BIOECONOMY CONCEPT PAPER

EXECUTIVE SUMMARY

HUNGARY

EXECUTIVE SUMMARY OF THE STRATEGIC CONCEPT PAPER FOR BIOECONOMY: HUNGARY

THE NEW PARADIGM FOR LAYING THE FOUNDATIONS FOR A SUSTAINABLE, CARBON-NEUTRAL AND RESILIENT AGRICULTURE AND RURAL AREAS

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"Vision without action is merely a dream. Action without vision just passes time. Vision with action can change the world." - Joel A. Barker

1.1. Introduction

Thanks to the considerable biomass potential and other factors like industrialization, increasing productivity and joining global food chains, the agriculture became a prosperous and profitable economic sector during the last decades in the Central and Eastern European region (CEE). However, the global population explosion, urbanisation, economic growth, changes in production and consumption patterns have put ecosystems and natural resources (water, topsoil, air, biodiversity) under enormous pressure. The unsustainable use of natural resources and the consuming society model have triggered a crisis in the production as well as in the consumption models and has increased the risks of collapse of biological, social and economic systems in the near future. The increasingly frequent geopolitical conflicts also point to the fact that the tried and tested schemes of the past as well as the historical statistical data can no longer provide satisfactory answers to the challenges of our time. A durable solution requires a paradigm shift in economic thinking towards a new type of economy by ground-breaking interdisciplinary research.

1.2. The background of the document

With the above mentioned changes in mind one of the most pressing challenges for CEE (and Hungary included) region is to put the linear type agriculture, forest, aquaculture and food systems on new foundations and pathway to make them resilient and sustainable as well as to preserve the ecosystems and biomass production ability for future generations. Building long term strategy, developing scenarios with different outcomes and harmonizing the biomass-related existing strategical documents have key importance in order to see the biomass need of bio-based industries in a system together with the biomass production. There are numerous different national strategies in Hungary dealing with biomass, so it is necessary to create policy coherence among them. The bioeconomy concept is the one that can create the coherence with the help of a conceptual umbrella type document like this, which contains the main principles of circular bioeconomy, set the framework for a national bioeconomy strategy and action plan development, and could serve as a reference for future strategies having biomass implications. The BIOEAST Initiative with methodological support of the European Union in the framework of BIOEASTsUP project (financed by Horizon 2020 program) backed the development process of a knowledge based agriculture, forestry and aquaculture which is one of the most important features of the bioeconomy.

The concept paper has a triple goal. Firstly, the Ministry of Agriculture intends to generate deeper discussions on national level on the necessity of paradigm shift in economic thinking regarding renewable natural resources like biomass and the carrying capacity of an environment without which the circular economy and sustainable development cannot be achieved. Secondly, the team members would like to bring the current agricultural challenges into public consciousness, to raise awareness and to direct attention to the circular bioeconomy as a promising tool in order to respond to global and regional challenges caused by the fossil era

and the ruling economic models that support successive industrial revolutions based on excessive resource use. Thirdly, we are going to demonstrate the wide range of options to create added value and the conditions for doing so.

As circular bioeconomy thinking is at an early stage in Hungary, the main intention of the bioeconomy workshops being led by the Ministry of Agriculture is to make the initial steps toward a deeper dialogue with stakeholders on agricultural challenges to find system-level solutions. This document serves these purposes. It builds on the idea that the above complex challenges cannot be answered using the existing toolkit of mainstream economic thinking. It is necessary to build new context and launch long-term action programs that are leading to paradigm shift. In the shadow of recent geopolitical tensions and epidemics sweeping through the world the necessity of finding systemic solutions is more relevant than ever.

The concept paper emphasizes the need of systemic thinking approach in order to coordinate the biomass production and demand effectively in a sustainable way bearing in mind that (i) biomass is a strategical raw material and (ii) systemic changes have huge research, development and innovation needs. In the light of these we have to set the directions of R+D+I, as well. The document also points out that restoring the disturbed balance of the atmosphere as soon as possible has become a crucial issue not only because of human involvement, but also in terms of stable biomass supply and stably functioning productive system in the future. All the countries and sectors must play a responsible role in achieving this goal.

1.3. Promising solution: the bioeconomy concept

As B. Kovacs points out, bioeconomy refers to the sustainable conversion of biomass, bio-based resources into a portfolio of marketable products, which may include, even in a single process, the production of food and feed, chemicals and other biomass-based industrial products, and bioenergy (heat, power, fuel). The concept treats biomass production and processing as a single system. It builds a new context in which biomass is seen as a resource and focuses on the identification of new potential resources (waste, marine). It also puts technology in a new light: in the context of the raw material production, industry, energy and services sectors available biological resources are processed (bio-refined) to create added value, even new business model(s). In this way bioeconomy is a new approach that help making bio-based sectors and rural areas sustainable. The essence of bioeconomy is defossilization that is we replace “old carbon” created in millions of years with organic “new carbon” of renewable origin with a timescale of between 1 and 10 years. The renewable carbon comes from living systems existing in a natural environment in equilibrium with the atmosphere. The circular bioeconomy is more than circular economy of biomass that takes into account the entire life cycle of products. It is a new techno-socio-economic paradigm of production and consumption based on biomass offering an alternative to the challenges of the fossil economy and supporting systemic thinking.

1.4. Main findings of the SWOT and macro context analysis and the recommended priorities to be focused in strategy planning

In order to get a true picture of the country the author used several reports co-created by the BIOEASTsUP project members as well as made by other experts of the country and the European Union like the Joint Research Centre (JRC) of the European Commission's in-house

science service. The SWOT and macro context analysis provides an overview of the foundations on which the Hungarian national strategy can be built. Benchmarking tool helped us measuring some key data and comparing them against other countries having more developed bioeconomy thinking or similar opportunities to understand where we needs to improve the country performance.

- Hungary similarly to other CCE countries has huge biomass potential, and the soil is the primarily place of biomass formation. It is in the group of countries where agricultural landscapes dominate the countryside (60%). The sector provides high quality food and has a significant share in the food supply of other countries like Germany, Romania and Italy. The total domestic biomass production originates from agriculture, forestry, and aquaculture. Due to the increased rate of biomass extraction and over-industrialized production the soil organic matter stocks have declined during the last decades. Parallel with it since 1990, the area under cultivation in Hungary has decreased by more than one million hectares. In 1990, there were 8.24 million hectares of arable land in Hungary, which has decreased to 7.2 million hectares by 2019 because of urbanisation, industrial relocation, urban, infrastructure and resort development, mining and waste disposal.[1]

  → Land protection, stopping land degradation and extraction should be the top priority and we should find the proper balance in the distribution of biomass for different purposes (e.g Straw should primarily play a role in soil recharge, and the remaining part should be used in the energy sector.) It is more urgent than ever that the use of biomass should be seen in a system if we want to avoid disruptions in supply chains.

- Despite the significant biomass potential, the country is not entirely exploiting the value-added creation. A relatively high share of unprocessed biomass leaves the country and returns in form of value-added processed products.

  → That means there would significant room for manoeuvre for creating high added value products on domestic level.

- There are serious gaps in data collection which can be a severe handicap for the implementation of systemic thinking and planning.

  → It is highly suggested to map biomass potential, the existing value-chains, the relevant market players and interactions between them.

- Statistics are primarily about the past and these cannot inform us on the possible changes in the future.

  → We need to use the toolkit of scenario analysis to prepare the worst-case scenarios, as well.

- The banking sector is generally too cautious related to the green financing despite important initiatives have emerged in this segment and most bank CEOs refers to the importance of it. Energy efficiency programmes are the main focus of interest for banks. The financial system combined with public programmes and funds (e.g. public procurement[2]) can be an important driver of change. The cohesion funds, CBE JU and Horizon Europe funds, CAP funds, domestic funds may extend the financing opportunities and the field of

[1] https://www.agrarszektor.hu/fold/20210115/mennyire-es-mitol-fogy-a-hazai-termoterulet-27208
[2] https://www.portfolio.hu/uzlet/20221223/elfogadta-a-kormany-az-oteves-zold-kozbeszerzesi-strategiat-586850
https://ceelegalmatters.com/hungary/19084-green-finance-in-hungary
https://www.greenfinanceplatform.org/research/green-finance-hungary
https://www.portfolio.hu/bank/20221228/mi-lesz-a-magyar-bankokkal-2023-ban-elmondtak-nekunk-a-bankvezerek-586878

research and innovation. There has not been culture of venture capital financing in the region, nor of financing innovation by outsider firms or private investors.

→ An overall and transparent financing map could be an effective tool for entrepreneurs to find the proper fund for reaching their goals.

- Hungarian agriculture is one of the lowest in EU countries in terms of productivity. The biggest challenge for the country is how to increase it parallel with reaching carbon neutrality and biodiversity targets. The lack of willingness of bioeconomy stakeholders to innovate or join R&I consortium is a big challenge as well as the low level of R&D resources are major obstacles to development.

  → The financing research and education can accelerate modernisation. Also the creation of innovation ecosystems could be a good opportunity to boost willingness of innovation. As defined by Gobble innovation ecosystems are dynamic, purposive communities with complex, interlocking relationships built on collaboration, trust, and co-creation of value and specialising in exploitation of a shared set of complementary technologies or competencies.[3]

- In Hungary some sectors (like woodworking industry or other creative industries) suffer from the absence of skilled labour. [4]

  → Training and education are needed to meet new skills requirements. Modern forms of vocational training should be used alongside traditional training.

- Education must not only meet current market needs, but also should take steps towards the future, taking into account the development tendencies of one or another discipline, scientific knowledge in general, scientific and technological discoveries and prospects of their usage in future, goals and directions of national and EU strategic documents.

  → The strategy planners should learn the methodology of writing foresight studies looking ahead more decades, and presenting the important conclusions for political decision makers.

- In Europe one of the most effective drivers of bioeconomy is the Western European policy making itself both on national and EU level in order to reach climate neutrality by 2050. Their good example can be a driving force for the CEE region, too.

  → The policy-science dialogue should be accelerated in order to transmit the necessary messages to the level of political decision-makers.

To summarize: similarly to the experiences of other CEE countries the biggest barriers to the bioeconomy development in Hungary are:

- the lack of long term vision and strategy how to put the bio-based sectors on sustainable path both on governmental and business level;
- the lack of mapping biomass potential and the systemic approach on how to distribute it among different sectors;
- the lack of cross-sectoral dialogue in policy making;

[3] OveGranstranda – MarcusHolgersson: Innovation ecosystems: A conceptual review and a new definition https://www.sciencedirect.com/science/article/pii/S0166497218303870#:~:text=An%20innovation%20ecosystem%20refers%20to,services%20(Moore%2C%201993).

[4] https://www.butorszovetseg.hu/kutatas

- lack of local businesses with strong financial and innovation background who could accelerate changes and create new value chains;
- lack of thinking in regional and larger landscape units;
- missing well-functioning green finance culture;
- the cooperation between the different actors is weak.

Naturally there are external factors, as well like trends and threats which have effect on the existing system and generate changes. At the same time, these factors also represent an opportunity to get the most out of the changes.

1.5. Principles of a future implementation plan

In the light of the above mentioned challenges the main pillars and suggested principles of the implementation plan should be:

- Cascading use: Rationalising the use of domestic biomass potential and coordination of biomass needs by cascading use
- Food first and healthy diet: The food first principle remains in force, in this way supporting local, organic food production and healthy diet have key importance
- Systemic thinking: Strengthening systemic thinking in order to generate real paradigm shift both on production and distribution level
- Value added creation: Supporting value added creation and extension of existing value chains parallel with reducing dependence from global value chains
- Multi-stakeholder approach: Mapping biomass potential and developing a common, long-term vision by the involvement of wide range of bioeconomy actors (multi-stakeholder approach)

In this context the principle means fundamental rules that serves as the foundation for a system and is a permanent feature of successive strategies.

1.6. Suggested intervention points for Hungary

By grouping the challenges, the Ministry of Agriculture has identified five focus areas where the most visible results can be achieved in the medium term among the traditional thinking market players:

1. **Supporting the small scale, newer generations of biorefineries**

- **Challenges**: Hungary is heavily dependent on imports of natural gas from areas hit by geopolitical conflicts. Without systemic thinking the energy crisis may generate huge damages in biomass potential if we substitute fossil raw materials with biomass.
- **Opportunities**: The recovery of organic by-products and wastes support the transition to climate neutral energy production and defossilisation of industries like textile, plastics, pharmaceutical sector and energy production. By applying biorefinery concept we can replace several traditional chemicals by advanced bio-based materials.
- **Intervention:** Hungary should making a biorefinery action plan with the involvement of relevant stakeholders and by applying fact-based approach to map and monitor (the sustainable) biomass availability, to optimize biomass production and use, to create value-added products, to support local markets while maintaining biodiversity and preserving the environment, and to find the role of biomass in energy mix.

2. **Firmament of safe food system and supporting healthy diet**

- **Challenges:** Households are generating valuable biological waste meanwhile recycling is not solved. Global crises (environmental, geopolitical and economical) may generate problems in food/feed security.
- **Opportunities:** Biological waste can be a valuable feedstock by applying biorefinery concept. Soils can be regenerated by composting green waste. The diversification of the raw material base and changing eating habits can make our diet healthier.
- **Intervention:** By supporting new business models and innovative start-ups added value can be made from biological waste. Awareness raising helps us to make the healthy way of life more popular. Supporting biodiversity, crop diversification, drought damage relief, prevention programmes also support the firmament of safe food system. Digitalization may increase the efficiency in food industry.

3. **Preservation and strengthening of biomass production potential**

a. with special attention to forests and added value creation

- **Challenges:** Unfavourable climate change in the Carpathian Basin causes significant damage to the forest population. Rapid changes can upset the ecological balance of our native tree stands. Because of decline in the growth of trees and decrease in the amount of timber less renewable raw materials will be available. Huge amount of wooden biomass leaves the region and return in the form of value added manufactured products.
- **Opportunities:** By shorten the value chain the atmospherical CO2 can be decreased mitigating the effect of climate change. The home made products increase the GDP and employment rate.
- **Intervention:** Creating new and updating existing research infrastructures, increasing the human resources in number of researchers and skilled workers are essential for value added creation. It is also very important to promote by public tools the use of wood as a durable structural material in order to replace more energy-intensive building materials.

b. with special attention to soil and biodiversity

- **Challenges:**. Due to the increased rate of biomass extraction and over-industrialized production the soil organic matter stocks have declined. Global warming and the increasing water demand would potentially result in water shortage, which threaten the present ecological status of waters and biodiversity.
- **Opportunities:** By increasing the efforts to understand the effects of extreme climate events policymakers may give more adequate answers to climate change. Pond aquaculture is the most resource-efficient animal protein production and fish farms may contribute to preserve biodiversity. It has also important role in the better way of water management retaining the water to the drying landscape.
- **Intervention:** Increasing the amount of organic matter returned to the soils by at least 30% during the period of 2021-2030. There is a need to develop and maintain large experimental research infrastructures, as well. We should pay more attention to awareness raising in order to keep our soil healthy.

4. **Permanent storage of captured carbon, combined with other uses**

- **Challenges:** The spectacular development of industry, the advance of urbanisation, the globalisation of trade have all contributed to the creation of carbon balance deficit, which is inevitable to be rebalanced, since the increasing frequency of atmospheric disturbances clearly shows how harmful and risky the increased carbon dioxide concentration is.

- **Opportunities:** Carbon capture utilization storage technologies will play an important role in meeting net zero targets, including as one of few solutions to tackle emissions from heavy industry and to remove carbon from the atmosphere.
- **Intervention:** Initiate a debate about the issue with the relevant stakeholders and build a concept paper on the topic, if necessary.

1.7. Conclusion

1. Having regard to the fact that unlocking the potential and widespread application of bi-oeconomy concept has huge development and financial need, without high level political support the concept could remain of secondary importance to the stakeholders.
2. In order to response the above mentioned challenge new forms of cooperation (like stakeholder approach; policy-science dialogue; academic ecosystem; national level workshops for building common, long term visions and strategies; common financing and business models etc) would be worth exploring and applying.
3. Climate change and other global crises pose huge challenges not only for future gener-ations, but also for the current ones. It is increasingly clear that the challenges of our time cannot be solved in the framework of mainstream economic thinking. For imple-menting the paradigm shift the policy makers need new models which support them to lay the foundations for carbon-neutral and resilient agriculture.