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OPPORTUNITIES FOR BIOECONOMY IN CENTRAL AND EASTERN EUROPEAN COUNTRIES

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Abstract: *During the last years, the strategies and policies in the world have moved to bioeconomy concept. However we define the bioeconomy, the future of humanity will have to focus on this concept and what derives from it. For European countries, whether EU states or non-EU countries, the bioeconomy will play an important role in their national economy, by policies and strategies promoted. The goals of this paper are to present the bioeconomy concept, the EU bioeconomy strategic agenda, the state of the national bioeconomy strategies creation and implementation at EU level, and the main opportunities and challenges for CEE countries. To carry out this work, data available from different European bodies with responsibilities in this field were used. A text analysis of these documents, a comparative analysis of the implementation stages, as well as forecasts on the chances of approval and implementation of these strategies in the next period were performed. Part of the results of this study is based on the analyses carried out within the Horizon 2020 project "Advancing Sustainable Circular Bioeconomy in Central and Eastern European countries" (BIOEASTsUP). Through the results of this research we consider that, we can offer a broad perspective on the bioeconomy at the level of the EU, CEE countries, as well as Romania, with their own characteristics, opportunities and challenges for the near future.*

Key words: *Bioeconomy, EU Strategic Agenda, National strategies, CEE countries*

JEL classification: *Q57*

INTRODUCTION

During the last years the strategies and policies in the world have moved to bioeconomy concept. For European countries, whether EU states or non-EU countries, the bioeconomy will play an important role in their national economy, by policies and strategies promoted. Not all EU countries created a national bioeconomy strategy. At the end of 2019, only nine EU countries developed a dedicated bioeconomy strategy at national level and other six had dedicated bioeconomy strategy at national level under development (https://ec.europa.eu/knowledge4policy/bioeconomy/country/austria_en). Generally, the countries from Central and Eastern Europe (CEE) are at different stages as regards the creation and the implementation of their national bioeconomy strategies according with bioeconomy strategy that was established at EU level in 2012. Romania is at the beginning of the process, the first steps were already done, but there are many others that must be realised to fulfil the objectives of EU Strategic Agenda. This is the reason why the subject is important and actual for the future evolution of the EU economy and not only.

The objectives we considered in the elaboration of this paper refer to the presentation of the concept of bioeconomy in general, the presentation of the EU's Strategic Bioeconomy Agenda, the stage of creation and implementation of national bioeconomy strategies at EU countries level and last but not least, we will offer ideas of how to create the national bioeconomy strategy in Romania. The main characteristics and differentiations in the evolution of the creation of the national bioeconomy strategies will be analysed, the advantages resulting from their implementation for the states that already have a bioeconomy strategy will be highlighted, what are the opportunities for their implementation and the main challenges for CEE countries will be identified. The benefits of changes in national strategies are many and can be the winning keys to solving all the problems we face today. That is why the opportunity to develop a bioeconomy strategy in line with EU regulations must not

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be lost, so that it is approved and operational at the beginning of the 2021-2027 financial programming period, and EU funds for this purpose can be absorbed.

MATERIAL AND METHODS

To carry out this work, the data available at the level of the European Commission, the European Parliament and other European bodies with responsibilities in this field were used. National data from some EU countries, approved or debated official documents on the bioeconomy were also used. A text analysis of these documents, a comparative analysis of the implementation stages, as well as forecasts on the chances of approval and implementation of these strategies in the next period were performed. Part of the results of this study is based on the analyses carried out within the Horizon 2020 project "Advancing Sustainable Circular Bioeconomy in Central and Eastern European countries" (BIOEASTsUP), funded by the European Commission for the period 2019-2022.

RESULTS AND DISCUSSIONS

There are many definitions for bioeconomy. For instance, the European Commission states "bioeconomy comprises those parts of the economy that use renewable biological resources from land and sea – such as crops, forest, fish, animals, and micro-organisms – to produce food, materials and energy." (<https://youmatter.world/en/definition/bioeconomy-definition/>) With other words, "the bioeconomy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy independently of the processing technologies. It thus includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, bio-technological and energy industries." (<https://bioeast.eu/bioeconomy/>) According to Birner's paper citing the White House's National Bioeconomy Blueprint (2012) "bioeconomy is one based on the use of research and innovation in the biological sciences to create economic activity and public benefit. Birner further adds that the U.S. bioeconomy is all around us: new drugs and diagnostics for improved human health, higher-yielding food crops, emerging biofuels to reduce dependence on oil, and biobased chemical intermediates, to name just a few." (<https://youmatter.world/en/definition/bioeconomy-definition/>) In a simple way "Bioeconomy can be seen as a knowledge-based production and use of natural/biological resources, together with biological processes and laws, that allow providing economy goods and services in an environmentally-friendly way." (<https://youmatter.world/en/definition/bioeconomy-definition/>) However we define the bioeconomy the future of humanity will have to focus on this concept and what derives from it.

The European Commission adopted the Strategy "Innovating for Sustainable Growth: A Bioeconomy for Europe" in 2012. The document includes the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions and the Bioeconomy Action Plan. The goal of the document is to emphasise the importance of the bioeconomy for Europe in addressing major societal and economic challenges and to create a more favourable environment for its realisation (EC, 2012). The text starts from the premises that the world population will reach 9 bil.in 2050 and the natural resources are limited. This is an important reason for EU to look for solutions to keep a balanced development of economies having in view the ecological and environmental aspects, the energy, food supply and the limitation of the natural resources. The Bioeconomy Strategy and the Bioeconomy Action Plan are focusing on three key aspects (EC, 2012):

- developing new technologies and processes for the bioeconomy;
- developing markets and competitiveness in bioeconomy sectors;
- pushing policymakers and stakeholders to work more closely together.

The Strategy elaborated complements other EU policies like the Common Agricultural Policy, the Common Fisheries Policy, the research programs/projects in frame of Horizon 2020, European environmental initiatives, the Blue Growth initiative for the marine sector and the European Innovation Partnership on Sustainable Agriculture.

The Strategy has in view the societal challenges: ensuring food security, managing natural resources sustainably, reducing dependence on non-renewable resources, mitigating and adapting to climate change, creating jobs and maintaining European competitiveness. To develop a coherent bioeconomy there are specific actions that maximize the impact of the Strategy. First is needed a coherent policy, at EU, national and regional level. Secondly, investments in knowledge, innovation and skills are necessary. Thirdly, participative governance and informed dialogue with society will ensure the success of the Strategy. Finally, new infrastructures and instruments are expected like integrated and diversified biorefineries, including small-scale local plants.

The Bioeconomy Action Plan describes the Commission's main actions for the implementation of the Bioeconomy Strategy objectives. It has twelve objectives, in three major areas, which refer to: Investments in research, innovation and skills, Reinforced policy interaction and stakeholder engagement, Enhancement of markets and competitiveness in bioeconomy, each with four objectives. Investments in research, innovation and skills have in view: Research and innovation funding (Horizon 2020), Leadership in biosciences, Implement multidisciplinary education programmes across the EU, Increasing opportunities for high- and low-skilled labour forces. Reinforced policy interaction and stakeholder engagement has in view: Creating a favourable environment for the bioeconomy: policy coherence and cross-sectoral interaction, Policy coherence, Improved policy interactions, Engaging society, reaching end-users and linking with policy makers, Regional approaches, International cooperation for a global bioeconomy, Social innovation. Enhancement of markets and competitiveness in bioeconomy has in view: Agriculture and forestry (Land use and the transition towards more sustainable production, Agriculture and climate change, Livestock production, Forestry, Policies and public goods, Agricultural advisory and support services, extension services), Fisheries and aquaculture (Sustainable fisheries, Sustainable aquaculture, Marine biotechnology), Bio-based industries (Biorefineries, Waste as an alternative biomass source, Biotechnologies, Bio-based products), Food chain (Resource efficiency, Food waste, Packaging, Food safety, Nutrition and dietary choices).

The document also includes a series of actions which are necessary for the implementation of the objectives, which are not discussed in this paper. The reason and the justification of the EU Strategic Action Plan derive from the roles the EU has in the world as regards the future economic development. They are synthetizing as follows: A common view and a global answer for the main challenges, Overall economic added value in a single market, A stronger EU commitment, The benefits of EU research and innovation.

The document ends with four scenarios to assess how to best unlock the innovation and employment creation potential of Bioeconomy research. The analysis of the social, economic and environmental impacts of the four scenarios will allow for identification of the most efficient one to achieve the objectives, while respecting the principles of subsidiarity and proportionality (EC, 2012). The scenarios are:

- SO1: The bioeconomy under “business as usual” conditions;
- SO2: A Non-EU coordinated Research and Innovation in bioeconomy: In this option, EU research efforts in the bioeconomy are discontinued, but are undertaken by Member States;
- SO3: The bioeconomy is supported by enhanced efforts in research and innovation: In this scenario, the bioeconomy research benefits from a new approach supporting the implementation of the Innovation Union through the Horizon 2020 programme: research is performed under an integrated research and innovation approach specifically aiming at tackling societal challenges,

and in an effort to support innovation to allow a better deployment of products and processes on the market and to enhance social innovation. It is also supported by instruments to foster excellence in the science base and create industrial leadership and competitive frameworks. The different policies related to the bioeconomy continue to work on a sectoral approach at both EU and Member States' levels;

- SO4: The bioeconomy supported by reinforced policy interaction and enhanced efforts in research and innovation: In this option, the bioeconomy is given a coherent interaction framework of supportive public policies that aim at reconciling competing activities and overlapping initiatives. Research and Innovation is structured so as to match societal challenges and policy objectives. This scenario links with the CAP and CFP, as well as industry, environment and energy related policies, due to the potential of innovation in these sectors. The future European Innovation Partnership (EIP) on “Agricultural Productivity and Sustainability” as proposed in the reform package for the CAP post 2013 and the Communication “Innovation Union” will, for example, become a key tool for inducing innovation in agriculture. Regional policy contributes to the development of new innovative businesses and infrastructures in Europe. Provision of appropriate human capital requires coordination with training and educational policies.

In 2018, the European Commission launched the new Bioeconomy Strategy for a Sustainable Europe. Actually, it is an update of the old Strategy, based on the objectives from the political program of former President Juncker and First Vice-President Timmermans of the European Commission. The document is called “A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment-Updated Bioeconomy Strategy”. Why was important to update the old Strategy? Because the research done in the last years gave us many evidences that the bioeconomy sector is huge at EU level, how demonstrates the data available for 2015 (see figure 1).

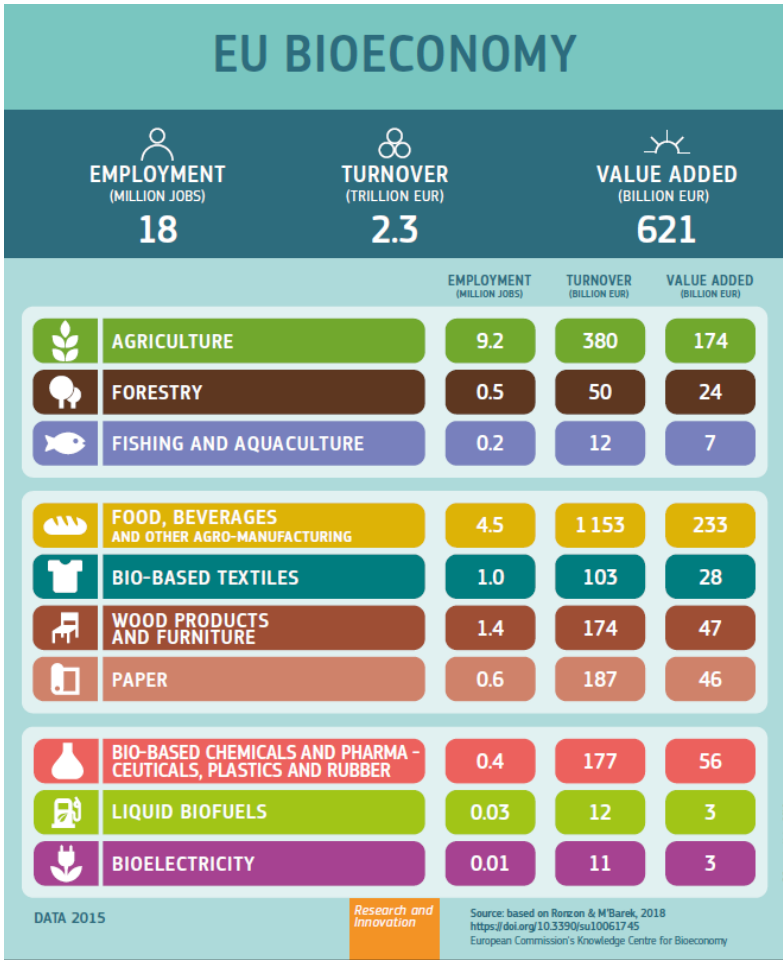


Figure 1. Bioeconomy in EU

Source: European Commission, 2018, A new bioeconomy-Strategy for a sustainable Europe

The purpose of this update to the 2012 Bioeconomy Strategy was to address these challenges through a set of 14 concrete actions. These actions reflect the conclusions of the 2017 review of the Strategy from 2012. The 2018 update of the Bioeconomy Strategy aims to accelerate the deployment of a sustainable European bioeconomy so as to maximise its contribution towards the 2030 Agenda and its Sustainable Development Goals (SDGs), as well as the Paris Agreement (https://ec.europa.eu/knowledge4policy/publication/updated-bioeconomy-strategy-2018_en). The update also responds to new European policy priorities, in particular the renewed Industrial Policy Strategy, the Circular Economy Action Plan and the Communication on Accelerating Clean Energy Innovation, all of which highlight the importance of a sustainable, circular bioeconomy to achieve their objectives. The update proposes an action plan with 14 concrete measures, based on three key priorities:

1. Strengthen and scale up the bio-based sectors, unlock investments and markets
2. Deploy local bioeconomies rapidly across the whole of Europe
3. Understand the ecological boundaries of the bioeconomy

In the next figure (2), we present the new bioeconomy concept.

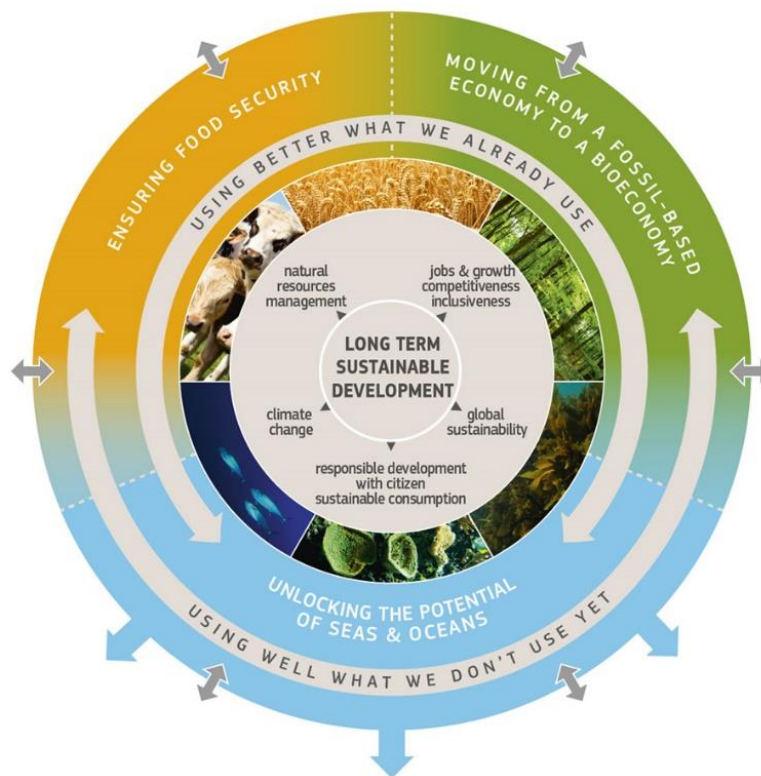


Figure 2. New EU Bioeconomy Strategy 2018

Source: https://ec.europa.eu/knowledge4policy/publication/updated-bioeconomy-strategy-2018_en

The 14 actions proposed are graphic presented in figure 3. Five of them are from the old Strategy: Ensuring food and nutrition security, Managing natural resources sustainably, Reducing dependence on non-renewable resources, Mitigating and adapting to climate change, Strengthening European competitiveness and creating jobs.

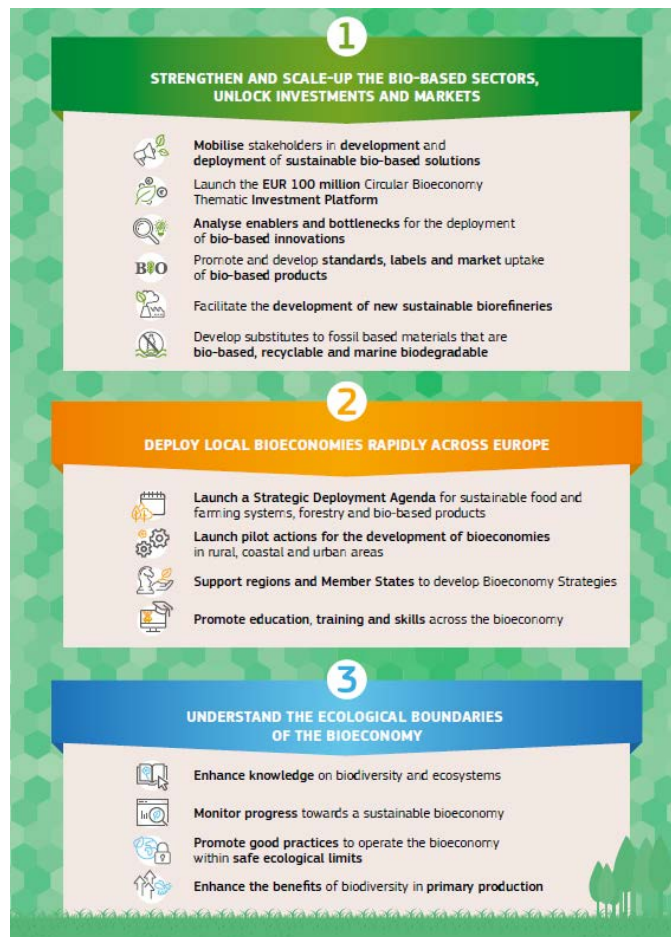


Figure 3. Actions for New EU Bioeconomy Strategy 2018

Source: European Commission, 2018, *Bioeconomy: the European way to use our natural resources-Action plan 2018*

Sustainable bioeconomy activities are deemed central to meet the Sustainable Development Goals (Figure 4), from food and nutrition security to ensuring energy access and health. The figure is an overview of the economic, social and environmental dimensions of the bioeconomy and its expected impacts towards 2030.



Figure 4. Sustainable Bioeconomy Activities and Sustainable Development Goals

Source: European Commission, 2018, *A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment-Updated Bioeconomy Strategy (pick up after Azote Images for Stockholm Resilience Centre)*

The bioeconomy was in the centre of the discussions and political agenda for many EU officialities. For instance, the subject was on the agenda of the former president of the European Commission Juncker (Agenda for Jobs, Growth, Fairness and Democratic Change) or on the agenda of Commissioner Carlos Moedas (Agenda for Research and Innovation). All these efforts during the last years made possible the implementation of bioeconomy principles in a few EU member states. Despite of so many debates, not all EU countries have a Bioeconomy Strategy and the efforts of the present EU commissioners are focused on the elaboration and implementation for the next financial programming period.

In EU there are nine countries (2019) which have dedicated bioeconomy strategy at national level: Austria, Finland, France, Germany, Ireland, Italy, Latvia, The Netherlands, Spain (https://ec.europa.eu/knowledge4policy/visualisation/bioeconomy-different-countries_en). Other six countries have dedicated Bioeconomy Strategy at national level under development: Croatia, Czech Rep., Lithuania, Poland, Portugal, Slovakia. The rest of the EU member states have other policy initiatives dedicated to the bioeconomy or related strategies at national level, including Romania. Among Western and Central European countries, there are other two that have national bioeconomy strategy: Norway and U.K. Also, Switzerland has dedicated Bioeconomy Strategy at national level under development. As we see, from 27 EU member states only 15 have already, or are going to have in short time, dedicated bioeconomy strategies, that show how difficult and slow the process is. Based on these simple statistics, we can conclude that the Central and Eastern European (CEE) countries are behind the Western countries in this process. From, CEE, only Latvia has a bioeconomy strategy. Other five (Croatia, Czech Rep., Lithuania, Poland, Slovakia) have strategies under development and the rest have other policies and strategies. For comparisons, we will give the example of Latvia, Poland and Hungary, countries which are in different stages of creation and implementation of Bioeconomy Strategy and can be examples for Romania. Why we choose to give examples only from countries from CEE? Because these countries have different background and evolution than Western countries, which are similar with Romanian evolution, from some points of view. In 2014 started the meetings for the creation of a Central European strategy based on Bioeconomy Strategy. This was the spring for the future BIOEAST Initiative under Hungarian involvement, plus other countries from Visegrad Group (Czech Rep., Slovakia, Poland). Meantime, the group became bigger and bigger and presently, it gathers eleven countries: Bulgaria, Croatia, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. All these countries from Central and Eastern Europe put the efforts to establish the BIOEAST Initiative, which “offers a shared strategic research and innovation framework for working towards sustainable bioeconomies in the Central and Eastern European countries” (<https://bioeast.eu/home/>). The next map presents the countries involved in this initiative (figure 5).



Figure 5. BIOEAST Initiative
Source: <https://bioeast.eu/home/>

Through the BIOEAST Initiative, the Central and Eastern European (CEE) countries set the vision for 2030 to develop knowledge and cooperation based circular bioeconomies, which helps to enhance their inclusive growth and to create new value-added jobs especially in rural areas, maintaining or even strengthening environmental sustainability.

The BIOEAST Initiative's mission is to assist Central and Eastern European (CEE) countries to operationalise their vision for 2030 drawing on their potential and offering opportunities for (<https://bioeast.eu/home/>):

1. A sustainable increase of biomass production, to become competitive and leading, high quality, food and feed producers worldwide;
2. A circular (“zero waste”) processing of the available biomass, to become key players in the development of new bio-based value chains;
3. Viable rural areas: to develop an innovative, inclusive, climate-ready and inclusive growth model. Based on this collaboration, the BIOEAST Initiative proposed and applied for the project BIOEASTsUP (H2020 Project “Advancing Sustainable Circular Bioeconomy in Central and Eastern European countries”) which aims at supporting Central and Eastern European countries in their bioeconomy development. What was achieved till now, in these countries? Except, Latvia, which has its own Bioeconomy Strategy, the rest of the countries are at different levels of development of their strategies. As we said above, we analyse by comparison the evolution of three countries from this region: Latvia, Poland and Hungary (based on IEA Bioenergy, 2018).

Latvia

National institutions involved in the bioeconomy: Lead Ministry is Ministry of Agriculture of the Republic of Latvia. Other Ministry: Ministry of Economics of the Republic of Latvia; Ministry of Education and Science of the Republic of Latvia. Other Institutions: Forest and Wood Products Research and Development Institute (MeKA); Institute of Agriculture Resources and Economics; Institute of Food Safety, Animal Health and Environment “BIOR”; Institute of Horticulture; Latvia University of Life Sciences and Technologies; Latvia Plant Protection Research Centre; Latvia State Forest Research Institute “Silava”; Latvia State Institute of Wood Chemistry.

National bioeconomy definition is: Bioeconomy covers those parts of economy where renewable bio-resources (plants, animals, microorganisms etc.) are used in the production of food, feed, industrial products and energy in a sustainable and well-considered way. The definition is based on the EU definition provided by the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions “Innovating for Sustainable Growth: A Bioeconomy for Europe” Status of national policies and bioeconomy Dedicated Bioeconomy Strategy at national level (Latvian Bioeconomy Strategy 2030).

Hungary

National institutions involved in the bioeconomy: Lead Ministry is Ministry of Agriculture. There is no national definition for bioeconomy. There is a dedicated Bioeconomy Strategy at national level under development (In Hungary, a dedicated Bioeconomy Strategy at national level is under development. Hungary also participates in BIOEAST, a macro-regional bioeconomy initiative being developed by Central and Eastern European countries). Other national bioeconomy-related strategies: Medium and long-term food industry development strategy 2014-2020.

Poland

National institutions involved in the bioeconomy: Lead Ministries are Ministry of Agriculture and Rural Development, Ministry of Entrepreneurship and Technology, Ministry of Investment and Economic Development, Ministry of Science and Higher Education; Other Ministries are Ministry of Energy, Ministry of Environment, Ministry of Maritime and Inland Waterway Transport. Other Institutions: AgroBioCluster; Green Chemistry Cluster “West-Pomeranian Bioeconomy Cluster”;

Institute of Soil Science and Plant Cultivation – State Research Institute; Klaster Life Science Kraków; Polish Bioeconomy Technological Platform. There is no national definition for bioeconomy. Poland participates in BIOEAST, a macro-regional bioeconomy initiative being developed by Central and Eastern European countries. Poland is also developing a Roadmap towards Circular Economy. Other parts focus on sustainable industrial production, sustainable consumption and new business models. Other national bioeconomy-related strategies: BIOSTRATEG Strategic and Research program “Environment, Agriculture and Forestry”; Map towards Circular Economy (not approved yet); National Smart Specializations.

We gave all these examples to show how different are the countries in this region. Of course, the initiative to develop the macro-regions and the national strategies is welcome and can help the development of the countries, including Romania.

CONCLUSIONS

The COVID-19 Academy can be that key moment in the evolution of humanity and its economic development in which, in order to have positive perspectives, it is necessary to reset the policies and strategies promoted so far and promote new ones that include the concept of bioeconomy as we define it. we at present. The opportunities to implement the bioeconomy strategy are multiple and beneficial to the states that adopt this concept, both in terms of future economic activities and in terms of daily life, ours and our descendants. The presentation we gave about the Bioeconomy Strategic Agenda, Bioeconomy Action Plan, the level of development of these strategies at national level among EU countries and generally in Europe, offers us a wide image about this process. As we said, it is not finished yet, the countries are at different levels of creation and implementation. We consider that, the BIOEAST Initiative, also the BIOEASTsUP Project will help the countries from CEE to create and approve their national strategies in very short time and then to contribute, all together, to the development of the bioeconomy macro-regions in this area. In this way, the gaps between Western and CEE countries will be attenuated..

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