL ANALYSIS

Categories	Investor Costs	Investor Revenues	All parties External costs	All parties External benefits
revenues (no. of items sold x price per item)				
investent expenses				
operational expenses				
materials				
wages				
taxes				
energy				
fuel (transport)				
depreciation of assests				
other expenses				
communication services				
other services				
losses				
addtional benefits				
Profit or Loss	Profit if the sum of revenues and benefits > the sum of costs			
positive impacts on environment and third parties				
negative impact on environment and third parties				
Net Benefits	If the sum of Revenues, Benefits and External Benefits > the sum of Costs and External Costs			

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Life cycle of a product

Figure : Life cycle perspective of a product or a process

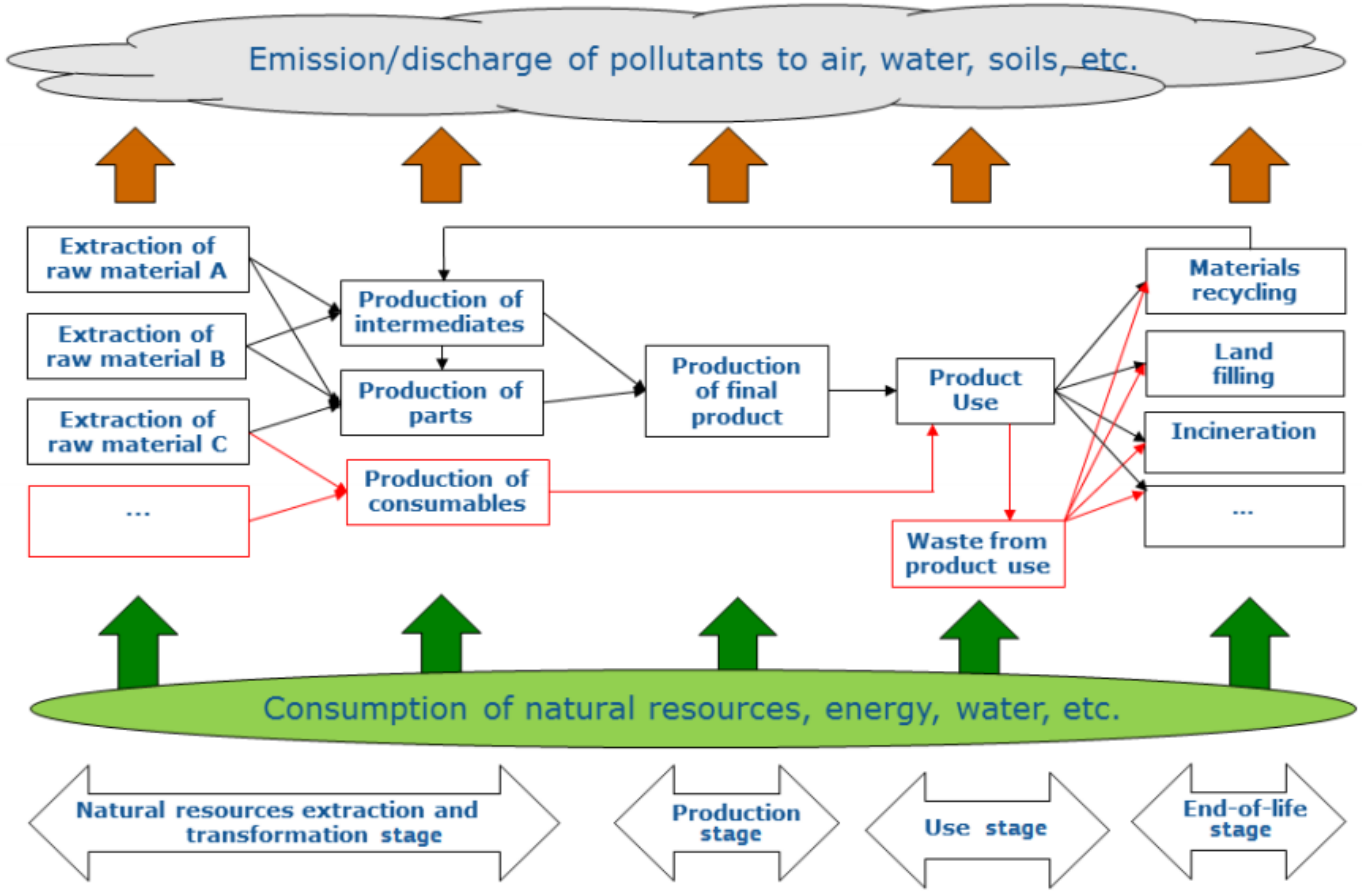

Figure 1: Life-cycle stages of a product or a process. The elements in black picture a simple product that does not require consumables for its operation and does not generate waste. The elements in red picture a more complex situation where the product (or process) requires consumables for its operation (e.g., filters, oil) and generate waste (e.g., wasted filters, waste oil). These elements may have to be taken into consideration in a life-cycle perspective of the technology[3]

Source: Ronald Piers de Raveschoot (JRC), Jean-Pierre Schosger (JRC), Ana Barbosa Lanham (JRC), Bernd Gawlick (JRC), Simona Tavazzi (JRC), Pierre Henry (DG ENV), Jiannis Kougoulis (DG ENV), Guidelines on assessing the environmental added value of an environmental technology in a life-cycle perspective at the proposal stage, European Commission

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Impacts matrix

Impacts matrix					
	Pre-production	Production	Distribition, incl. Packaging	Usage	Disposal
water related impacts (quality and quantity)					
soil pollution and degradation					
air contamination (emissions, e.g. NOx, SOx, PM10, PM2.5)					
climate related impacts (measured as CO2 emissions)					
noise emission					
energy consumption					
natural resources deplation					
lanscape impacts					
natural ecosystems and biodiversity degradation					

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Comparison of plactic and bioplactic

1. Production costs are higher for biomaterials.
2. While corn is a cheap resource, processing it to make polylactic acid (PLA) granules is already complicated and expensive.
3. Currently, European producers sell a kilogram of material for several euros, the cost of plastic is roughly a few euros per kilogram.
4. Bio-packaging of food products /Bezpieczna żywność w bezpiecznym bioopakowaniu (pwr.edu.pl)/ There are research on creating packaging from biodegradable materials derived from renewable raw materials, which will also extend the shelf life of the food stored in it. In addition, the packaging should allow the sterilization of food with electrical impulses without releasing harmful elements into it.
5. Bioplactic could be biodegradable and compostable.
6. Raw materials for bioplastic production can be a trade-off for food production in some parts of the world.

Research the topic further and prepare a costs and benefits matrix for all stages of Life Cycle Analysis.

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