



Bio-based strategies and roadmaps for enhanced rural and regional development in the EU



Regional strategy and roadmap documents

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with contributions from BE-Rural's OIP facilitators



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EXECUTIVE SUMMARY

This report presents strategies and roadmaps for strengthened regional bioeconomies in five European regions: the Szczecin and Vistula Lagoons, Poland; Stara Zagora, Bulgaria; Strumica, North Macedonia; Vidzeme and Kurzeme, Latvia; and Covasna, Romania. The individual strategy and roadmap documents can be accessed via <https://be-rural.eu/resources/>. They are available in the local languages and in English.

For each region, the documents examine the regional context, the sectors relevant for the bioeconomy, as well as the existing national and regional institutional and policy context. The strategies and roadmaps were developed in the context of structured regional stakeholder processes and outline explicit actions that could support the further development of the regional bioeconomies.

In the Polish Baltic Lagoon regions, the fishery sector plays an important role in the regional development, which is why the roadmap is focused on strengthening this sector. The roadmap has a unique character as it strongly focuses on social innovation and aims to promote the economic potential of low-value fish species by using traditional knowledge.

Stara Zagora's economy is dominated by a mix of small- and medium sized enterprises and, as such, one of the main priorities of the roadmap is creating conditions for the development and strengthening of bio-based sectors and promoting the introduction of new technologies. It further focuses on the potential of agriculture and forestry for the region and aims to promote different approaches for sustainable resource management and strengthen the links between bioeconomy and regional development.

The roadmap for the development of the bioeconomy in Strumica, North Macedonia, focuses on the agricultural sector as the region is rich in agricultural resources and agricultural residues. Its main objectives are promoting advisory services for agricultural products, as well as training and education in the agricultural sector in addition to supporting the sector's digital transition.

The roadmap for the bioeconomy development in the Vidzeme and Kurzeme regions focusses on the utilization of forest and agricultural biomass, as well as on waste and production residues. It further highlights the relevance of small-scale business models for the production of organic textiles or other organically produced lignocellulosic products, as well as the utilization of wood pellets, wood chips and pyrolysis products for energy.

In Romania the development of the *Roadmap for a Bioeconomy Strategy in Covasna County* was strongly driven by innovation clusters, which are well established in the region. Its main objective is to foster a qualitative and sustainable way of living in the region by laying out specific actions for harmonised rural development, social inclusion and eco-innovation.

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Abbreviations

CLLD	Community-led Local Development
CSOs	Civil-society organisations
EMFAF	European Maritime, Fisheries and Aquaculture Fund
EMFF	European Marine and Fisheries Fund
ESF	European Social Fund
EU	European Union
FLAG	Fishery Local Action Group
LAG	Local Action Group
NGOs	Non-governmental organisations
OIP	Open Innovation Platform
OP	Operational Programme
PESTEL	Political, Economic, Social, Technological, Environmental, Legal (factors)
PPP	Public-private partnership
RDI	Research, Development and Innovation
RIS3	Regional innovation strategy for smart specialisation
SDGs	Sustainable Development Goals
SWG	Stakeholder Working Group
SWOT	Strengths, Weaknesses, Opportunities, Threats

1 Introduction

Many regions in South-eastern and Eastern Europe have great – yet untapped – potential for the development of the bioeconomy, as they are rich in biological resources, traditional knowledge and expertise in agriculture, forestry, fisheries, use of medicinal herbs, etc. Developing bio-based business models on that basis and generating new jobs and economic growth, while simultaneously contributing to climate and environmental protection through efficient and environmentally friendly use of resources area is a promising concept – especially for structurally weak regions. Nevertheless, the innovation performance of many regions in this part of Europe is well below the EU average¹ and they have been slow in generating new economic, social and environmental benefits through bioeconomy development (Spatial Foresight et al., 2017).

BE-Rural focuses on emerging innovator countries, covering the Szczecin Lagoon and Vistula Lagoon areas in Poland, the Stara Zagora region in Bulgaria, the Strumica region in North Macedonia, the Vidzeme and Kurzeme regions in Latvia, and the Covasna region in Romania. The regions were selected because they are quite distinct in their biomass availability, structure of the economy, policy context and existing networks. At the same time, they face common challenges such as emigration and an aging population. The low awareness of the bioeconomy concept and its potential impacts on economy, society and nature constitutes another common challenge leading to a lower acceptance of new bioeconomy initiatives, as well as the products and services associated with them (Anzaldúa et al., 2020). Here, well-balanced bioeconomy strategies and roadmaps, along with other measures, could contribute to creating a number of job opportunities, provide incentives for younger people to stay or return to their regions, and increase public awareness through targeted communication and education measures.

To this end, the aim of BE-Rural was to support regional actors in these regions in the participatory development of regional bioeconomy strategies and roadmaps. Based on a bottom-up approach, Stakeholder Working Groups (SWG) were established in the regions of BE-Rural. Building on the knowledge exchange and guidance provided and generated throughout the duration of the project, the regional SWGs developed strategy and roadmap documents for strengthened regional bioeconomies in the respective regions.

All five documents address key concepts such as circularity, the sustainability of the biomass supply, the optimization of value creation (cascade use of biomass), the integration of biorefineries into existing or new agricultural and industrial value chains, or demand-side developments. While quite similar in their structure and stakeholder engagement processes accompanying the strategy development process, the strategies differ in terms of their sectoral focus and outlined actions.

The aim of this report is to introduce the regional strategies and roadmaps based on which common themes and differences across the regions could be drawn out. Chapter 2 describes the methodology that has been applied to facilitate the strategy and roadmap development processes in the five OIP regions. Chapter 3 presents a short summary of the five regional contexts in terms of natural, climatic, economic, social and political conditions. It further gives an overview of the strategy and roadmap development processes focusing on stakeholder engagement and co-creation activities, and then summarizes the objectives of the strategies and roadmaps. Chapter 4 draws together these various outcomes and includes a discussion on the next steps towards the implementation of the regional strategies and roadmaps.

¹ European and Regional Innovation Scoreboard 2021. Available at <https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis>.

2 Methodology

To meet BE-Rural's objectives, all project activities followed the principles of co-creation, openness and inclusiveness, sustainability and transparency.² The development of regional strategies and roadmaps was embedded in a structured participatory process. To facilitate this co-creation process, BE-Rural created five regional Open Innovation Platforms (OIPs), which main task was to formulate concrete roadmaps and strategies (BE-Rural's principle of co-creation). The regional strategy and roadmap development processes were open to all relevant stakeholder groups. Besides the so-called 'Triple Helix', representing government, business and academia, BE-Rural strongly encouraged the participation of civil society (organisations) throughout the project duration (BE-Rural's principle of inclusiveness). The strategy and roadmap documents developed in the context of BE-Rural equally address social, environmental and economic sustainability and explicitly promote the sustainable use of agricultural, forest and marine ecosystems. Explicit references are made to the UN's 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs), the EU Green Deal, the EU Bioeconomy Strategy and the EU's Circular Economy Action Plan (BE-Rural's principle of sustainability). All stakeholders had the opportunity to enter the regional strategy and roadmap development activities also at a later stage of the process. Furthermore, all participatory activities and their outcomes are transparently documented and published on BE-Rural's website.³

Furthermore, BE-Rural builds upon the action research approach, where researchers undertake an ongoing critical reflection of their own values, preconceptions and circumstances needed to shape knowledge and scope for action (Abhold et al., 2019). As such, regular reflection activities such as evaluation reports for all participatory activities, feedback loops and regularly exchanges of lessons learned between the regions were embedded in the project activities. The process of strategy and roadmap development was structured along the phases reflected in the figure below.

Figure 1: BE-Rural implementation phases



The strategy development was based on an extensive analysis of the policy frameworks and the biomass potentials of the regions. In parallel to the analytical work, the stakeholder process was kicked off by creating regional Stakeholder Working Groups responsible for the development of bioeconomy strategies and roadmaps. Dedicated capacity building and knowledge exchange activities were developed in a way to increase the capacities of regional/local authorities and stakeholders to design and implement bio-based roadmaps and strategies. In addition, pop-up stores with bio-based products and information about their impacts were organised to increase the awareness of the bioeconomy among the general public. Educational institutions were provided with teaching materials on the bioeconomy to support the development of dedicated curricula and were engaged through a number of educational events and through a summer school for teachers. Finally, the regional strategies and roadmaps were formulated by the members of the SWGs.

² The conceptual framework of BE-Rural is outlined in D1.1 "Sustainability and Participation in the Bioeconomy: A Conceptual Framework for BE-Rural" and can be found [here](#).

³ More information about the project activities and their outcomes can be found [here](#).

3 Strategy and roadmap development processes in the five OIP regions

3.1 Szczecin and Vistula Lagoons, Poland

3.1.1 Regional context

The Polish OIP covers two separate regions with similar economic structures – the Szczecin Lagoon and the Vistula Lagoon. The first region is composed of four municipalities represented by the Fishery Local Action Group “Zalew Szczeciński” (FLAG “Zalew Szczeciński”) – an organization selected for the implementation of the Local Fisheries Development Strategy under the Operational Program financed by the European Marine and Fisheries Fund (EMFF). The Vistula Lagoon region is composed of three coastal municipalities represented by FLAG “Rybacka Brać Mierzei” and three lagoon municipalities represented by FLAG “Zalew Wiślany”.

Both regions are losing the traditional economic functions associated with their proximity to the sea. Due to low industrialization, they are areas with a high unemployment rate and generally low professional activity. For both areas forming the OIP, tourism services are the primary source of income generation. Industrial development is constrained, as the entire area of both regions is situated within a Natura 2000 site.

Fisheries, as an industry, are socially and culturally important elements in both regions, and this branch uses regional resources – fish, which is sold to other regions or used by the local tourism sector. Local fishermen report the need to increase the added value of fishing. The areas of both lagoons are rural and not strongly urbanized regions and, due to the distance from open sea water and the lack of sandy beaches, tourism is not as developed as in the case of the seaside resorts.

The economy of those regions is based mainly on agriculture, forestry and small services. NMFRI conducted a review of strategies at local and regional levels as well as of the industries operating in the regions. So far, no official document addresses the circular bioeconomy. This presents a considerable opportunity, but also requires considerable expenditure on targeted education & capacity building and promotion of pro-ecological behavior. The available resources could be used more efficiently by applying new technologies and by returning to the tradition of using low-value fish species for human nutrition.

In the context of the next EU programming period and the need to conduct a new competition for financing Local Development Strategies for Fisheries Dependent Areas, the existing FLAGs will update their strategies to match the new Operational Programme (OP) guidelines. Delays in the creation of the OP provisions have slowed down the update process due to the lack of government guidelines. They are planned to be finalized in the first quarter of 2022. In this context, the FLAGs participating in the regional OIPs are going to use the strategy prepared within BE-Rural and assign an additional criterion for the selection of new investments with pro-circular actions. Furthermore, the individual FLAG member municipalities will adapt their local strategies to the provisions of the strategy developed within BE-Rural.

3.1.2 Summary of strategy development process

The idea to create a regional development strategy based on the concept of circular economy (called “Closed-loop economy” in Poland - GOZ) and the use of local bio-resources was initiated by the BE-Rural project and its Polish partner, NMFRI. The very idea of circularity was known in the selected regions only to a small number of people involved in the activities of the Fishery Local Action Group (FLAG). Already at the application stage of the BE-Rural project, the FLAG boards, consisting of representatives of local authorities, business and social organizations, were very favorable to the idea of full utilization of fish resources, especially the so-called low-value fish species (used little or not at

all). Initial discussions among the wider community indicated that the local people may be very supportive in creation of the strategy.

After the grant was awarded, community meetings were organized in both selected regions to present the concept of circular bioeconomy and the project objectives. The creation of two regional Stakeholders Working Groups (SWGs), as the leading bodies in the process of creating the strategy, proved to be a difficult task due to the specificity of the regions, mainly related to a division into a coastal part with an active community focused on generating income from seasonal tourism and a lagoon part where economic activity is concentrated on traditional work related to fishing. Efforts were made to activate people from the lagoon part as the ones mainly targeted by the strategy.

1st phase – Establishing SWGs

As part of the project activities, two regional SWGs were formed: one for the Szczecin Lagoon and one for the Vistula Lagoon. In order to establish the SWGs, first bilateral meetings were organized with stakeholders, FLAG offices, selected fishermen and local NGOs. FLAGs, as local partners, were in contact with local authorities, businesses and NGOs and their representatives were invited to the first official meetings in the two regions.

2nd phase – Getting familiar with circular economy and SDGs

The participation of SWG members in seminars, workshops, educational activities and on-line meetings organized within the frame of BE-Rural as well as the organization of the BE-Rural pop-up store in Świnoujście brought the two SWG groups closer together and resulted in establishing a cooperation and making the decision to develop a joint strategy for both regions. Study visits of the representatives of both regions, both mutual in the regions and visits to the project partners (Strumica in North Macedonia and Covasna in Romania), as well as visits organized by NMFRI to regions more advanced in the use of local bioresources (Barycz Valley, Carp Valley) proved to be advantageous. Both SWG joined their activities and worked together as one group with members across the two regions.

In the meantime, SWG meetings were held in which information on the progress of the project was disseminated, tasks in support of the work on the diagnostic part of the strategy were completed, research results and feedback on the expectations of regional residents were presented. The needs of the local communities were identified and strategic goals were formulated.

The SWG members decided to work in a smaller core group, based on representatives of FLAG offices, with the remaining members supporting the “core team” as needed, through active participation in SWG meetings, or bilateral contacts and answering specific industry-related questions. The composition and style of the FLAGs, which were statutorily concerned with regional development and gathering information about community development expectations, proved to be a favorable factor.

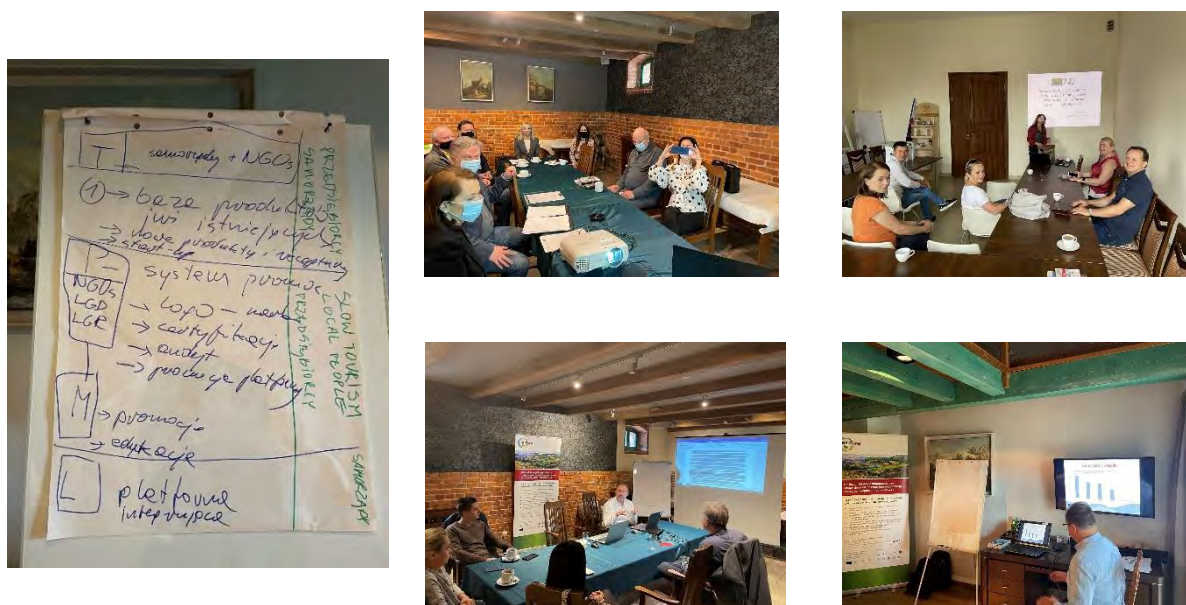
Finally, the SWG consisted of 14 persons, with the “core team” steering their activities (5 people from FLAG offices). According to the leading partner (NMFRI), the team from the Department of Fisheries Economics (7 persons) was responsible for advisory services. Until the COVID-19 pandemic, it was strongly supported by the manager of the research station in Świnoujście (Tadeusz Krajniak - R.I.P.), who was well informed on the issues of the Szczecin Lagoon and well known by the members of the local community.

This body, supported by information supplied by the NMFRI concerning an attempt to strengthen the strategy by including the Fish Market Department of the Ministry of Agriculture and Rural Development, decided to prepare a single strategy for both regions, arguing that there were minor differences in management and socio-economic conditions. Educational and promotional activities played a key role in community involvement in the strategy building process. To this end, the BE-Rural project facilitated mutual learning and national and international cooperation across regions, which was meant to ensure the exchange of knowledge between sectors and regions and enable the use of proven ideas to promote the involvement of local communities. These activities provided stakeholders with the relevant knowledge and experience needed to understand the concept of the circular economy and support the development of strategies.

3rd phase – Strategy development

The process of preparation of the strategy document was organized in three workshops. The work during the workshops was facilitated by so-called activation methods. During the first workshop, a number of heuristic techniques based on using the creative power of the group process were applied (brainstorming, metaplan, snowball method) in order to identify necessary materials for the analytical work. The next workshop was aimed at defining the socio-economic conditions of the examined Lagoon areas. Drawing on principles of design thinking, the subject of the third strategic workshop was effectively setting long-term objectives, a mission and a vision for the development of the areas, analyzing current development trends and working out detailed directions for the development of the two areas based on available resources. The fourth and last meeting served to discuss the draft strategy document, including the operational part of the strategy and opportunities for its implementation. The technical preparation of the strategy itself was left in the hands of the NMFRI team. In accordance with the latest standards, the document format has been adapted for use by visually impaired and blind people who will benefit from the "text-to-speech" feature. After the diagnostic part, the SWOT analysis and draft objectives were finalized and a validation workshop was organized to verify the content and define strategic actions for achieving the objectives. This information was incorporated into the first version of the strategy, which was presented at the following workshop meeting. The purpose of this meeting was to verify the final coherence of the study and to determine the possibility of implementation of the proposed actions.

Figure 2: Strategy building process in the Polish lagoons



An overview of the individual meetings is presented in the table below. 169 stakeholders participated in the meetings and contributed the development of the regional bioeconomy strategy, and, in addition, a total of 230 regional stakeholders participated in the wider project activities, including capacity-building seminars and business model development, which framed the strategy development process.

Table 1: Overview of stakeholder meetings – Polish lagoons OIP

Scope of the meeting	Date	Number of participants
Pre SWG - several meetings with stakeholders on their role in the process		21
SWG 1 - Forming SWG Vistula Lagoon	05.02.2020	8
SWG 2 - Forming SWG Szczecin Lagoon	17.02.2020	5
SWG 3 - cooperation of both SWGs and experience exchange.	03.06.2020	12

SWG 4 - Identification of regional weaknesses and threats to the creation and implementation of a local development strategy. proposition on unification of SWGs in one body.	17.09.2020	14
SWG 5 +workshop on priorities of the local strategy, introduction to SWOT of the region	18.02.2021	10
SWG 6 - Fishermen needs	08.–09.04.2021	16
SWG 7 - Study visit (stakeholders involvement benchmark)	27.05.2021	15
SWG 8 - Study visit (side area development in one big attraction region)	01.07.2021	9
Consultation - Opinion of Fish Producer Organizations managements	17.–18.08.2021	6
NMFRI consultation - good practice of strategy implementation to the region	27.–28.08.2021	4
Workshop - diagnosis of the region	12.–14.09.2021	23
Study visit (Strumica)	27.07.–01.08.2021	6
Study visit (Covasna)	23.–27.09.2021	4
SWG 9 - workshop - review of the diagnosis part and SWOT analysis description and set of priorities	07.–09.10.2021	9
SWG 10 - workshop - review of the operational part. Measures for priorities.	27.–29.10.2021	9

3.1.3 Outline of the strategy document

The “Strategy for development of circular economy through utilization of low-value fish species from the Szczecin Lagoon and the Vistula Lagoon areas for 2021-2030” is based on a diagnosis of the lagoon areas to exploit the economic potential of low-value fish species. The strategy is aimed at responding to the lacking exploitation of low-value fish species in the Baltic Sea lagoon areas based on the principles of circular economy and available local bio-resources.

The strategy includes an introductory part which includes a description of methods to involve residents, entrepreneurs and other entities and active groups that were part of the strategy development process. The next chapter describes final conclusions from the diagnosis of crisis factors and phenomena, the scale and nature of the lagoon areas and the potential of available local bio-resources in order to indicate possible directions of their use in accordance with the principles of the circular bio-based economy. In the next chapter, the results of the SWOT analysis are presented, providing the basis for a vision for future bioeconomy development in the areas. Based on the results of the SWOT analysis, general and specific objectives and projects were formulated.

The main goal of the strategy is to promote the development of the bioeconomy in the Szczecin Lagoon and the Vistula Lagoon through the utilization of low-value fish resources. It outlines specific activities focused on the realization of five key objectives concerning infrastructure, business/economy, logistics, marketing and environmental aspects. Descriptions of the strategic objectives and activities aimed at their implementation are provided. The next chapter contains a description of the connections between the strategy and existing strategic documents at the national, regional and local level and presents the method and necessary steps for the strategy implementation. The implementation of the strategy, its monitoring, evaluation, updating and promotion methods are described in the chapter on the implementation system. The last chapter covers an environmental impact assessment.

The strategy document also contains an annex with a detailed socio-economic diagnosis based on research and studies prepared within the project. The structure and work plan of the BE-Rural project allowed for an adequate analysis of the region and its resources and guided the regional partners and stakeholders in their thinking about the effective use of local fish resources.

3.1.4 Outlook and next steps

The main element of the implementation system will be the entity responsible for monitoring and reporting of the strategy. This function will be fulfilled by NMFRI along with a separate unit responsible for the coordination of the strategy – the team of the Department of Fisheries Economics of NMFRI. This secretariat will lead and coordinate the creation of permanent regional bioeconomy stakeholder panels, which will consist of FLAG managers previously involved in the SWG.

An option for the management of the strategy implementation process is being provided by the new programming period 2021-2027 under the CLLD instrument, ensuring funding from the European Maritime, Fisheries and Aquaculture Fund. The FLAGs will indicate measures under which it will be possible to receive financial support. Alternative sources of funding include the local business sector and local government units as well as funding by the European Union.

After the preparation of the strategy document, the approval of the NMFRI Director will be obtained. As part of internal consultations, the working position (opinion) of the Ministry of Agriculture and Rural Development, Department of Fisheries, as the institution supervising the activities of NMFRI and involved in the programming of aid funds under the EMFAF 2021-2027, will be obtained.

The Szczecin Lagoon and the Vistula Lagoon are located administratively in the Zachodniopomorskie, Pomorskie and Warmińsko-Mazurskie Voivodeship, respectively. It is planned to apply to the Marshal's Office of the Zachodniopomorskie Voivodeship with the seat in Szczecin, to the Marshal's Office of the Pomorskie Voivodeship with the seat in Gdańsk and to the Marshal's Office of the Warmińsko-Mazurskie Voivodeship with the seat in Olsztyn with regard to compliance of the Strategy with the voivodeship development strategy.

Finally, in accordance with the provisions of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessment, it is planned to agree on the abandonment of environmental impact assessment of the draft Strategy. In this respect, it is planned to apply to the Pomorskie Voivodeship Sanitary Inspector based in Gdańsk and the Regional Director for Environmental Protection in Gdańsk to waive the need for environmental impact assessment for the draft Strategy.

Finally, in accordance with the provisions of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessment, it is planned to agree on the abandonment of legally required environmental impact assessment of the strategy. In this respect, it is planned to apply to the Pomeranian Voivodeship Sanitary Inspector based in Gdańsk and the Regional Director for Environmental Protection in Gdańsk to waive the need for environmental impact assessment.

3.2 Stara Zagora, Bulgaria

3.2.1 Regional context

Stara Zagora District is located in Southern Bulgaria and is included in the territory of the South-Central Planning Region. The district has many valuable natural resources conducive to the development of agriculture, energy and industry. The soils in the area are mostly flat and fertile. Soil and climatic conditions are very favourable for growing all types of crops from the temperate climate zone. This allows the area to successfully grow cereals, oilseeds, essential oils, fiber, vegetable crops, fruit species and vineyards.

Especially the cultivation of essential oils and medicinal crops is very important in the area. Due to the specific combination of very favourable soil and climatic conditions in the Kazanlak Valley, the area is known for the cultivation of essential oilseeds and the production of the highest quality rose oil which meets an internationally recognized quality standard. Growing medicinal crops, too, is essential, as Bulgaria has a leading position in Europe in the export of dried herbs.

The geographical location of the region is strategically very favourable and is characterized by well-developed road infrastructure. Highways and railways pass through the territory of the district. The

routes of three European transport corridors, which are the most-used connections between the northern border of Bulgaria along the Danube River with the southern border to Greece and Turkey, cross here. The Trakia and Maritsa highways are also essential, providing transport of products, goods and communications in all directions.

The economy of the region is characterized by a very well-developed industry, a large share of which is occupied by the extraction of lignite and electricity, mechanical engineering, processing industry, cosmetics and others. Forests in mountainous areas also determine the development of the wood processing and furniture industry in the region. Agriculture occupies a smaller share but has great potential for development.

Bulgaria has not yet developed a national strategy for the development of the bioeconomy, but the bioeconomy is addressed in the development path “Green and Sustainable Bulgaria” of the National Development Programme until 2030. Two of the identified priorities provide measures and policies for the development of an environment that supports the bioeconomy. The priority “Circular and low-carbon economy” is expected to increase composted bio-waste and recycled municipal, industrial and construction waste and to introduce a separate collection of bio-waste and textile waste. The priority “Sustainable Agriculture” is to improve competitiveness, by, among other measures, placing a greater emphasis on research, technology and digitalization, as well as the development of the value chain.

Apart from that, Bulgaria is part of the BIOEAST initiative along with 10 other countries from Central and Eastern Europe, which offers a shared strategic framework for research and innovation to work towards a sustainable bioeconomy.

3.2.2 Summary of strategy development process

The development of the strategy was a continuation of the work that has been carried out in the context of the Horizon 2020 project BioSTEP (2015-2018) and addresses the objectives of the updated EU Bioeconomy Strategy (2018) as well as of the development programmes of Bulgaria in the new programming period.

As a result of the BE-Rural project activities, a regional Stakeholder Working Group (SWG) was created which includes representatives of regional and local authorities, business, science and civil society organizations in the relevant areas related to the bioeconomy. The members of the SWG took an active part in the development of the strategy document. Several meetings and discussions were held to identify development objectives and options for achieving them. During the workshops, the EU’s priorities for the development of the bioeconomy, as well as the results of the PESTEL analysis and the business models assessed within the BE-Rural project were presented and discussed.

Figure 3: Meetings with the members of the regional SWG in Stara Zagora





The main focus of the meetings was the formulation of objectives and priorities for the development of the bioeconomy of the Stara Zagora region, by taking into account the availability of regional biomass resources and important components of the vision for the development of the region. They were included in other regional documents, such as the strategic development plans 2021-2027 of the Municipality of Stara Zagora and other smaller municipalities in the region, as well as strategies and initiatives of the local communities, created within the National Program for Rural Development. An overview of the relevant meetings is presented in the table below. 15 stakeholders participated in the meetings and contributed to the development of the regional bioeconomy strategy, and a total of 98 regional stakeholders participated in the wider project activities, including capacity-building seminars and business model development, which framed the strategy development process.

Table 2: Overview of stakeholder meetings – Stara Zagora OIP

Scope of the meeting	Date	Number of participants
Knowledge sharing and capacity building seminars – discussion of bioeconomy features, existing good practices and their applicability in the region	February 2020 – June 2021	106
Stakeholder working group meetings – involvement of core group for regular participation in activities and co-creation throughout the project	February 2019 – October 2021	27
Business model development – interaction with focus group about suitable business models in the region and drafting their structure	January – July 2021	10
Formulating the main sections of the bioeconomy strategic document and defining the development team	15.07.2021	8
Presentation of the first draft of the document- bioeconomy roadmap aligned with plans in the region	30.09.2021	6
Discussion of the bioeconomy development strategy worked out within the project	26.10.2021	11

3.2.3 Outline of the strategy document

The first chapter of the “Strategy for the Development of the Bioeconomy in Stara Zagora Region” contextualizes the concept of the bioeconomy by providing background information on its definition as included in the EU Bioeconomy Strategy and on its potential contribution to a more circular and greener economy, food security and green gas emissions reduction. The second chapter discusses national strategic documents and local initiatives with relevance to the bioeconomy development in Bulgaria in general and in the region of Stara Zagora in particular. It further describes the role of business as a

driver of change towards a greener society. After a detailed examination of the bioeconomy potential of the Stara Zagora region in terms of natural and climatic conditions, existing infrastructure and economic development, the strategy lays out the following objectives:

- Developing a local bioeconomy based on the key factors and advantages for the region;
- Creating conditions for development and strengthening of bio-based sectors, promoting the introduction of new technologies;
- Increasing the economic competitiveness of the region and building an environmentally conscious society;

The proposed **specific actions** to achieve the objectives above are:

- Efficient management of natural resources in accordance with the principles of sustainable development;
- Generating the necessary knowledge and technology to underpin the region's sustainable and climate-neutral economy;
- Development of specific solutions and coordination mechanisms in line with the Community's strategic priorities, e.g. the 2030 Agenda for Sustainable Development. This is particularly important as the current sectoral approaches to the bioeconomy in Bulgaria are not sufficiently integrated in terms of coordination, implementation and monitoring;
- Embedding the above-mentioned activities in a structured engagement process by ensuring the active participation of the public and all stakeholders.

The next section outlines priority areas for a sustainable bioeconomy in Stara Zagora, looking at the potential of agriculture and forestry, different approaches to sustainable resource management, the links between the bioeconomy and regional development and, in particular, the need of involvement of primary producers, opportunities for networking and clustering, and challenges ensuing from the digitalization.

3.2.4 Outlook and next steps

Given Bulgaria's centralized government structure in which decisions are made mainly at the national level, it is crucial to link the regional activities in Stara Zagora with the national activities in the field of the bioeconomy. The Ministry of Agriculture, Food and Forestry (MAFF) is working on a National Bioeconomy Strategy for the Agriculture Sector (incl. agriculture, forestry and fishery) and established an expert group with representatives from the MAFF and the Agricultural Academy. BIA as OIP facilitator is in contact with the Agricultural Academy and will use this window of opportunity to create synergies and inform the national authorities about the strategy that has been developed within the framework of BE-Rural. This will be supported by the creation of a bioeconomy stakeholder panel, which will present the developed strategy to the new Regional Administration of the region, which is to be elected as a new government is formed in Bulgaria. This panel will also play a key role in presenting the strategy during future regional events, as well as in initiating pilot projects on waste management, reclamation of contaminated soils, etc.

Furthermore, Bulgaria is implementing the national scientific program "Healthy foods for a strong bioeconomy and quality of life", whose main purpose is stimulating targeted research and policies in the field of agriculture, food and bioeconomy. This will help address the three main challenges these sectors face today: ensuring sustainable food production in response to growing global demand, ensuring sustainable management of natural resources and climate action as well as a balanced development of the bioeconomy of rural areas and their communities. The Thracian University, located in Stara Zagora, is part of the consortium implementing the program and was a key contributor to the development of the bioeconomy strategy for Stara Zagora, thereby generating synergies and ensuring complementarities with national-level activities.

Over the next decade, much work is needed to be done in the region related to the restructuring of coal-fired power plants and retraining of the workforce, and the developed strategy will be a key tool for releasing the region's potential for development and job creation. The strategy for the development of the bioeconomy in the Stara Zagora region will serve as a key instrument for uniting the efforts of

the stakeholders in the region and initiating discussions and pilot actions for the transition to a green economy. Within the BE-Rural project, the first steps were taken to inform and train young people in the region, which will continue in the coming years. We believe that this marked the beginning of the creation of an environmentally conscious society, and the forms of consultation and training will be further developed and enriched.

3.3 Strumica, North Macedonia

3.3.1 Regional context

The Strumica region is located in the south-eastern part of North Macedonia, close to Bulgaria and Greece. The region consists of four municipalities – Strumica, Bosilovo, Vasilevo and Novo Selo. In total, the Strumica region covers an area of 935 km² and has a population of 93,024 inhabitants. From a bioeconomy point of view, favourable climate conditions make the region the largest producer and exporter of agricultural products in the country.

The regional OIP, which has been set up as part of the BE-Rural project, focused on the utilization of agricultural residues, specifically the by-production of organic materials from agricultural activities, as a source of energy for domestic and industrial purposes. The region has a high biomass potential in vegetables (peppers, melons, potatoes, tomatoes, cabbage, cucumbers), cereals (wheat, maize, barley), forage crops (bur clover, clover, alfalfa), and industrial plants (tobacco). Some of the most important sectors are agriculture, early gardening, viticulture, fruit cultivation, livestock breeding, industry (food, wood, mining, construction, metalworking, electrical, textile), tourism and catering as the most prevalent for rural development and successful bioeconomy expansion.

North Macedonia and Strumica have not yet published dedicated bioeconomy strategies. There are, however, national documents such as the “National strategy for agriculture and rural development for the period 2021-2027”, the “Third biennial update report on Climate change” (2020) and the “Communication and visibility plan of the rural development network of the Republic of North Macedonia 2019-2022” to which a regional bioeconomy roadmap can link. The national strategy links strategic policy documents with annual operational programs and agricultural and rural policies. The existing policy framework, consisting of numerous strategic and planning documents that have already been formulated for Strumica, serve as a foundation for this roadmap. At the South-East Planning Region level, these are: the “Regional plan for an integrated system of waste management in the South-East Planning Region”, the “Investment guide for the South-East Planning Region”, the “Programme for development of the South-East Planning Region 2015-2019”, the “Strategic Plan for Economic Development of the Strumica Micro Region”, the “Strategy for Local Economic Development of the Municipality of Strumica 2016-2020”.

3.3.2 Summary of roadmap development process

The process of the roadmap development in Strumica was guided by BE-Rural's principles of co-creation, openness and inclusiveness, sustainability and transparency. Particular attention has been paid at the involvement of stakeholders from the Quintuple Helix (business, academia, policy and civil society). While a broad spectrum of stakeholders and citizens were involved in the co-creation activities, the members of the regional SWG were the key actors involved in the roadmap development process. This process started with the identification of the bioeconomy potential in the region, capacity-building through seminars and workshops, the identification of a biobased business models suitable for the region, and ended with merging all previous results into a single document, which takes into consideration various aspects for enhanced regional development.

1st phase – Knowledge exchange and capacity building

The creation of the bioeconomy roadmap was initiated at the beginning of the project, as all previously conducted activities were aligned with the concept of gathering ideas and inputs from the regional stakeholders, also by discussing the barriers and challenges for bioeconomy deployment within BE-Rural's knowledge exchange and capacity building seminars and workshops.

2nd phase – Stakeholder validation

A number of dedicated SWG meetings were organized in order to validate the objectives and the principles that the roadmap should entail. As part of the stakeholder process, alternative technology options for energy conversion of biomass materials generated on agricultural fields or farms (field-based residues), as well as those generated during the processing of agricultural products (process-based residues) were presented and discussed. As a result, the production of mycelium-based isolation and packaging materials was analyzed and included as a promising regional business model in the Strumica's bioeconomy roadmap.

3rd phase – Creation of Bioeconomy Roadmap Document

The draft structure and contents of the bioeconomy roadmap were discussed with key stakeholders in the beginning of July 2021. Afterwards, a public event entitled “World style cafe: Setting the ground for our bioeconomy roadmap” was organized as part of the temporary bio-based pop-up store that has been set up in Strumica. This event was organized on 31st of July and welcomed around 15 stakeholders. The main goal of this event was twofold: Firstly, to obtain an understanding of what prevented the region from developing bioeconomy practices so far. This was helpful in order to devise appropriate actions, which should be part of the roadmap. Secondly, to identify the key stakeholders in the region who will be responsible for further developing the bioeconomy. As part of a brainstorming exercise, all ideas were put on post-it notes and two topics were selected for further discussion and elaboration: 1) what are the main barriers for bioeconomy deployment in the six focus areas, and 2) what is the importance of the focus areas which are most relevant to the Strumica region.

Figure 4: Workshop organized within in the frame of BE-Rural's bio-based pop-up store in the municipality of Strumica





To follow up on the workshop, members of the SWG gathered in early August to formulate key conclusions. The feedback from the stakeholders was a vital part in drafting the first version of the bioeconomy roadmap. The roadmap follows a simple and clear structure, which is easy to understand to people with various backgrounds, levels of education or knowledge and degrees of involvement in the bio-based sector. The main objective was to gather all knowledge that was previously obtained in the scope of BE-Rural project and to include an implementable case study, namely a business model canvas about the mycelium bio-based packaging and insulation materials.

By the end of the September, the stakeholders from the Strumica region had the opportunity to examine the format and contents of the document and to comment, suggest or amend the roadmap. Several bilateral calls and online exchanges for aligning the roadmap were organized. To finalize and polish the roadmap document, an online meeting for final consultation was organized at the end of October.

An overview of the individual meetings is presented in the table below. 13 stakeholders participated in the SWG meetings and contributed the development of the regional bioeconomy strategy, and a total of 40 regional stakeholders participated in the wider project activities, including capacity-building seminars and business model development, which framed the strategy development process.

Table 3: Overview of stakeholder meetings – Strumica OIP

Scope of the meeting	Date	Number of participants
World Café Style workshop (within the pop-up store) – gathering initial ideas	31.07.2021	13
Follow-up meeting with the SWG members	01.08.2021	5
Drafting the first version of the roadmap	28.08.2021	5
Bilateral calls and online exchange for aligning the roadmap	27 – 30.09.2021	/
Online meeting for final consultation on the bioeconomy roadmap	28.10.2021	5
Knowledge sharing and capacity building seminars and other project activities	28.05.2020 – 31.07.2021	40

3.3.3 Outline of the roadmap document

Chapter 1 presents the results of an enhanced PESTEL analysis of the Strumica region, including biomass profiling and a SWOT analysis. The bioeconomy potential in terms of biomass amount and its utilization and agricultural and forest residues is depicted. Furthermore, it dives deeper into regulatory, social-economic, technical and environmental conditions, essential for the municipalities to further

develop the regional, bio-based sector. Additionally, existing weaknesses and threats that prevent the region from fully and more intensively developing the bioeconomy are recognized. Potential synergies and complementarities with the national level and with relevant documents are identified.

Chapter 2 is focused on the global, national and local drivers which are key for the bioeconomy transition in the Strumica region. At the same time, the main barriers that prevent effective regional bioeconomy development and should receive prioritized attention from policy-makers are detected.

Chapter 3 of the roadmap document outlines several groups of activities that should be realized in the future:

- Increasing the flow of knowledge and strengthening the links between research and practice
- Strengthening advisory services for agricultural products within the Knowledge and Innovation System in agriculture⁴
- Improving interactive innovation through Operational Groups for agricultural innovation partnerships
- Supporting the digital transition in agriculture
- Introduction of a system for compulsory training and education in agriculture.

The activities address **six thematic pillars**:

- Business sector development;
- Research and Innovation capacities and activities;
- Use of diverse EU, national and regional funding streams;
- Synergies with other policy fields, related to rural and regional development, as well as smart specialization strategies;
- Education and information in relation to sustainability and international collaboration and sharing good practices among regions.

The specific actions for each of the pillar are elaborated qualitatively, including the objective and the desired timeframe. Moreover, the type of the activity, the sector it belongs to and its scope are identified. A connection with relevant legal and regulatory documents was established in order to perceive the acceptable conditions for a measure to develop. Initial assumptions about how the activities will evolve have been made. To bridge the forthcoming challenges, some further steps are introduced. In order to follow the progress of the different activities, a set of indicators is suggested and recommended to be measured throughout the proposed period. Furthermore, the financing body and, accordingly, the implementing and monitoring entities are presented. Finally, synergies with the UN SDGs were specified in order to align the regional goals with overarching sustainability principles.

The business model assessed in the context of the BE-Rural Mycelium-based Packaging and Insulation Material is briefly demonstrated with a business model canvas, as it was found to potentially evolve into a successful bio-based project.

Chapter 4 depicts the potential impacts from a successful implementation of the bioeconomy roadmap in the region, focusing on enhanced stakeholder engagement, international collaboration, and transparent regulatory and financial support.

The expected impacts of the roadmap aim at enhanced stakeholder engagement, close international collaboration, fair and transparent regulatory and financial support. In addition, the creation of new, modern and green jobs extremely valuable for the progressing regional economy and stable markets. It is expected that the sustainability and circularity will be embedded in various aspects among quadruple stakeholder's helix and further promoted. Moving forward with a bio-based economic development would improve policy congruence as well as legitimacy and representation, enhance business development, facilitate knowledge sharing and knowledge creation. It is anticipated that the bioeconomy will have the additional impacts on sustainability and circularity such as better utilization

⁴ <https://ipard.gov.mk/wp-content/uploads/2021/02/Национална-стратегија-за-земјоделство-и-рурален-развој-2021-2027.pdf>

of agriculture and forest residues, improved energy security and local self-sufficiency and reduced biosphere degradation.

3.3.4 Outlook and next steps

Next steps will be implemented by the members of the regional bioeconomy stakeholder panel, which will be created. Their task will be to define specific activities that are in line with the six pillars of the bioeconomy roadmap outlined above and to communicate them to key stakeholders via bilateral communication and workshops. The aim of the bioeconomy stakeholder panel will be to support the municipalities in the Strumica region in facilitating better collaboration between educational institutions, R&I units, business and public sector, NGOs and CSOs. On the roadmap, representatives of the four municipalities were designated as responsible for the implementation of different activities; they will be part of the regional bioeconomy stakeholder panel, which will continue to further promote the bioeconomy and ensure prosperous development in the bio-based sector in the Strumica region. These so-called “bioeconomy ambassadors” will play a key role in the realization and implementation of the activities of the roadmap.

To ensure the sustainability of the activities, it is envisaged that monitoring, support and data collection will be facilitated by the bioeconomy stakeholder panel as well as SDEWES-Skopje, to ensure the effective measuring of that progress.

3.4 Vidzeme and Kurzeme, Latvia

3.4.1 Regional context

Vidzeme region is located in eastern part of Latvia, while Kurzeme region in western part. Both regions have similar economic structures and were chosen as focal regions in this project. Both regions have large areas of marginal lands with limited use for agricultural production, but high potential for forestry. In both regions, the primary production of bioresources comes from agriculture, fishery, and forestry. Vidzeme region area is 15 245 km² or 24% of Latvia's territory. Currently, 56% of the region is covered by forest and 34% is covered by agricultural land. The region is characterized by low building density and a high proportion of natural landscapes with low human impact. Primary sectors (agriculture, forestry, fisheries) make up 15.8% of the economic structure of the Vidzeme region. This is the highest percentage of all regions in the country. The region accounts for 11% of the value added of Latvian production.

Kurzeme region area is 13 596 km² or 21% of all Latvia territory, currently, 53% of the region is covered by forest and 32% is covered by agricultural land. Population density is 18 people/km² and 36.2% of the region's population lives in rural areas. The main economic sectors of the Kurzeme region are agricultural production and processing, forestry and wood processing, tourism and fishing, transport and logistics. There are also several metalworking and mechanical engineering companies in the region.

In Latvia, the bioeconomy is addressed in several policy planning documents, such as the Latvian strategy for the low-carbon development until 2050, the forest sector strategy and the Latvian Smart Specialization Strategy. However, the main planning document is the Latvian Bioeconomy Strategy 2030. The strategic vision embodied in the national strategy is that the bioeconomy sectors of Latvia become the innovation leaders in the preservation, increase, as well as efficient and sustainable use of the natural capital value in the Baltic States. The strategy's three main objectives are: a) promotion and preservation of employment in bioeconomy sectors to up to 128,000 employees; b) increasing the added value of bioeconomy products to at least 3.8 billion EUR in 2030; c) increasing the value of exported bioeconomy goods to at least 9 billion EUR in 2030.

References to the bioeconomy are also made in Vidzeme's sustainable development strategy 2030, where areas directly related to the bioeconomy are a) high value-added wood products; b) healthy food

and drink products; c) use of biomass for chemical processing and energy. In addition, an “Action Plan for Development of a Knowledge-Driven Bioeconomy Innovation Ecosystem in Vidzeme Region in Latvia” exists. The plan aims to create, develop and strengthen the bioeconomy innovation ecosystem in the Vidzeme region with the purpose of establishing preconditions for knowledge-driven bioeconomy innovation and to providing support to those who innovate. The action plan defines objectives and actions for bioeconomy development in the region; priority areas include the agriculture and forestry sectors. These priorities have been taken up by the regional OIP and are addressed in the strategy document that has been developed in the frame of BE-Rural by discussing specific biomass utilization options and funding opportunities. In Kurzeme’s sustainable development strategy 2030, the bioeconomy is not specifically addressed; however, the strategy recognizes the region’s development potential on the basis of local resources. In Vidzeme, a variety of stakeholders are actively engaged in regional bioeconomy development, while in Kurzeme, bioeconomy is currently not defined as a focus sector in relevant planning documents. It is, however, expected to be included in future planning documents.

In both regions, strategic development plans are currently being developed, in which the bioeconomy will be addressed. The strategy document prepared as part of the BE-Rural project aims at informing these ongoing processes and the formulation of the respective development plans.

3.4.2 Summary of strategy development process

The strategy development process was organized through physical and online meetings with stakeholders as well as literature review and empirical data processing from statistics, policy documents, BE-Rural project reports, and deliverables. As Vidzeme and Kurzeme share the same socio-economic characteristics and biomass potentials, the strategies for both regions are jointly presented in one document entitled “A Bioeconomy Strategy for Vidzeme and Kurzeme regions”.

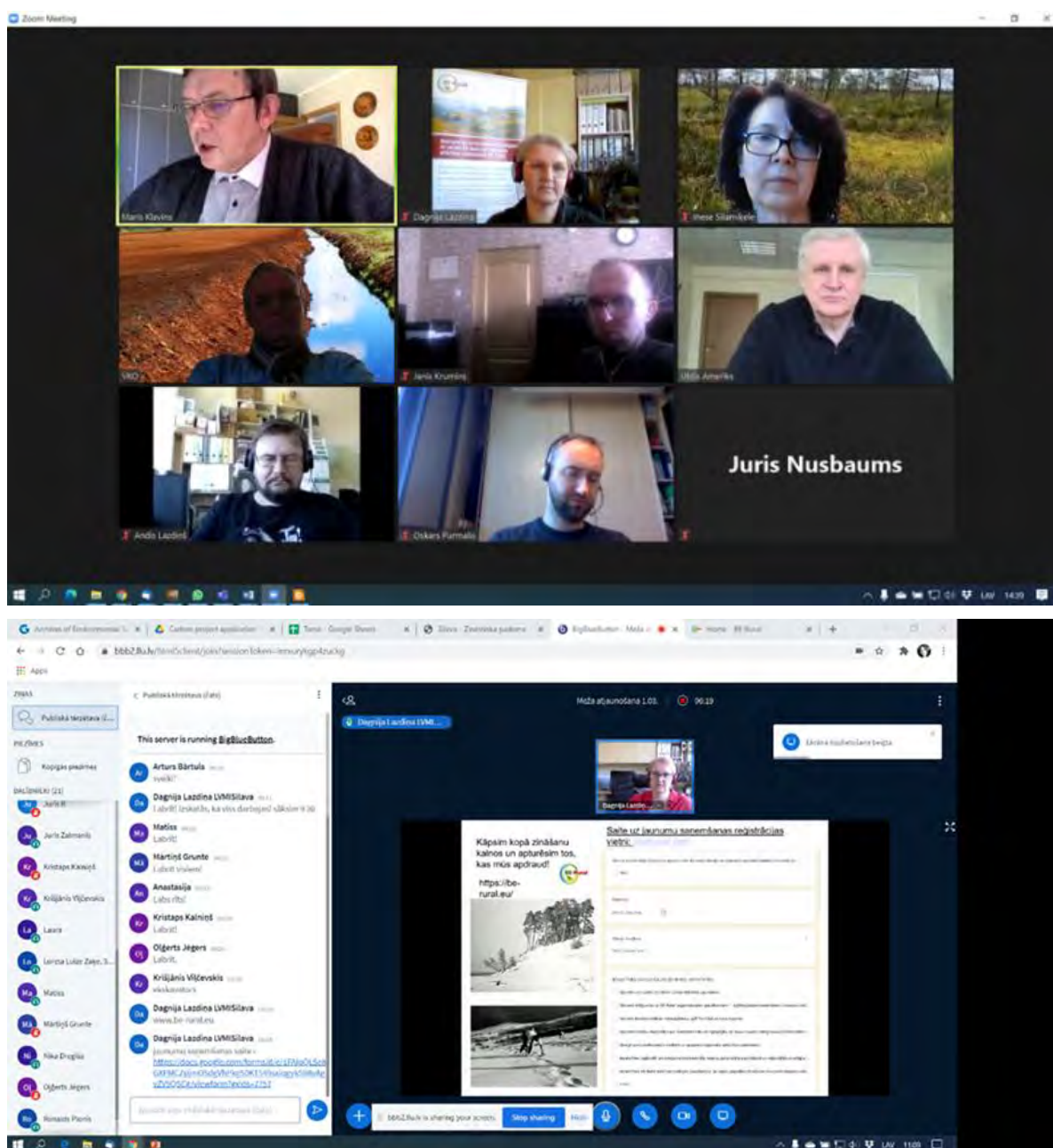
In the meetings and in the communication with regional stakeholders, the main bioeconomy sectors were identified as agriculture and forestry, in accordance with the region profiles. Key stakeholders that were consulted during the strategy development process included municipalities, educational institutions and NGO representatives, as well entrepreneurs.

A first stakeholder meeting was held in February 2020 in the frame of the annual Vidzeme innovation week. In the Vidzeme innovation week BE-Rural was introduced and contact with stakeholders was established. Stakeholders agreed that the bioeconomy should be a cornerstone of future regional development, especially in regions such as Vidzeme and Kurzeme, where the main economic sectors are forestry and agriculture and timber and agricultural crops are key resources.

A second stakeholder meeting was held in June 2020. Here, participants discussed potential biomass utilization pathways. In addition, business funding opportunities (mechanisms for bioeconomy business development in the regions as well support systems and programs) were discussed, addressing an existing knowledge gap among key stakeholders.

A third stakeholder meeting was held in August 2020. At this meeting, bio-based products were discussed for which new business models could potentially be developed. It was established that these products could be rather simple, e.g. wood chips, or more sophisticated, e.g. bioethanol.

Additional insights were generated through individual discussions during the capacity-building seminars, meetings with forestry students (16.11.2020., 01.03.2021., 15.07.2021.), meetings with forest managers (11.08.2021.), bilateral meetings with stakeholders (08.04.2021., 09.02.2021) as well by participation of LSFRI “Silava” in public discussions related to the development of the regional development plans (21.01.2021., 16.02.2021., 31.07.2021., 01.10.2021.).

Figure 5: Strategy building process in Vidzeme and Kurzeme region

The strategy document was then developed and formulated by LSFRI “Silava” on the basis of the inputs gained from the various stakeholder interactions.

An overview of the individual meetings is presented in the table below. 23 stakeholders participated in the individual meetings and contributed the development of the regional bioeconomy strategy, and a total of 87 regional stakeholders participated in the wider project activities, including capacity-building seminars and business model development, which framed the strategy development process.

Table 4: Overview of stakeholder meetings – Vidzeme and Kurzeme OIP

Scope of the meeting	Date	Number of participants
Phase 1 – Gaining insights and collecting ideas about bioeconomy development in regions from stakeholder meetings.	27.02.2020 29.06.2020 06.08.2020	23

Scope of the meeting	Date	Number of participants
Phase 2 – Gaining insights and discussion about bioeconomy strategy from capacity building and individual meetings.	16.11.2020., 09.02.2021., 01.03.2021., 08.04.2021., 15.07.2021., 11.08.2021.,	87
Phase 3 – Strategy draft writing	Summer – autumn 2021	LSFRI Silava

3.4.3 Outline of the strategy document

The development of the bioeconomy sector at the national level is defined in existing strategies and plans. Although the direction of the general development is determined by the state, entrepreneurship is initiated at the local or regional level, using the resources and labor obtained there, and using the infrastructure of the specific location. These aspects are addressed in the “Bioeconomy Strategy for the Vidzeme and Kurzeme regions”.

Chapter 1 gives an overview of the bioeconomy in Latvia, outlining the most important sectors for bio-based activities: agriculture, forestry and forest-based industries, fisheries, the food industry, and bioenergy production.

Chapter 2 describes existing policy planning documents at the national and regional levels that address the development of bio-based activities in Vidzeme and Kurzeme regions

Chapter 3 describes the current biomass usage in Latvia. It then outlines the main areas that should be prioritized in the further development of regional bio-based activities: energy production, biogas and bioethanol production, as well biomass usage in new materials and food products.

Chapter 4 gives an overview of support mechanisms for bioeconomy business development in the regions as well as support systems and programs. Support could mainly be received from the Investment and Development Agency in Latvia, which includes financial as well mentoring support. The chapter further describes, that in both regions (Vidzemes and Kurzeme) bio-based businesses have the opportunity to receive financial support as well as consultation services through several business support programs, mainly initiated at the national level as well as through smaller programs initiated by the regions.

Chapter 5 describes Vidzeme and Kurzeme region from a resource and bioeconomy perspective, and elaborates the region-specific bioeconomy potential.

Chapter 6 outlines pathways the future development of the bioeconomy sector in Vidzeme and Kurzeme. The main conclusions are that Vidzeme and Kurzeme regions have a significant potential when it comes to the utilization of biomass as part of novel bio-based activities. This relates to forest and agricultural biomass, as well as to waste and production residues. In this context, the production of small-scale organic textiles or other organically produced lignocellulosic products as well as renewable energy, such as wood pellets, wood chips, or pyrolysis products is highlighted.

3.4.4 Outlook and next steps

The strategy document highlights opportunities for the utilization of regionally available biomass and funding programs that can support bio-based business development in the regions. It can serve as a reference document for regional policy-makers and relevant stakeholders. The strategy document is further expected to inform the working groups in charge of advancing the new regional development strategies for the period until 2027. This is particularly important as the bioeconomy is expected to become a key focus sector in the next planning period. In addition, a regional bioeconomy stakeholder panel will be established to keep stakeholders engaged after the end of the BE-Rural project. In the panel meetings, new insights or actions may be added to this document, if necessary. The members of the stakeholder panel will promote and discuss the actions outlined in the bioeconomy strategy with the regional working groups engaged in the formulation of the regional development strategies.

3.5 Covasna, Romania

3.5.1 Regional context

Covasna County is located in the South-eastern part of Transylvania, within the Centru region of Romania. It covers an area of 3705 km² and occupies 1.55% of the total area of Romania. The seat of the county is the municipality of Sfântu Gheorghe. Covasna is among the smallest counties in Romania, comprising 5 cities and having a population of 220,840 inhabitants (1.04% of the country's population), of which 49.4% live in urban areas. Most of the territory comprises of disadvantaged mountain areas which have one of the lowest average population densities compared to national average. It is, moreover, characterized by strong traditions which make locals keen to retain their historical and economic features and preserve their natural habitat. Covasna County benefits from a series of natural resources, which support the promotion of the bioeconomy, such as: abundance of mineral water, wood, rapeseed, grains, livestock and resources for textiles.

Covasna County is one of the Romanian promoters of bio-based industries and the region where the Institute for Economic Forecasting (IPE) has been involved in a number of EU projects. The bioeconomic potential of Covasna County lies in its biomass resources and its dense stakeholder network, consisting of business incubators and clusters and benefitting from the decade long action of three Local Action Groups (LAGs). It has a strong cultural identity still tributary to local traditions, which are carefully cultivated: thermal baths, mofettes (an opening in a region of nearly extinct volcanic activity, through which carbon dioxide, nitrogen, and other gases pass) and traditional crafts. Covasna has a considerable potential for the development of bio-circular economy based on its economic structure: all primary production sectors (agriculture, forestry, fisheries, and aquaculture) are well represented in the local economy, as are green energy, livestock farming, woodworking and furniture, textiles, clothing and knitwear, food processing (meat and milk) and tourism.

Romania does not have a national bioeconomy strategy, but the Centru's RIS3 (2021–2027) addresses 5 cross-sectoral themes, including the theme of sustainable economy, with the following three subdivisions: a) collaborative economy, b) circular economy, and c) local value chains. In addition, references to bioeconomy are made in the Regional Development Plan of the Centru region 2021–2027. This cross-sectoral regional trend is in line with national efforts, in which several government institutions, such as the Government Department of Sustainable Development, the Ministry of Agriculture, the Ministry of Environment and the Ministry of Economy, are getting involved. In addition, there are also national bioeconomy-related strategies: the Strategy for the development of the agri-food sector on medium and long-term 2020–2030 and the Romanian Strategy for Competitiveness 2021–2027. Furthermore, in the context of the wider macro region, Romania is part of the BIOEAST initiative for knowledge-based agriculture and forestry in the bioeconomy.

3.5.2 Summary of roadmap development process

Due to the high uncertainty of the Romanian political situation, stakeholders involved in the regional OIP decided to develop bioeconomy roadmap for a more comprehensive local bioeconomy strategy. The lack of government due to the political crisis will influence the structure of the future government, regional and local authorities and is thus limiting the current administration's commitment to supporting the elaboration and implementation of a comprehensive bioeconomy strategy that entails a political mandate. In a first step, IPE has developed a stakeholder database with the help of the Romanian Association of Clusters (Clustero) and the Association of Small and Medium-Sized Enterprises in Covasna (ASIMCOV). In this way, effective cooperation and networking between all relevant local stakeholders for the roadmap development process in Covasna County was achieved within the framework of the regional OIP. Given Covasna's characteristics (mountain area, high degree of poverty, very low density and ageing population, low internet connection), the BE-Rural's key principles for participatory roadmap development, namely co-creation, openness and inclusiveness, sustainability and transparency, were applied. The local people are familiar with public consultation actions given the elaboration of previous regional and national strategies. For instance, the development of the Regional Smart Specialization Strategy was based on a bottom-up exploratory program coordinated through the Entrepreneurial Discovery Mechanism conducted by the CENTRU Regional Development Agency.

The development process of the bioeconomy roadmap was based on a participatory approach which relied on the involvement of the local/regional stakeholders. It has a strong qualitative character and is based on the principle that “peers” know more about the relevant aspects of their own field of competence and region than statistical data, which are often inaccurate by the time they are consulted. Nevertheless, statistical data concerning the regional bioeconomy potential have not been neglected and have been used to validate the qualitative results. The approach “quantitative follows qualitative” also contributes to building up the team spirit and the responsibility of the stakeholder group whose role is crucial in the implementation, continuous monitoring, and evaluation of the roadmap.

The development of the bioeconomy roadmap encompassed three phases, covering a period of one year (September 2020 to September 2021):

1st phase – Kick-off Workshop, St Konstantin & Elena Resort, Bulgaria, 28.09.2020

The process was kicked off by a first workshop that was organized in the context of an international conference⁵ that focussed on the topic of bioeconomy as a driver for green, sustainable, and inclusive growth. It was conceived as an interactive meeting through an online communication platform that would facilitate the sharing of knowledge and expertise on best practices in different EU region’s bioeconomies. The workshop focused on collecting ideas and the exchange of knowledge among European regions in order to facilitate the elaboration of regional bioeconomy strategies. The workshop was organized as a brainstorming game about the specific topics of bioeconomy. For example, in order to convince local producers to turn to bioeconomy, the participants identified the following solutions: providing financial incentives; supporting them in the elaboration of a viable business plan; implementation of appropriate public procurement policies; and providing best-practice examples.

As part of the workshop, the following long-term objectives have been defined: new value chains an access to new markets; circular economy; multidimensional resilience of the human society; food security and achieving 100% biotechnology until 2050. These results represented initial inputs for the second phase, the “Peer Review Workshops”.

2nd phase – Peer Review Workshops

During the second phase, several SWG meetings were organized in order to elaborate a logical matrix, which represents an auxiliary tool frequently used in the process of developing strategic documents. As the necessary inputs were completed, a synthetic picture of Covasna County with respect to objectives, reference period, indicators, references and prerequisites was obtained. The logical matrix combined the impact rate with the importance rate of these elements. The participants of the SWG meetings were asked to cast three for the most important and impactful elements of the matrix, mentioned above. After processing the vote, the inputs necessary to complete the logical matrix were obtained. Moderated by IPE, the events were dedicated to the formulation of the general objective (**Qualitative and sustainable way of living in the region**), strategic objectives (**Harmonious Rural Development; Socially Responsible Region; Competitive advantage by eco-innovation**), operational objectives (**Develop Bioeconomy Business Models, Support education and cooperation culture for the implementation of regional bioeconomy processes**), activities, outputs, outcomes, assessment of risks and monitoring measures. In parallel to the peer review workshops, other events such as knowledge and capacity-building seminars and educational events were organized as part of BE-Rural, which contributed to the substantiation of the bioeconomy roadmap.

⁵ For details on the event, see <https://be-rural.eu/event/bioeconomy-as-driver-for-green-sustainable-and-inclusive-growth-clusters-and-their-role-as-key-players/>.

Figure 6: Participants to the SWG on principles and objectives of the roadmap for strengthening the bioeconomy in Sfantu Gheorghe, Covasna County



3rd phase – Elaboration of Bioeconomy Roadmap Document

Based on the logical matrix, the roadmap document was drafted. It takes account of the current situation of the circular bioeconomy in the county of Covasna, describing in detail the action plan for the achievement of the goals as well as the monitoring and governance. An overview of the individual meetings is presented in the table below. 83 stakeholders participated in the meetings and contributed the development of the regional bioeconomy roadmap, and a total of 181 regional stakeholders participated in the wider project activities, including capacity-building seminars and business model development activities, which framed the roadmap development process.

Table 5: Overview of stakeholder meetings – Covasna OIP

Scope of the meeting	Date	Number of participants
1 st face to face workshop, St Konstantin & Elena Resort, Bulgaria	28.09.2020	6
SWG on principles and objectives of the strategy/roadmap for strengthening the bioeconomy in Covasna County; presentation of the development Matrix. Sfantu Gheorghe, Covasna County	15.06.2021	23
SWG on principles and objectives of the strategy/roadmap for strengthening the bioeconomy in Covasna County; Matrix for identifying the strategic and operational objectives of the Bioeconomy Strategy/Roadmap in Covasna (first operational objective). Sfantu Gheorghe, Covasna County	03.08.2021	33
SWG on Matrix for identifying the strategic and operational objectives of the Bioeconomy Strategy/Roadmap in Covasna (second operational objective); Best practices of green economy in Ghelinta Commune. Sfantu Gheorghe, Covasna County	04.08.2021	30
SWG on monitoring the activity through indicators, and for all objectives, each type of action, according to the logical matrix for	22.09.2021	63

Scope of the meeting	Date	Number of participants
assessing the impact of the bioeconomy strategy/roadmap in Covasna County. Sfantu Gheorghe, Covasna County		
BE-Rural World Café on Covasna's County bioeconomy potential; presentation of roadmap documents developed in the framework of BE-Rural project; debate with public on the presented documents. Sfantu Gheorghe, Covasna County	23.09.2021	68
SWG on reflection on feedback from BE-Rural World Café on Covasna's County bioeconomy roadmap documents. Sfantu Gheorghe, Covasna County	23.09.2021	39

3.5.3 Outline of the roadmap document

Covasna represents the cradle of the clustering process in Romania. Several clusters (Pro Wood, Green Energy, Transylvania Textile & Fashion, AgriFood Covasna etc.) are part of the business incubator of Sf. Gheorghe, which represents the main innovation actor in the region. They will be the main beneficiaries of the bioeconomy roadmap while the Association of SMEs in the county of Covasna will assure its monitoring and governance.

In the Covasna case, the regional stakeholders are well aware of the urgency of developing a bioeconomy roadmap; and this necessity became even more obvious once the pandemic hit and all businesses were affected by the temporary but complete shutdown of the Romanian economy (not only in the Covasna region). The lack of bioeconomy-oriented institutions and networks hinders the bioeconomy development in Covasna even though it is a region with a strong bioeconomic profile given its natural resources and heritage. Thus, the *Roadmap for a Bioeconomy Strategy in Covasna County* outlines the actions from cross-sectoral areas that are then taken forward by cluster organizations and representatives of the relevant institutions.

Based on the knowledge generated by key local stakeholders during the participatory process, the document follows a logical structure: 1) regional context; 2) methodology; 3) action plan; and 4) monitoring, evaluation and governance. The regional context refers to the analysis of market needs and local conditions as well as the identification of promising (small-scale) business models for bio-based industries. The current situation in Covasna County described in this first chapter was assessed, in addition to other sources, mainly using the BE-Rural PESTEL analysis and the results obtained from the processing of the SAT questionnaires.

According to the logical matrix methodology presented above, the identified objectives that were taken up in the roadmap are as follows: 1) General Objective: Qualitative and sustainable way of living in the region; 2) Strategic Objectives: a) Harmonious Rural Development; b) Socially Responsible Region and c) Competitive advantage by eco-innovation; and 3) Operational Objectives: a) Develop Bioeconomy Business Models ("1 village 1 MW" based on a small-scale technology option ensuring the autonomous energy supply for civil and industrial needs); and b) Support education and cooperation culture for the implementation of regional bioeconomy processes. The actions which have to be developed based on the operational objectives identified in the analysed sectors are mentioned in the third chapter. Specifically, the challenge of assuring a qualitative and sustainable way of living in the region must be addressed both in its economic component by means of developing circular bioeconomy business models, but also in strengthening the human capital, in supporting the cooperation culture as a prerequisite for the implementation of the circular bioeconomy. Furthermore, there is a need for a harmonious rural-urban development, updating infrastructure of any kind, speeding up inclusion of the Roma minority, supporting social responsibility and social innovation initiatives.

The last chapter is dedicated to monitoring, evaluation and governance. As an active local actor involved during the whole participative process of roadmap drafting, the Association of SMEs in Covasna has the ability to further monitor the implementation of the Roadmap for a Bioeconomy Strategy in Covasna County.

The roadmap features a bottom-up approach; activities will be mainly implemented by the regional stakeholders gathered in several public-private partnership (PPP) initiatives concerning business infrastructure, financing of joint projects and capacity building measures including international transfer of good practices. In that regard a stronger cooperation with the Covasna County Council and the City Hall of Sfântu Gheorghe is of highest importance.

In the context of the regional S3 of the Centru Region, which emphasises both the role of clusters as drivers of green, digital, and resilient economic recovery and bioeconomy as one of the smart specializations in the region, funding of the strategy could be assured by means of the Regional Operational Programme as well as the National RDI Plan, Horizon Europe, INTERREG Europe etc. In the same line of thought, the timeline of the strategy is aligned with the general programming period at the EU, national and regional levels (2021-2027).

3.5.4 Outlook and next steps

Achieving a sustainable circular bioeconomy requires a substantial effort on part of both the public authorities and industry. The circular economy is one of the development priorities of the Centru region where Covasna County is located, as it is also a topic that has been carefully analysed in the preparation process of the programming period 2021-2027. Under these circumstances, the roadmap for the bioeconomy strategy of the Covasna County acquires an increased significance. Therefore, on the occasion of the last SWG meetings which were held in September 2021 and dedicated to the elaboration of the document, the creation of a permanent regional bioeconomy panel of stakeholders from Covasna County was discussed. This nucleus of people concerned with promoting the bioeconomy will present the results of the BE-Rural project at future regional events, looking for synergies with similar local initiatives. Additionally, it will launch pilot actions for bioeconomy development (e.g. waste management, soil carbon storage etc.) in rural areas not involved in the BE-Rural project.

The roadmap document elaborated within the BE-Rural project will be a reference document for both other projects initiated at local level and for consolidating the knowledge base and understanding of the specific fields of bioeconomy and will be used for promoting good practices regarding the functioning of the bioeconomy within safe ecological limits.

The active involvement of clusters in the Covasna County in the sustainable circular bioeconomy will stimulate growth in the rural area and will contribute to job creation, especially by halting the migration of young people. The roadmap will be a practical guide for local people in their attempt to capitalize on the vast potential in the bioeconomy of Covasna County.

4 Conclusions and Outlook

The roadmap and strategy documents, which have been developed in the frame of the regional OIPs, reflect the priorities of the broad spectrum of stakeholders who have provided input to their development. The underlying co-creation processes, which were organised in the frame of BE-Rural, aimed at identifying and addressing the needs of the regional bio-based sectors and their representatives, as well as of additional stakeholders who wished to contribute to the formulation of future regional development pathways. The aim of BE-Rural was to enable broad and inclusive stakeholder participation in the roadmap and strategy development processes. The resulting outputs entail a strong mandate from various interest groups, which increases their relevance in the regional and national policy debates.

In the cases of Poland and Latvia, the documents deliver concrete input to ongoing policy processes, namely the development of strategies in the context of the new Operational Programme under the European Social Fund (ESF) in the case of the Polish lagoons, and the formulation of strategic development plans in the case of Kurzeme and Vidzeme. In Covasna, Stara Zagora and Strumica, the roadmap and strategy documents will serve as a key reference for regional stakeholders in their ambition to strengthen the role of the regional bio-based sector as part of related policy developments. All documents outline concrete actions that may be taken forward by individual actors, such as regional clusters and sector associations.

To ensure that the visions and actions formulated in the roadmap and strategy documents will be taken up in relevant policy processes, the OIP facilitators and individual stakeholders already agreed to actively promote and disseminate the documents after their publication. In order to support this ambition, BE-Rural will establish permanent bioeconomy stakeholder panels in each of the regions, consisting of up to five members who will promote the bioeconomy within their regions and represent the regions and their interests to the national governments as 'bioeconomy ambassadors'. The main objective of the stakeholder panels will be to maintain the momentum which has been created in the context of BE-Rural and to ensure broad support for the further development of the regional bioeconomies in the five OIP regions.

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