



EU needs more from bioeconomy

Recommendations by Natural Resources Institute Finland

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We are facing a polycrisis. The EU's competitiveness has been severely weakened by geopolitical tensions, the COVID pandemic and the faster economic development of our competitors. The EU's heavy dependence on imported production inputs and feedstock also poses a growing risk to our security of supply. At the same time, globally we need long-term solutions to biodiversity loss and adaptation to climate change. Sustainable bioeconomy can provide solutions to these challenges. Europe needs bioeconomy to transition from niche to norm.

The Natural Resources Institute Finland (Luke) is committed to competitive Europe enabled by Bioeconomy.

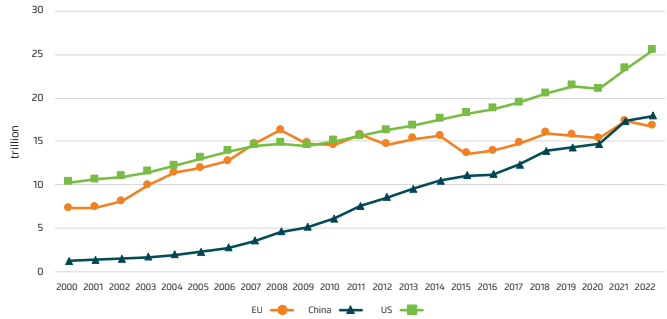
European aim for open strategic autonomy challenges us to optimize the use of our bio-based raw materials throughout the value chain. The European Union should:

1. Ensure that EU's industrial and finance policies enable bioeconomy solutions to polycrisis.
2. Create more value added from bioeconomy.
3. Reduce the dependence of the EU food system on imported production inputs.

Bioeconomy needed to boost EU's global competitiveness and value added

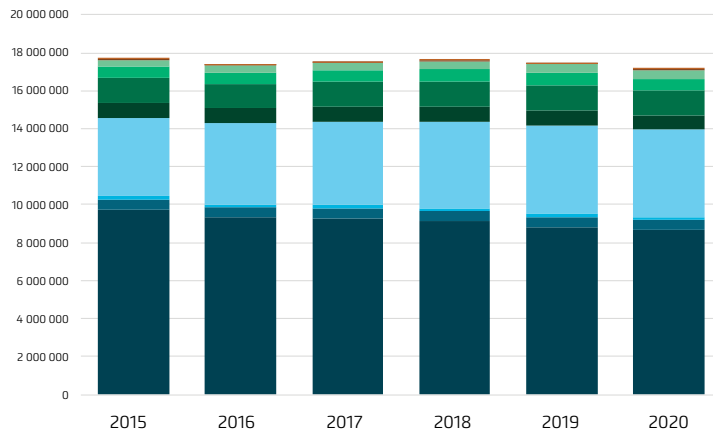
The US and China are overtaking Europe in GDP growth as shown in Figure 1. The future competitiveness of the EU will largely depend on how well research and innovation actions succeed in developing, up-scaling, implementing and commercializing new innovative sustainable solutions.

Figure 1 | GDP development in the US, China and the EU¹.



Bioeconomy has potential to boost EU's value added. However, the development of bioeconomy value chains has recently been forgotten (see Fig 2A and 2B).

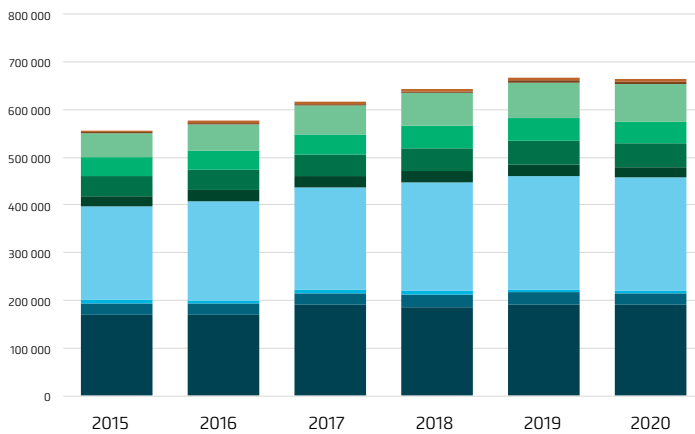
Bioeconomy - employed people



Figures 2A and 2B | Bioeconomy trends in the EU: employed people and value added in bioeconomy².

- Bio-based electricity
- Liquid biofuels
- Bio-based chemicals, pharmaceuticals, plastics and rubber (excl. biofuels)
- Paper
- Wood products and furniture
- Bio-based textiles
- Food, beverage and tobacco
- Fishing and Aquaculture
- Forestry
- Agriculture

Bioeconomy - value added



¹ The World Bank. Data for United States, European Union, China. <https://data.worldbank.org/?locations=US-EU-CN>. Accessed on 21/02/2024.

² European Commission. Jobs and Wealth in the European Union Bioeconomy. <https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html>. Accessed on 21/02/2024.

Goal 1

Ensure that EU's industrial and finance policies create bioeconomy solutions to polycrisis



Bioeconomy should be an essential part of the EU's industrial policy. It is in a key role in green transition and in enabling the EU to move beyond the use of fossil raw materials. **It is time to harmonize the objectives and priorities of circular bioeconomy, bioeconomy, and industrial and financial policies.** In addition, regulatory and sectoral frameworks need to support development in a coherent way.

Bioeconomy and RDI solutions can enable the EU to pursue open strategic autonomy and reduce its dependence on fossil-based energy and imported inputs, such as fertilizers necessary for food production.

Recommendations

- Respond to the polycrisis by increasing the EU RDI budget.
- Focus on strategic competitiveness. EU funding should be aligned with the EU's strategic competitiveness objectives. More focus on the bioeconomy is needed, closely integrated with industrial and financial policy development.
- Focus more on building long-term competitiveness rather than just providing manufacturing subsidies in the EU's Multiannual Financial Framework³. This would help to build European open strategic autonomy combining elements such as the economy, competitiveness, adaptation to climate change, biodiversity loss and RDI activities in the bioeconomy.
- Strengthen the role of bioeconomy in EU industrial policy and ensure the acceptability and competitiveness of biomass sourcing.
- Emphasize collaboration between research, finance and industry to stimulate investments leading to high value-added production using bio-based raw materials.

Goal 2

Create more value added from bioeconomy



Forest industry value added peaked at the end of the golden age of glossy printing papers, which ended with the collapse of the US housing market in 2008 and the subsequent economic crisis. Since then, the value added of forest products has partially recovered, albeit due to increased production volumes rather than manufacturing higher value added products.

Forest biomass is a source for bio-based materials and chemicals that can first substitute fossil-based materials and chemicals, and later be refined into more functional products. For example, wood should be used in long-term construction products or processed into high-value products, such as packaging, textile materials or even carbon fibers.

Currently, several EU policies focus on the role of forests as carbon sinks. Recent studies in the LULUCF sector show that, **despite ambitious goals, natural carbon sinks are declining.** The new target of the EU Commission is to reduce emissions by 90% by 2040 and to increase the size of technical carbon sinks to 280 Mt CO₂/a.

Biogenic carbon from forest industry is a huge opportunity for both the forest sector and the hydrogen economy, as both require sustainable carbon for their products. EU-level support for biogenic carbon capture and utilization is needed to accelerate European technology development. This could lead to novel value-added and climate-smart products from CO₂ as well as increased cost efficiency of technological carbon sinks.

Recommendations

- Strengthen research and innovation actions to support the whole value chain from biomass production to processing and value-added products.
- Support industrial scale demonstrations and the creation of the whole value chain from raw materials to high quality and branded products (see Fig 3).
- Utilize biogenic carbon to its full extent by
 - setting a policy goal for technological carbon sinks for 2040 and securing access to CO₂ storage sites;
 - promoting bio-based CO₂ capture and utilization concepts in the hydrogen economy, leading to industrial demonstrations.

Case Finland:

More value added from forests - textile value chain

Luke's report⁴ shows that in Finland significantly higher value added can be expected from the forest industry. This would be possible through investing in product portfolio renewal and the creation of novel ecosystems. Unfortunately, in the textile industry,

for example, the industrial value chain is broken and the main industrial players are located in China or in other countries outside Europe. **Finland lacks the value chain from raw materials to high quality and branded finished textile products.**

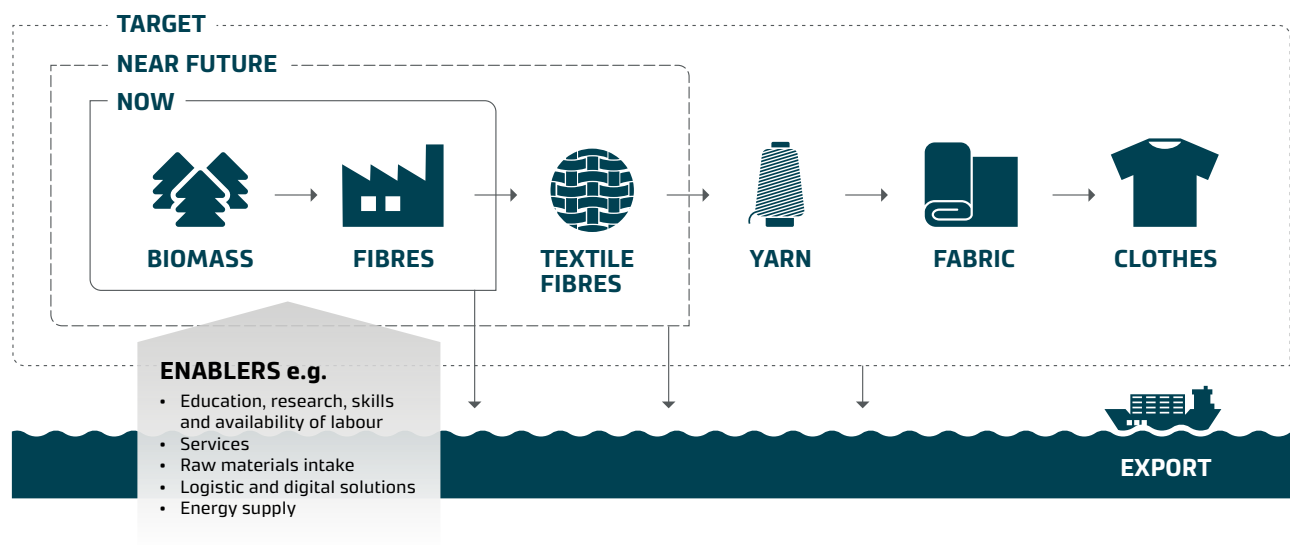


Fig 3 | The whole forest-based textile value chain is still undeveloped in Finland and the value added is created especially in the end of the chain.⁴

Goal 3

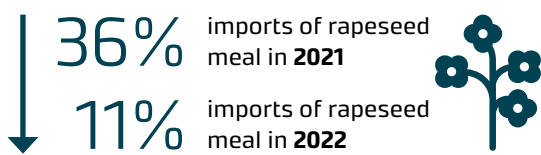
Reduce the dependence of the EU food system on imported production inputs

The EU food system contributes significantly to the socio-economic development, security of supply and well-being of the region. Agriculture supports the livelihoods of millions of people across the EU. High quality EU agricultural products are sold worldwide, contributing to a positive trade balance. On the other hand, **the EU is dependent on external inputs such as nutrients, but also key food and feed components like proteins, sugars and oils.** Russian import has been declining since 2022 in some ingredients.



EU needs policy for comprehensive security

In Finland, there has been a rapid change in rapeseed meal import from Russia⁵. Russia's share of rapeseed meal imports was 36% in 2021 and only 11% in 2022. Imports from Russia have been replaced by imports from Eastern European countries. In this example a rapid change has been possible but e.g. moving away from imported fertilisers is more complex. Europe can reduce the dependence on imported production inputs, but the actions are still partly missing.



Improved self-sufficiency, together with the pressure to meet carbon neutrality and biodiversity targets, is a multifaceted challenge for the EU as it strives for strategic autonomy. **Increased resilience is needed and can be promoted through diverse and integrated current and new food production systems.**

Recommendations

- Invest in research, technology development and innovations to improve Europe's resilience and self-sufficiency in nutrients, energy and food components.
- Support the development of strong regional business clusters and value chains promoting circular bioeconomy principles in order to:
 - ensure resource efficiency in the food chain;
 - reduce local dependency on imported inputs;
 - enable coherent collaboration between different stakeholders.
- Educate the new generation of farmers to be capable to adapt and use new technologies, tools and business models created through the RDI process, e.g. precision and regenerative agricultural practices, digital technologies and European data spaces.
- Identify the linkages between land use, new challenges in providing comprehensive regional security and the need to increase the value added of the food sector.

Case Finland:

More resilience and food security from the Northern food system

Drastic droughts in southern Europe and extreme weather conditions in many regions are shifting the food system towards northern Europe. Northern Europe can play a greater role in Europe’s food security and self-sufficiency.

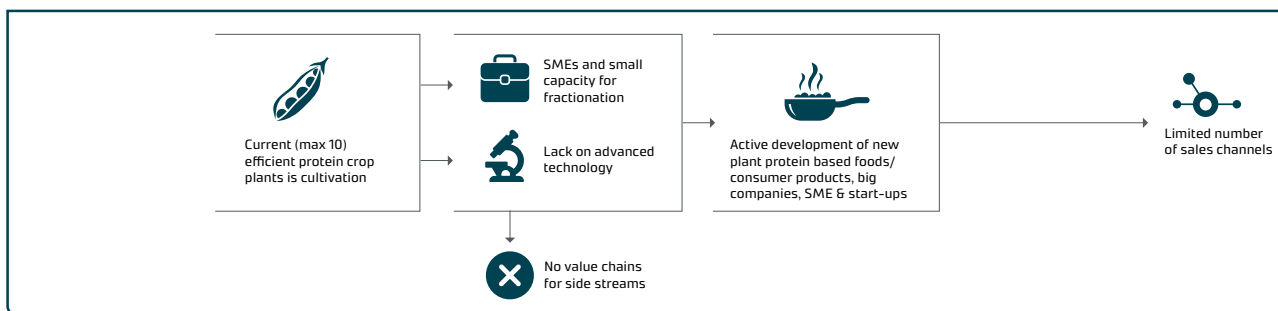
The potential to build a strong and competitive plant protein business in Finland has been identified in our recent report⁶. This will help reduce dependence

on imports of protein for food and feed from outside Europe, increase healthy crop rotation on farms and reduce the need for nitrogen nutrients in agriculture.

To reach this, there is a need for reorganization and increased collaboration in the food chain between current and new players, as well as support for new plant breeding technologies, farming practices, and the coherent development of new food legislation.

The plant protein value chain in Finland - What is needed?

NOW



FUTURE

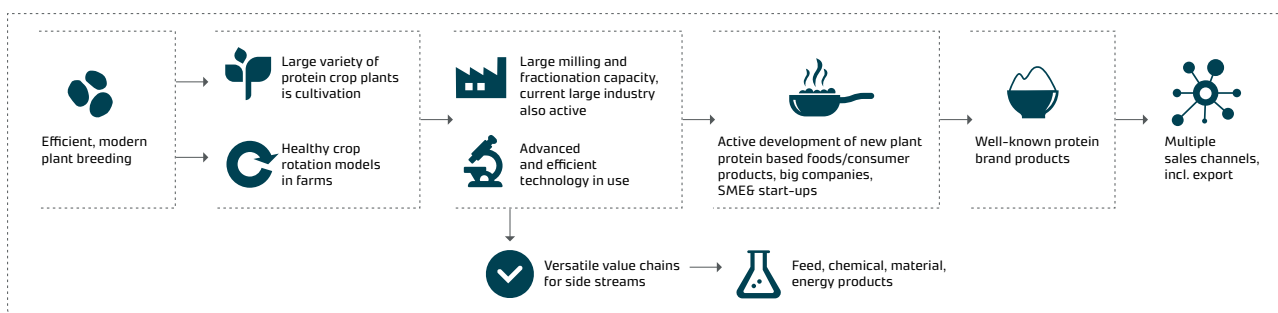


Figure 4 | Development of the current and new plant protein value chains can only be enabled by having old and new stakeholders playing along.

We build sustainable future and well-being
from renewable natural resources.



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