Empowering the Bio-Based Sector for Solid Waste Management in Humanitarian Settings

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Bio4HUMAN's main goals

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The main task of the Bio4HUMAN Consortium

**To assess the scope to which
bio-based innovative technological solutions
and bio-based systems
have the potential to be applied
under the humanitarian context,
with the positive effect on the environment.**

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Important facts on bioeconomy

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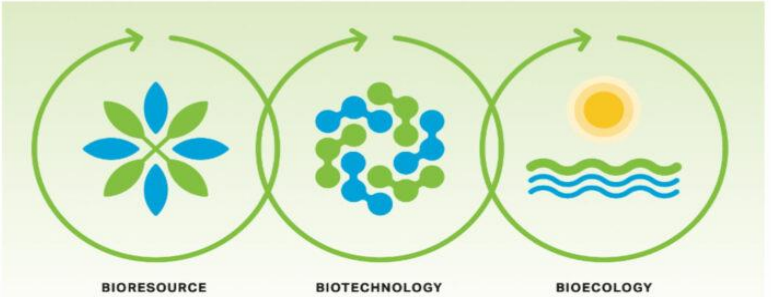
Let us start with a few facts about bioeconomy…

A Status of the Global Bioeconomy



Latest developments in the bioeconomy since the beginning of 2022

A status of the Global Bioeconomy study was conducted by the World Bioeconomy Forum during 2Q 2023.

The study evaluates some of the latest bioeconomy strategies and action plans carried out by major economies and selected nations.

The study shows the differences in bioeconomy visions (bioresource, biotechnology or bioecology) and what sectors are incorporated into bioeconomy action in different regions.

This study is a must read if you are contemplating your own action in this sector.

WORLD bioeconomy FORUM

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Important facts on bioeconomy

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The international bioeconomy has been very dynamic, especially since 2022. World economic powerhouses such as China, USA, and Europe have recently increased engagement in this sector.

There is growing interest in considering bioeconomy as a source of solutions to deal with the global and humanity's basic challenges, such as climate change management, biodiversity, health care and food security.

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Important facts on bioeconomy

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The importance of bioeconomy is growing also economically. It is estimated that the current global value of the bioeconomy is approx. 4 trillion USD and according to some projections its value will rise to 30 trillion USD, which is
a third of the global economic value.

Biotechnology increases its importance. As such, the topic is not new. What is new is that new tools like digitalisation, automation, and AI are boosting the development work of the sector enabling faster product launches and greater investor confidence.

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Important facts on bioeconomy

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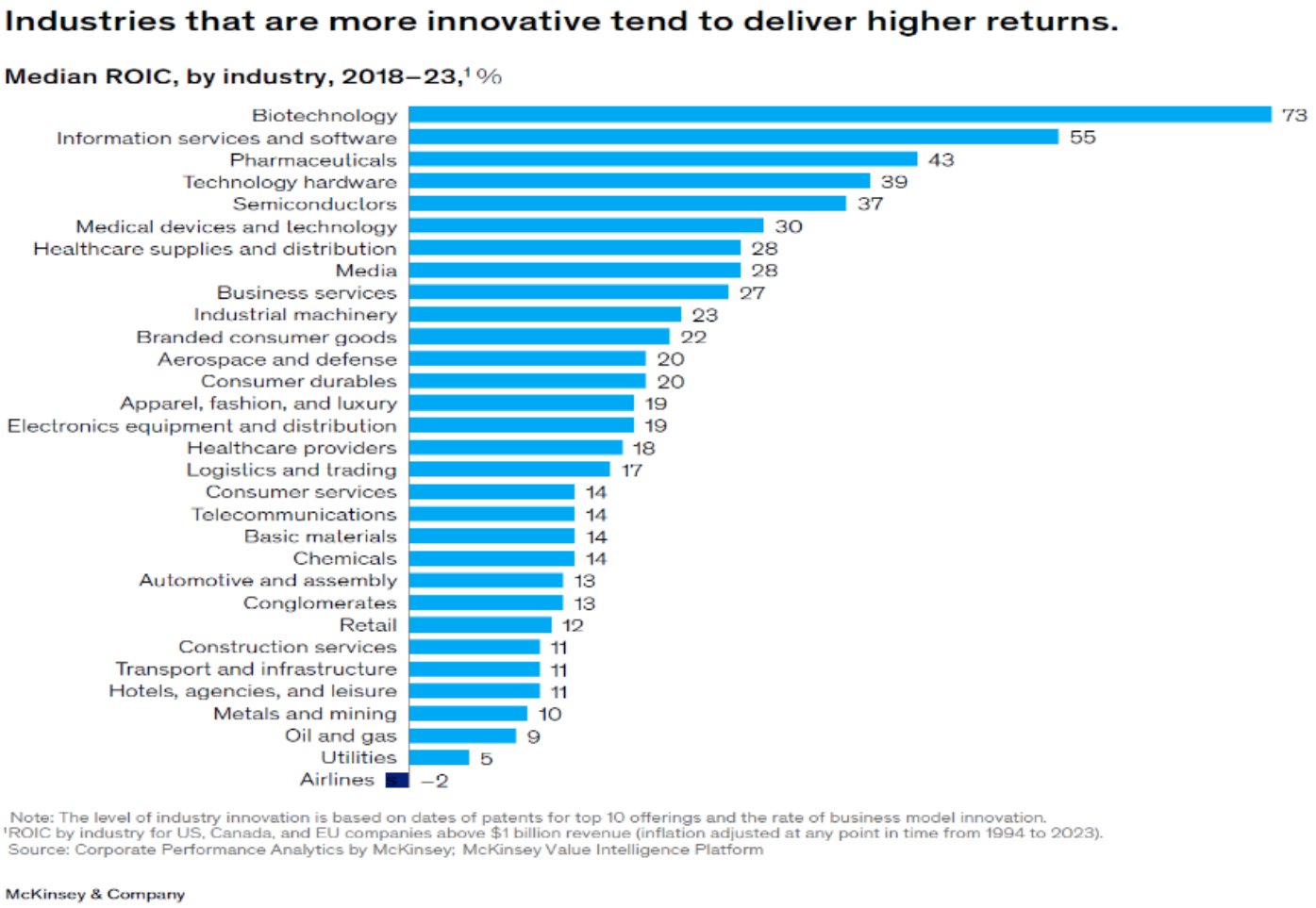

The level of industry innovation is based on dates of patents for top 10 offerings and the rate of business model innovation.

Return on invested capital (ROIC) is a calculation used to determine how well a company allocates its capital to profitable projects or investments.

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Important facts on bioeconomy

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Different definitions of bioeconomy highlight multiple substantive aspects important from the perspective of the Bio4HUMAN project.

All the aspects to be taken into consideration when scoping for bio-based products/services and bio-based technologies of potential application for humanitarian purposes.

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What are the bio-based sectors?
Where are we going to look for bio-based solutions?

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Primary sectors

- Agriculture
- Forestry
- Fisheries
- Aquaculture

Manufacturing sectors

- Food, beverage and other agro-manufacturing
- Bio-based textiles
- Wood products and wooden furniture
- Paper
- Bio-based chemicals
- Bio-based plastics and rubber
- Biofuels
- Production of bioelectricity

Management of bio-based wastes and remediation

Bio-based construction sector

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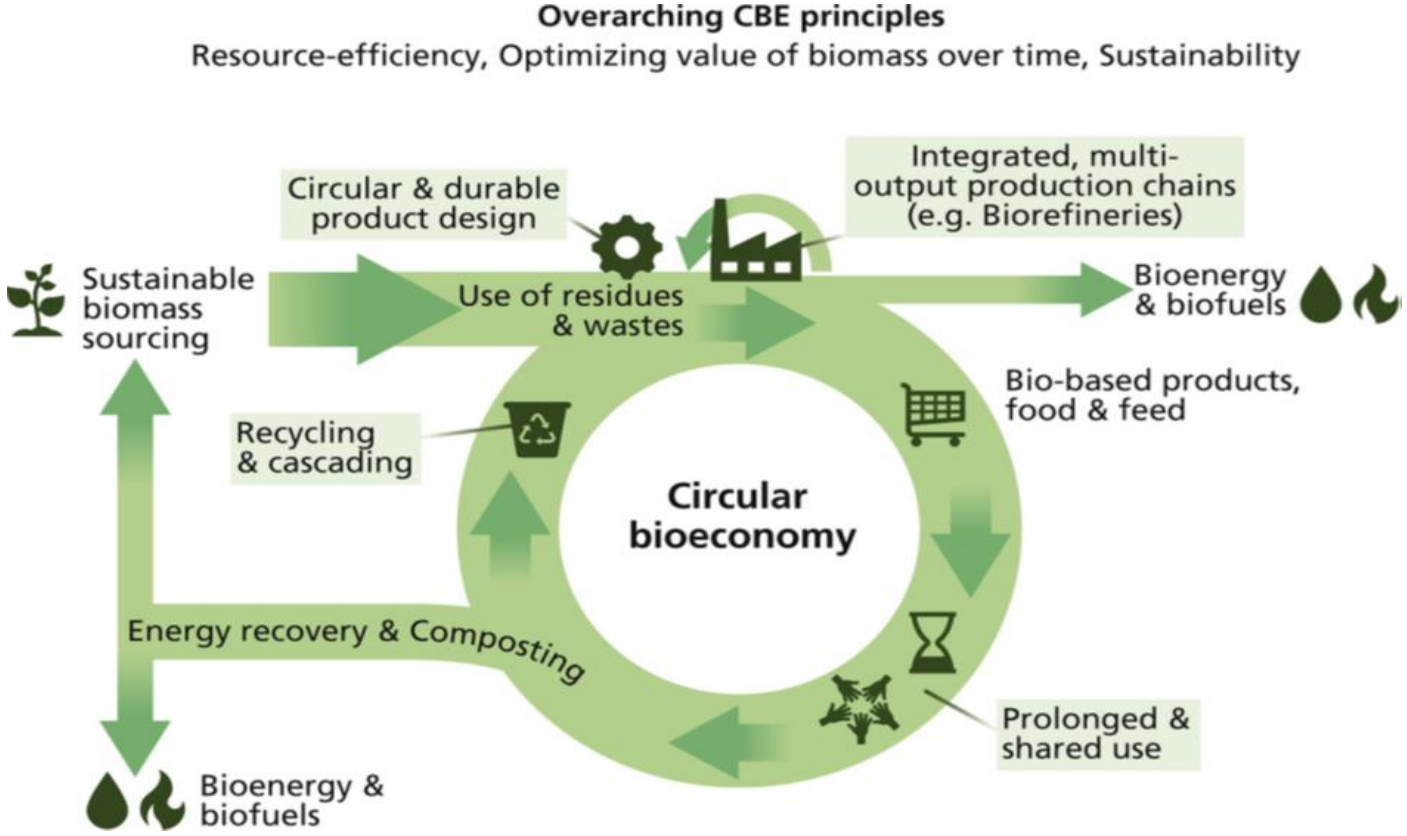
How the circular bioeconomy paradigm can be of help for Bio4HUMAN?



The circular bioeconomy paradigm being a so-called twin transition, where at the same time:

- the fossil resource is being replaced by a bio-based one;
- the linear economic model is being replaced by a circular one,

relates strongly to the circular and durable product design and to the waste management issues.

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What are the potential bio-based solutions created, designed and delivered by the bio-based sectors?

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- Bio-based products
- Bio-based technologies
- Bio-based processes
- Bio-based systems
- Bio-based innovations

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What kind of bio – based products Bio4HUMAN will be looking for?

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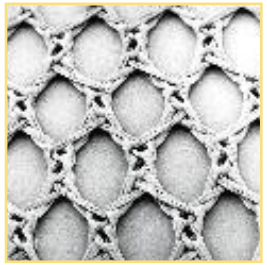
Bio4HUMAN is first and foremost looking for "bio – based products" which have succeeded or are about to succed in progressing from early ideas to a final product placed on the market.

Bio-based plastics

Bio-based packaging

Bio-fibers for textiles



Hygiene and sanitary products of bio-based origin

Bio-based construction materials

Bio-based lubricants

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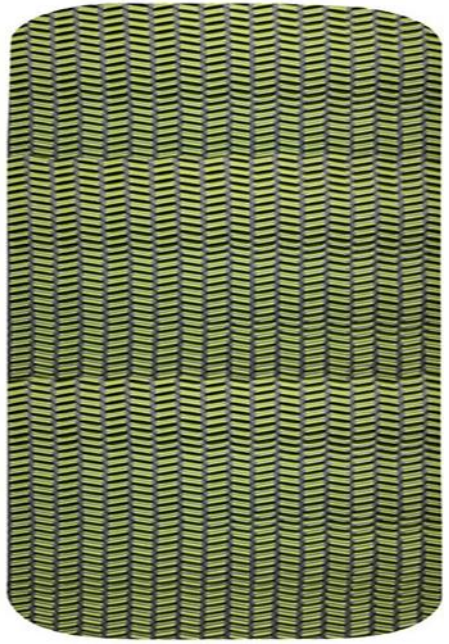
Examples of “bio-based products” of potential relevance for the humanitarian purposes

Disposable tableware (plates, bowls, cups) derived from 100% bio-based feedstock

Ointments to treat wounds and burns

Wood fibre–based flexible bags



Bio-foam sleeping pads

bio-based, hard surface cleaning products

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What are the potential bio-based technologies in solid waste management that Bio4HUMAN will be looking for?

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*A photograph showing **the Waste Advantage Magazine** as an example of innovative technologies pioneering more sustainable waste management practices.*

Bio-technology in solid waste management

- composting (incl. rapid composting)
- bioremediation
- waste biorefineries (incl. anaerobic digestion)
- black soldier fly biowaste processing
- vermiculture
- the innovative resource recovery technologies

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What role could the biorefinery concept play in Bio4HUMAN considerations?

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Biorefinery/Biorefineries

Defined as the conversion of biomass into several product streams (materials, chemicals, energy, food and feed) and the integration of various technologies and processes.

Have the potential to be integrated in a wide range of environments, from small scale plants using agricultural residues to large plants using waste from surrounding industries and municipalities.

Include the sustainability management practices and wherever possible – closed loop processing cycles.

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Commercial-scale biorefineries funded by CBE-JU
-Examples-

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CIRCULAR BIOCARBON (Spain,Italy) / two first-of-their-kind biorefineries converting urban waste into four value added products / using innovative circular approaches

ReSolute (France) / biorefinery established to provide a biodegradable, harmless and bio-based solvent alternatives to the fossil based chemicals / using waste from pulp and paper industries as renewable raw material

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Bio4Human – on the lookout for bio-based innovation waves!

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potential of nature's biological functions

+

abilities of available technologies

→

bio-based innovations

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Practical examples of “bio-based innovative solutions” with potential relevance for Bio4HUMAN

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solutions for replacing non – renewable materials with concrete products conveying sustainability

solutions for transforming the waste and utilizing it for innovative products with high energy efficiency and low impact on the natural environment

new and original applications of residues – as a standalone resources or after further processing and mixing

ideas for recombining the biobased materials and further ingredients

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Conclusions/thesis for discussion

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Bioeconomy in general and the particular multiple sectors constituting bioeconomy are developing rapidly.

The bioeconomy sectors are delivering new and innovative bio-based solutions.

From the Bio4HUMAN perspective, the bio-based products and bio-based technologies shall get the most attention.

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Conclusions/thesis for discussion

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The bio-based products with a potential of productive involvement into the humanitarian operations are already in the market, with more products being in the state of further technological development.

Innovation plays a key role in the development of circular and bio-based products, also these with the potential application in the humanitarian settings.

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Conclusions/thesis for discussion

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The management of bio-based wastes and bio-remediation is one of the pillars of the bioeconomy.

The subject of solid waste management is also vividly present in the theoretical and practical framework of circular bioeconomy.

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Conclusions/thesis for discussion

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Innovative bio-based technologies dealing with wastes and residues are supposed to be key areas of Bio4HUMAN considerations.

Interesting developments, also thanks to the EU projects, are taking place in the biorefinieries processes, utilising different kinds of waste and transforming these wastes into value added products.

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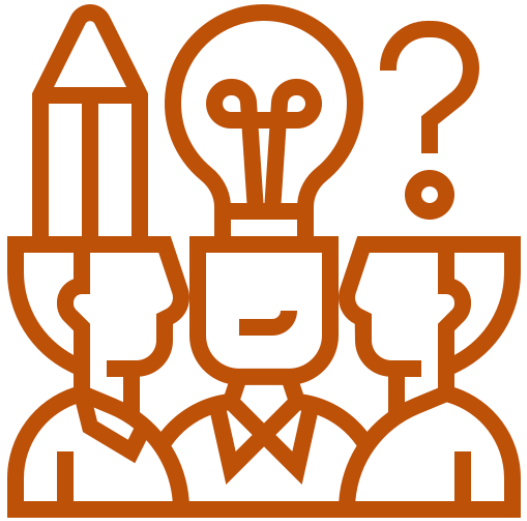
Lets us now jointly discuss the potential positive interactions between bioeconomy/ bio-based solutions and the humanitarian interventions



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Thank you!

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