Rural BioUp
Grow local, go global

Deliverable 3.2

RuralBioUp Regional Hubs' Actions Plan

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Our Consortium

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Abstract	RuralBioUp Regional Hubs' Actions Plan focuses on how to build a regional bioeconomy hub with the engagement of regional stakeholders and how to develop plans to keep the hub active and serving the needs of the region and the stakeholders in the bioeconomy field.
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Index of Contents

Index of Tables

Index of Figures

1. Executive Summary

This deliverable summarizes Action Plans developed by each Regional Hub and provides guidelines for stakeholders' engagement activities, training and events for each Regional HUB as well as instructions for structured discussion on bio-based solutions' development.

The RuralBioUp Regional Hubs' Action Plans aim to address the unique challenges faced by the HUBs in the bioeconomy sector. This deliverable provides an overview of the key objectives and tasks outlined in the nine Action Plans developed by the project HUBs.

The Action Plans focus on the establishment of regional bioeconomy hubs in nine European rural areas to promote economic growth and job creation. These hubs will serve as collaborative spaces for stakeholders, including entrepreneurs, researchers and investors, to come together and develop innovative solutions in the bioeconomy sector.

It is necessary to mention that the Action Plans are not envisaged as a static document, on the contrary, it is a managerial tool and therefore an open document that serves multiple purposes: to compare partial results and discussion modifications to reach the planned KPIs. Being living documents, the Action Plans will be completed along the way, with the participation in the actions organized within the RuralBioUp project.

2. Introduction

2.1 Structure of deliverable

The document is structured as follows: PART 1 gives a general overview of RuralBioUp regional HUBs and the vision and specification of the value chains chosen by each HUB. It analyses whether the HUBs have reached the first milestones associated with the establishment of HUBs.

PART 2 is a practical part and documents the individual Action Plans that were prepared by the HUBs during the period of the HUB's establishment (i.e. between June and December 2023).

3. Regional HUBs: Vision, focus, plan

During year 2023, many activities have slowly begun to take place in the nine RuralBioUp regional HUBs. On the basis of many researches, interviews and analyses, the mapping of possibilities for the development of the bioeconomy in rural regions started, stakeholders who were already involved in some way in activities connected with the bioeconomy sector in the project regions were mapped, and the needs of the regions for the development of the bioeconomy were determined. Based on these findings, conversations with stakeholders begun and HUBs were established through the co-creation process between June 2023 and December 2023. A total of 9 HUBs were established, of which 4 primarily focus on agriculture and the remaining 5 HUBs focus on agriculture and forestry (see table 1 for breakdown).

Agriculture	**Agriculture and forestry**
Puglia Regional HUB	Lombardia Regional HUB
Pays de la Loire Regional HUB	BIOEAST HUB CZ Charles Spa Regional HUB
Auvergne-Rhone-Alpes Regional HUB	Latvia Regional HUB
Ireland Regional HUB	Centru Region Regional HUB
-	Marche Regional HUB

Table 1 Main sectoral focus of established regional HUBs

3.1 Vision of the HUBs

The vision of the **Puglia Regional HUB** is to act in coherence with the national strategy by activating a regional institutional coordination between the different actors that make up the regional Akis. This will make it possible to identify and share the best and territorially most suitable tools for disseminating knowledge and adopting innovations. This will also result from the identification of needs on a provincial and local basis that enterprises and territories

manifest in relation to the knowledge system objective. The Hub aims to promote the development of three supply chains related to the bioeconomy in the rural environment. These supply chains are biofertilizers and bioactive compounds, agrovoltaic and bioenergy. The Hub will promote sustainable development in the region and at the same time create new employment and development opportunities for the residents of Apulia.

The **Pays de la Loire HUB** envisages the creation of a regional network made up of stakeholders involved in the circular bioeconomy transition, with the aim of defining 2 value chains and 6 intervalue chains, sharing knowledge and good practices as well as organizing networking events. The Pays de la Loire Hub aims by 31 July 2025 to have gathered the participation of at least 30 stakeholders and to achieve 444 participations in training, networking and good practices. In addition, it plans to include Hub followers and organize study visits to promote the exchange and information on viable, sustainable production facilities.

The vision of the **Auvergne-Rhône-Alpes Hub** (AURA) is to promote the circular economy in the region by developing initiatives and promoting the implementation of the circular economy by all actors involved. It focuses mainly on plant products and biomass, but also works with various actors to achieve the goals it has set, such as the commitment of stakeholders to appropriation as well as the implementation of collective change processes that are territorially anchored and based on collaborative models such as the circular economy, the functional economy, industrial and territorial ecology, biomimicry, eco-design, product life extension, and innovation through use. The AURA Hub aims to create a regional Hub, involving at least 30 stakeholders and defining at least 2 value chains + 6 inter-value chains.

The vision of the **Irish Regional Hub** is to further develop Ireland's bioeconomy in line with the 2018 National Policy Statement on the Bioeconomy "to be a global leader for the bioeconomy" through a coordinated approach that leverages natural resources and competitive advantage of Ireland, the hub will organize site visits in Ireland and Europe, provide training on relevant bioeconomy topics and bring together stakeholders from the bioeconomy and agriculture to provide information on funding and cross-border cooperation opportunities. promoting exploration, co-creativity, innovation and new knowledge to deliver climate action. The Hub takes a holistic approach, combining a range of technologies and practices to reduce greenhouse gas emissions and increase farm productivity and resilience.

Lombardia's Regional HUB vision is to create a collaborative network of professionals and companies in selected bioeconomic supply chains with the aim of promoting critical mass and collaboration. Alleviating the burden and limits of regulations on stakeholders and creating partnerships between companies that share similar ambitions and problems is also part of the vision. It also pursues the development of promising supply chains such as textiles, green building, green chemistry, etc. with the aim of creating an economy by minimizing the production of waste for disposal, contributing to the development of the bioeconomy and the reduction of fossil carbon emissions.

The vision of **BIOEAST HUB CZ Charles Spa Regional HUB**, is to enhance the development of the bioeconomy sector through education, awareness and networking. The aim is to promote innovation and good practice in the field, in creating links with research organizations as well as with other industries. It also seeks to build strong relationships with local stakeholders and ensure their commitment and participation in RuralBioUp activities. In addition it plans to organize various events such as national bioeconomy conferences, technology expos and networking events to promote the bioeconomy sector and create a sustainable and innovative bioeconomy sector in the Charles Spa area and beyond.

The vision of the **Latvia Regional Hub** is to act as a regional network of stakeholders interested in exploring and implementing a circular bioeconomy in the Latvian regions, bridging the Latvian regions with other EU regions and sharing good practices within the regions, organizing events networking and study visits within the region and to other countries, support the strengthening of value chains and provide training focused on bioeconomy and innovation management. In addition, the Latvia Hub aims to organize good practice demonstrations with the ultimate goal of supporting small-scale innovations and the development of small-scale organic solutions in rural areas.

The vision of the **CENTRU Region Regional HUB** is to achieve a sustainable transition towards the use of renewable energy sources and the sustainable management of agricultural, plant and wood resources in the CENTRU Region of Romania. It envisages to promote the development of the bioeconomy in the region while stimulating economic activity, and cooperation in the field of wood biomass use, developing access to finance for wood biomass use projects, improving biomass policies and legislation and the expansion of economic activity and cooperation in the field of the use of wood biomass. In addition, it envisages the creation of biolabel communities, the promotion of best bioeconomy practices by implementing domestic/district heating systems obtained from bioenergy sources.

The main vision of the **Marche Regional HUB** is to create a “technical table on the bioeconomy” (an advisory and support board) that would also provide advice and cooperation with decision-makers in the Marche region after the end of this project. This initiative would be an excellent legacy for RuralBioUp. The aim is to support new innovative projects within the operational groups already established in the previous programming period, which are to be implemented thanks to the activities carried out within the Action Plan.

3.2 Plans and goals of the HUBs

The **Puglia Regional HUB** is an initiative that aims to create a bioeconomy training center in the region of Puglia, Italy. The objectives of this initiative are to promote the development of three supply chains linked to the agricultural sector in rural areas, to facilitate sustainable development in the region and to create new employment and development opportunities for the people of Puglia.

To achieve these goals, the Puglia Regional HUB has set four objectives and for each of them tasks have been prepared with relevant timetables, resources, and stakeholders to be involved. In addition, the initiative also involves cooperation between various stakeholders, including Public Administrations, Companies/Sector Associations, Research Institutions, Organizations of various types, Consultants and NGOs from civil society.

The Puglia Regional HUB has established a Bioeconomy Regional Technical Panel to facilitate exchange of best practices, useful information, new project support and constructive lobbying.

The **Pays de la Loire hub** focuses on six objectives which are establishing a regional hub, involving at least 30 stakeholders, defining at least 2 value chains and 6 inter-value chains, organizing 2 networking events, 2 study visits, and ensuring at least 444 attendances to training sessions. The progress of the Pays de la Loire hub includes the mapping of 80 organizations, the organization of the hub kick-off meeting with 34 stakeholders, and the identification of 2 value chains related to food and non-food plant-based by-products. Moreover, 704 attendances to training sessions have been achieved, and 2 organizations are following the hub's progress. The stakeholders involved in the Pays de la Loire hub include various private sector businesses, civil society organizations, and institutions. The events and training sessions organized include the hub kick-off meeting, networking events, study visits, and training on stakeholder engagement. The progress and achievements indicate a strong commitment to the objectives of the Pays de la Loire hub and the active involvement of relevant stakeholders in the region.

The **Auvergne-Rhône-Alpes Hub** (AURA) focuses on six objectives which are establishing a regional hub, involving at least 30 stakeholders, defining at least 2 value chains and 6 inter-value chains, organizing 2 networking events, 2 study visits, and ensuring at least 444 attendances to training sessions. The progress of the HUB AURA includes the mapping of 47 organizations, the organization of the hub kick-off meeting with 17 stakeholders, and the identification of 2 value chains related to food and non-food plant-based by-products. Moreover, 330 attendances to training sessions have been achieved, and 2 organizations are following the hub's progress. The stakeholders involved in the AURA Hub include various private sector businesses, civil society organizations, and institutions such as ACTIV' HOME, ADEME AUVERGNE RHONE ALPES, ALTO PHYTO, BEERSCUIT, and BIO-VALO. The events and training sessions organized include the hub kick-off meeting, networking events, study visits, and training on stakeholder engagement. The progress and achievements indicate a strong commitment to the objectives of the AURA Hub and the active involvement of relevant stakeholders in the region.

Additionally, the objectives of the AURA Hub include promoting the circular economy in the region by developing initiatives and promoting the implementation of the circular economy by all actors involved. The Hub is mainly focused on biomass and plant-based products, but it also collaborates with various actors to achieve its goals.

Overall, the AURA Hub has made progress in achieving its objectives, with some actions already achieved and others in progress. The AURA Hub is committed to promoting the circular economy in the region and engaging stakeholders in the appropriation and implementation of collective processes of change anchored territorially and based on cooperation models such as the circular

economy, the functional economy, industrial and territorial ecology, biomimicry, eco-design, extending the lifespan of products, and innovation through use.

The **Ireland Regional Hub** aims to further develop Ireland's bioeconomy in line with the 2018 National Policy Statement on the Bioeconomy. Establishing Ireland as a global leader for the bioeconomy through a coordinated approach that leverages Ireland's natural resources and competitive advantage and that takes full advantage of available opportunities while monitoring and avoiding unintended consequences. In addition, the Ireland Regional HUB will showcase rural development projects, promote exploration, co-creativity, innovation and new knowledge to deliver climate action and the economic and social benefits of decarbonisation. The Ireland Regional HUB aims to achieve this by organizing site visits in Ireland and Europe, providing training on relevant bioeconomy topics, and bringing stakeholders from the bioeconomy and agriculture together to provide information on funding opportunities and cross-border collaboration.

More specifically the objectives of the Ireland Regional Hub include organizing study visits to Ireland and Europe, providing training on relevant bioeconomy topics and hosting networking/matchmaking events. The Ireland Regional HUB aims to engage stakeholders from government, academia and industry, including representatives from primary producers, clusters, co-operatives and research centres. The value chains identified during the kick-off meeting focused on dairy and forestry, particularly the valorization of dairy by-products such as whey and dairy processing sludge. Training sessions will cover topics such as bioeconomy general knowledge, communication, access to finance, circular bioeconomy, and bioeconomy education for younger audiences. The Ireland Regional HUB will also organize site visits in Ireland such as the National Bioeconomy Campus and Farm Zero C, as well as farm walks to facilitate discussions on small-scale craft-based solutions. The stakeholders involved in these initiatives include government bodies, industry, and academia, demonstrating a collaborative effort to promote the bioeconomy in Ireland.

The **Lombardia Regional HUB** has identified value chains in green chemistry, green building, textiles and other promising supply chains. And it seeks, through the four objectives it has set, to create an economy by minimizing the production of waste for disposal. The first objective is to create added value for stakeholders by promoting critical mass and collaboration between practitioners and companies in selected bioeconomy supply chains. The second objective is to propose objectives for stakeholders, which includes defining the goals and objectives of the action plan and describing what will be achieved. The third objective is to implement the action plan, which includes a detailed timeline and step-by-step instructions on how to implement the action plan. Finally, the fourth objective is to create a technical panel on the bioeconomy, which has a remarkable strategic value, as it will continue to function even after the end of the RuralBioUp project as a valuable legacy of the work carried out the Hub.

To achieve the set goals and objectives, the Hub organized two meetings with stakeholders, the first on a remote telematics platform (July 6, 2023), the other presence in Osimo at AMAP headquarters (December 6, 2023). The Lombardia Regional HUB has also proposed various outreach activities to reach, inform and involve the stakeholder group, such as periodic meetings

(face-to-face or online), the use of the "Rural Spot" tool, support for the development of new projects and the creation of stakeholder networks in specific supply chains.

BIOEAST HUB CZ Charles Spa Regional HUB, focuses on four objectives. Firstly, it aims to act as a regional network of stakeholders interested in exploring and implementing the circular bioeconomy. Secondly, it seeks to provide personalized training focused on the circular bioeconomy, as well as assistance to stakeholders and organizing networking events. In addition, the Hub aims to enhance innovation and technology transfer in the Charles Spa area, support the strengthening of value chains and promote bioeconomy education in the area. The Hub also plans to bridge the Charles Spa region with other EU regions and share good practices, as well as to create bridges between regional actors and organizations from other regions in relevant sectors.

Furthermore, BIOEAST HUB CZ Charles Spa Regional HUB aims to create a vibrant and innovative bioeconomy sector in the Charles Spa region and beyond through education, awareness raising and networking. Among the agencies involved are the public administration, the private sector and businesses, R&D and the educational community. The plan contains the continuation of the events, the provision of training and assistance and the bridging between regional actors and organizations of other regions in respective relevant fields.

The **Latvia Regional HUB**, focuses on four goals, initial goal is to operate as a regional network of stakeholders interested in exploring and implementing circular bioeconomy in the regions. The second goal is to bridge Latvia Region with other EU regions and share good practice how to implement bioeconomy within regions, organize networking events and study visits to other countries and regions, share knowledge with project followers. The third objective is to enhance innovation and technology transfer in Latvia region from other regions, support the enhancement of value chains, and provide training focused on bioeconomy and Innovation management. Additionally, the Latvia Regional HUB aims to organize good practice demonstrations within Latvia and from other RuralBioUp project regions, as well as organize good practice demonstrations to RuralBioUp regions. The final goal is to support small-scale innovations and small-scale bio-based solution development in rural areas.

The stakeholders involved in the Latvia Hub include NGOs, agricultural organizations, and other regional stakeholders interested in exploring and implementing circular bioeconomy in the regions. The value chains include, the utilization of agricultural and forest resources to create new products and solutions, as well as the incorporation of bio services, such as beehives, into agroforestry systems to keep them more sustainable with higher economic value.

Moreover, the events and training sessions organized by the Latvia Regional HUB include conferences, workshops, and seminars focused on circular bioeconomy, funding and project proposal writing, and bioeconomy topics. The Latvia Regional HUB also organizes networking events for inviting new stakeholders give update information and help them find new funding opportunities, organize trainings focused on bioeconomy and small-scale biobased solution, study visits inside the region and to other countries, as well as with other HUBS or clusters. Additionally, the Latvia Regional HUB provides training materials and seminars/webinars dedicated to value chains, and presentations about good practice examples where science

meets stakeholders. The Latvia Regional HUB also collects feedback from stakeholders during and after every event and updates its action plan and other planning documents regularly.

The **Centru Region Regional HUB** aims to promote the development of the bioeconomy in the CENTRU Region of Romania. The goal of the Centru Region Regional HUB is to achieve a sustainable transition towards the use of renewable energy and the sustainable management of agricultural, plant, and wood resources. The Centru Region Regional HUB aims to stimulate economic activity and cooperation in the field of wood biomass use, develop access to financing for wood biomass use projects, improve policies and legislation in the field of biomass, and expand the economic activity and collaboration in the field of wood biomass use. The Centru Region Regional HUB also aims to establish sustainable communities in the CENTRU Region of Romania and to promote best practices in bioeconomy, including district heating systems.

Moreover, the Centru Region Regional HUB, focuses on 6 objectives including the development of local green waste management, development of technical capacities for harvesting, storage and logistic utilization of agrobiomass for energy purposes, Encouraging households to collect and manage green waste sustainably, Establishment of energy plantations (energy willow, poplar, etc. - suitable for the region), Implementing renewable energy sources in public buildings and encouraging the use of biomass for heating, and final the inclusion of measures regarding the efficient management of biomass in the strategy of the LAGs. The details of these objectives and the specific actions to achieve them will be established and modified along the way, with the participation in the actions organized within the RuralBioUp project.

Additionally, the stakeholders involved in the Centru Region Regional Hub include regional policy makers, Researchers, Industries, Multipliers and representatives of other institutions from the Center region who have expressed their interest in the project. Cooperation between regional actors will benefit from the increased opportunities offered by the activities carried out under the RuralBioUp project. Value chains include the sustainable use of natural wood materials/products, the sustainable management of biological resources, wood resources and the use of renewable energy sources. In terms of events and training sessions, targets have been set that refer to different training courses, workshops, study visits, webinars, networking events and other forms of collaboration.

The **Marche Regional HUB** set up is based on a co-creation process with stakeholders. The objectives of this HUB are to promote the development of three supply chains linked to the agricultural sector in rural areas, to establish the Technical Table on the Bioeconomy. The "Technical Table on the Bioeconomy" which has a marked strategic value as it will continue to operate even after the end of the RuralBioUp project as a precious legacy of the work carried out by the Marche Hub. At the moment the Tasks of this goal are not easy to establish, this will be possible with the Hub activities procedures.

To achieve these goals, the Marche Regional HUB has set four objectives and for each of them tasks have been prepared with relevant timetables, resources, and stakeholders to be involved. In addition, the HUB also involves cooperation between various stakeholders, including Public

Administrations, Companies/Sector Associations, Research Institutions, Organizations of various types, Consultants and NGOs from civil society.

4. RuralBioUp Hubs' Action Plans

Action Plans of individual regional HUBs presented in this chapter are the result of considerable work by HUB Facilitators in their regions, and the involvement of interested parties. Through these steps HUB Facilitators were guided by a Guideline suggesting appropriate practices and practical examples that can be used to initiate the co-creative process that will launch the hubs. Subsequently, a Guideline was created on how to create Action Plans, which also used examples to help facilitators to set the goals, plans and steps of their HUB. Both guidelines were created by the ART team and are available on the project clouds and and are also included as an appendix to this deliverable.

4.1 A RuralBioUp hub Action Plan – Puglia Regional HUB

4.1.1 Introduction

The aim of this Action Plan (P.A.) is to provide the framework of the activities that the facilitators and the Regional contact point of the Apulia Hub (SPRING and the Department of Agriculture, Rural Development and Fisheries, Section - Competitiveness of agri-food chains, respectively) will organise in order to facilitate the development of three supply chains (one more than those required by the Project) linked to the bio-economy in the rural context.
With this in mind - starting from an in-depth analysis of the context and a series of questionnaires addressed to the Hub's members - four "Goals" have been established and for each of them "tasks" with a relative timeline, resources and stakeholders to be involved.
All this was conceived with a view to ensuring an S.M.A.R.T. approach, i.e. Specific, Measurable, Achievable, Relevant and Time-bound.

In addition, the following principles were considered for the Action Plan:
a. Environmental Sustainability:
- Decrease carbon emissions by implementing energy-efficient practices in buildings.
- Increase recycling rates by implementing a comprehensive recycling program in a community.
- Promote sustainable transportation options by encouraging the use of public transit and cycling infrastructure.

b. Education:
- Improve literacy rates by implementing reading intervention programs for elementary school students.
- Increase access to quality education in rural areas by establishing mobile classrooms or digital learning initiatives.

- Enhance skills development by implementing vocational training programs for unemployed youth.

c. Economic Development:
- Increase employment opportunities by supporting entrepreneurship through business incubation programs.
- Enhance tourism and local economies by developing and promoting cultural and heritage attractions.
- Improve financial literacy and access to financial services in underserved communities.

d. Social Justice:
- Promote gender equality by implementing policies to reduce the gender pay gap.
- Strengthen social inclusion by creating programs.

4.1.2 Target Audience and Situation Analysis

(Identifies the specific group or individuals the action plan is intended to reach and benefit.Analyzes the current state of affairs, including strengths, weaknesses, opportunities, and threats).

Apulia, located in the southern part of Italy, is a region renowned for its picturesque landscapes, rich history, and vibrant cultural heritage. Known as the "heel of the boot" due to its distinctive shape on the map, Puglia boasts a diverse agricultural sector that plays a crucial role in its economy. In 2020, the gross domestic product of Apulia amounted to EUR 66,465 million, registering, compared to the previous year, a sharp decrease in real terms of -8.3% (chained values), despite the fact that since 2014 it had maintained a consistently positive trend, although remaining below the values reached in 2011 (-5%). The territory of Apulia has a surface area of 1,954,050 hectares, equal to 6.5% of the entire national territory and 15.8% of that of Southern Italy. As of 1 January 2022, Apulia has a resident population of 3,922,941 inhabitants. In 2021, employment in Apulia increased by just over 18,600 units (+1.6%), reaching a total of approximately 1,206,760 employees, a percentage increase that is higher than at national level (+0.8%) and in the Mezzogiorno (+1.3%). The number of people employed in agriculture increased by 1% in the last year, an increase that was lower than both the values for the South (+2.7%) and the national level (+1%).

The Apulia fertile soil supports a variety of crops, making agriculture a cornerstone of the region's economic activities. In 2021, the value of production and services produced by Apulia's agriculture increased compared to 2020, thanks to a particularly significant contribution from wood crops and related activities. On the other hand, some indicators, such as that of fixed investments or the value added (VA) produced by the regional food industry, translate the conditions of uncertainty caused by the COVID-19 pandemic into a reduction in performance compared to previous years. However, the data continue to delineate for Apulia an agricultural sector oriented towards crop diversification, but also multifunctionality, and particularly inclined to confront markets, albeit still in a context of strong and increasingly complex global pressures.

Context analysis from the Regional complement for Rural Development (CSR 2023)

Over the last ten years, the performance of Puglia's gross domestic product (GDP) has been characterized by alternating periods of decline, starting from the sharp peak in 2013, and phases of substantial growth in the period 2014-2019. In 2020, according to EUROSTAT data, the regional GDP was 71,643 million euros and the GDP per capita was approximately 18,170 euros. Employment in the regional primary sector recorded an increase of 4.3%, an increase which particularly affected the male component (+14.5%), while the female component recorded a decrease (-16.4%) . The employment rate between 20 and 64 years old in 2021 was 50.5%, while the unemployed were 205,000. Total employment in 2020 was 1,370,000, of which 122,000 in agriculture, forestry and fishing, 270,000 in industries and 971,000 in services. The aggregate agriculture, forestry and fishing generated, in 2020, a gross added value of approximately 4.8 billion euros (the contributions from fishing and forestry were modest).

In 2019, Apulian agricultural companies were (source: Agricultural Accounting Information Network) divided into the following sectors: 17% wine, 16% olive, followed by cereal, mixed tree and livestock companies. From other investigations (source: Report 2022 "Apulian agriculture matters") for the year 2019 it emerged that the companies with the highest PLV are those focused on livestock farming with dairy cattle (147,684 euros), followed by those focused on fruit, then open field vegetables.

The main threats to agricultural companies are competition, market instability and price volatility. Such threats can be countered by implementing measures to stabilize farmers' incomes and increase farm resilience.

The propensity to invest in agriculture, expressed as fixed investments on agricultural added value, recorded a decrease of 3% from 2008 to 2018 in Puglia (in line with Southern Italy). According to Istat data, gross fixed investments in agriculture in 2021 reached a value of approximately 11 million euros. Access to credit continues to be a limiting factor for agri-food companies which, in fact, have no possibility of growth.

Selected stakeholders

The Cluster SPRING is a non-profit association acting as the Italian Circular Bioeconomy Cluster. SPRING seeks to encourage sustainable innovation and acts as a springboard for development and systemic growth based on the bioeconomy. SPRING fosters the creation of a strong, cohesive and representative community, represents its interests before regional, national, European and international institutions and promotes visibility and awareness among the general and specialist public. Thanks to the experience gained in previous projects acts to facilitate the transition from a product-based to a system-based economy, starting from the valorisation of territories and local resources through the engagement and the collaboration of the different stakeholders along the entire value chains.

Considering the nature of the cluster and his position on the bioeconomy at local, regional and national level SPRING selected to focus on Apulia region for multiple reasons. Frist of all, the SPRING national action plan include the development of Mezzogiorno as one of the strategic orientations. In addition, Apulia has been recognized as the second region in the Mezzogiorno

as added value of the bioeconomy over the region (after Campania) with 5.3 billion euro. Numbers on the employment rate, in the bioeconomy on the regional total, placed Apulia (12,2%) in the third place at national level. Moreover, the weight of the agricultural and food sector on the regional economy is around the 5%, indicating the high relevance of these sectors for the regional economy[1].

The first step towards a Puglia intervention strategy in the Bioeconomy panorama has been developed through the "Manifesto of the Bioeconomy in Apulia", undertaken by institutions (Presidency of the Apulia Region), research bodies (University of Bari) and industry (Confindustria) and signed on 20 March 2019. The The Alliance is committed to fostering the promotion, transition and adoption of the principles of the Bioeconomy through the establishment of a permanent table involving all stakeholders and aiming at:

- facilitate connections and dialogue between stakeholders from different value chains to facilitate a rapid transition to the Bioeconomy;
- promote and disseminate Bioeconomy principles at all levels;
- farm and map (as-is) the Apulian context regarding the Bioeconomy;
- draft a roadmap (to-be) for the strategic development of the Bioeconomy in Apulia;

The presence of Apulia, among the regions of Southern Italy, in the area of circular bio-economy and innovation, which are considered of primary importance in the rural context, makes it possible to define two main objectives and assign different categories of stakeholders in the following action plan.

Objectives:

- Set up a permanent working group that, even after the end of the project, would provide advice and collaboration to decision-makers in the Puglia region as a Technical Table on the Bioeconomy. Such a structure would be an excellent legacy of the project, both for the PAs involved and for the stakeholders.
- Promote within Operational Groups already established with the previous programming period, new innovative projects to be carried out thanks to the activities carried out with the RuralBioUp project.

Stakeholder categories:

- **Companies** operating within agricultural and agro-industrial economic chains.
- **Local research bodies** involved in product and/or bioproduct development programmes.
- **Trade associations** able to extend stakeholder involvement and dissemination of the outcomes of the RuralBioUp Project.
- **Public Administrations** (managers and technical officials) as a direct reference for local development strategies

[1] The data related to Apulia region has been obtained from the 8th report on the Bioeconomy in Europe (https://group.intesasanpaolo.com/it/research/research-in-primo-piano/ricerche-tematiche/2022/8--rapporto-la-bioeconomia-in-europa)

- **Technical consultants**, professional figures of great utility as an interface between governance/research and companies. The technical consultant is the person who has gained the trust of the company owner and is listened to when proposing changes in activities, new opportunities, innovative ideas.
- **Financial advisors**, with a view to facilitating access to economic resources useful for developing specific initiatives.

Based on the above, the selection of stakeholders and the definition of the main objectives were made from a close collaboration between SPRING, ITABIA and the Department of Agriculture, Rural Development and Fisheries, Section - Competitiveness of agri-food chains from Puglia regional administration.

Steps that lead to the HUB creation:

- Direct contact with the Department of Agriculture, Rural Development and Fisheries, Section - Competitiveness of agri-food chains. This structure has been selected due to his strategic, innovative policy leadership role within the region and, regional instrument of reference and connection between the production system and the world of research.
- Study and analysis of opportunities by understanding the critical issues and innovative projects in the territory. This step has been based on the discussion with the regional administration and analysis of their strategies (e.g. CSR 2023, regional laws, proposal for a Participatory Regional Law 'Provisions on the Bioeconomy
- Map and analysis of EIP-AGRI Operation Group (OG) as a functional unit for the social and economic development of a territory. Many selection criteria have been identified with the Department of Agriculture Rural Development and Fisheries to select the OGs.
- First approach to stakeholder by mean of email to present the project and understand their interests.

4.1.3 Public strategies and policy instruments

(*Analyzes the current state of affairs, including strengths, weaknesses, opportunities, and threats*).

The Complement for Rural Development (CSR) of the Apulia Region can be considered the main strategic instrument of reference for the agricultural, agro-industrial and territorial system of Apulia in the programming period from 2023 to 2027 with a total of €1,184,879,283 of allocated funds.

The regional strategic choices definitively approved through the partnership sharing process are as follows:

Sustainability of production processes: The Region of Apulia intends to integrate the issue of sustainability in all production processes, supporting production methods with reduced use of chemical inputs, targeted actions to protect biodiversity and agricultural and forest ecosystems, but also through the support of investments for the proper management of water resources, for

the adaptation of livestock systems to improve their sustainability, ensure animal welfare and biosecurity. In addition, carbon sequestration is also to be increased through the preservation and management of the forest heritage and the promotion of new forest plantations.

Organic farming and integrated production: The Apulia Region intends to contribute to this ambitious objective by relying on a considerable agricultural area already conducted with organic methods; in fact, about 23% of the regional agricultural UAA is conducted with this production method. The Plan intends to contribute to maintaining and further increasing this surface area if we consider that approximately 23% of the total regional public resources are dedicated to payments that incentivise organic farming; this focus on organic methods is reinforced, directly and indirectly, by the possibility envisaged for organic beneficiaries to also have access to support for other agri-environmental interventions, and by the possible definition of more favourable selection criteria in a set of rural development interventions.

Competitiveness of production processes: The competitiveness of regional production processes represents an important lever to ensure productive efficiency of agricultural and agri-food enterprises, to improve market position through innovative and sustainable investments, to encourage greater aggregation of supply and vertical and horizontal supply chain integration, in order to achieve a fairer distribution of value.

Generational change: The abandonment of agricultural activities is one of the main obstacles to increasing the competitiveness of the sector with undoubted impacts on the socio-economic vitality of rural territories in terms of depopulation and ageing of the population in these territories. Four per cent of the regional CSR public resources are dedicated to the start-up of new businesses in agriculture. These resources must contribute to the creation of new entrepreneurial opportunities, especially for the younger generations and women, by favouring the conditions of access to land and credit as well as an effective technical assistance network and the transfer of knowledge, including practical-operational knowledge, using the most efficient and innovative agricultural businesses as a benchmark and a place for field training for potential new entrepreneurs.

Attractiveness of rural areas: The Region of Apulia contributes to the development needs of rural areas in terms of reducing the gap between rural and urban areas with regard to basic services, infrastructure, unemployment, demographic trends, poverty, social inclusion, gender equality and vulnerable groups, targeting the most marginal rural areas as a priority.

The knowledge system (AKIS) at the service of competitiveness and sustainability: Information, awareness, knowledge are fundamental aspects to stimulate the change of production techniques and positively affect the fight against climate change, the quality of life and well-being, human health; it is fundamental to adopt a systemic and transdisciplinary approach to the strengthening of professional skills and competences along the supply chains and to the implementation of multi-actor collaboration processes, just as it is a priority to optimise the capacity of innovation transfer, both between the creators of new knowledge and between them and the final users (enterprises, institutions). The Apulia Region will support with

a horizontal intervention logic to which 3.75% of the CSR public allocation is allocated (44.045.742,00 eur). The main action sustained, with more than 60% of allocated fund, is related to EIP-AGRI Operational Groups (SRG01).

Regional rural development policies are part of a broader and more coordinated strategic "vision", which is the scope of European, national and regional programming in coherence with the following policy documents.

- The **Regional Government Programme**, adopted on 26/11/2020, with which the Council has defined the strategies and policies to be implemented over the legislative period, capable of combining the challenges on competitiveness, attractiveness and solidarity that the 2030 Agenda together with the National Strategy for Sustainable Development have set;
- The **2021-2027** programming of the **ERDF** (European Regional Development Fund) and **ESF+** (European Social Fund plus) funds financed under the Cohesion Policy, aimed at promoting and supporting the "overall harmonious development" of Member States and Regions;
- The **Intelligent Specialisation Strategy 2021-2027 (S3)**, which directs regional policies for research and innovation in order to foster the growth of production areas with strong development potential, taking an approach based on priorities related to the challenges impacting on the most established and emerging production specialisations, reinterpreting the boundaries of the different production systems.
- The **Agenda 2030 regional strategy for sustainable development**, which translates the objectives of the UN Agenda into regional terms.

4.1.4 Context and SWOT analysis

In 2019, the regional GDP was approximately EUR 73,064 million and increased by 0.7 per cent (chained values) compared to 2018. In 2020, according to EUROSTAT data, regional GDP was EUR 71,643 million and GDP per capita was approximately EUR 18,170. Employment in the regional primary sector increased by 4.3%, an increase that particularly affected the male component (+14.5%), while the female component recorded a decrease (-16.4%). The employment rate between the ages of 20 and 64 in the year 2021 was 50.5%, while the unemployed numbered 205,000. Total employment in 2020 was 1,370,000, of which 122,000 were in agriculture, forestry and fishing, 270,000 in industry and 971,000 in services. The aggregate of agriculture, forestry and fishing generated a gross value added of about EUR 4.8 billion in 2020. The contributions of fishing and forestry to the total output of the aggregate remain modest at around EUR 240 million for fishing and EUR 28.8 million for forestry.

The primary sector in Apulia is characterised by the presence of diversified production situations due to the territorial conformation of the region: the territory is predominantly flat and hilly,

the distribution of the population is uneven and the region has the largest number of hectares of Utilised Agricultural Area (UAA). The territory of Apulia has a surface area of 1,954,050 hectares, equal to 6.5% of the entire national territory and 15.8% of that of southern Italy. The contribution of the primary sector to the formation of the added value of the regional economy in terms of current prices, in 2018 is 2,881 million euro (CREA, 2021). The most recent Istat data on farm structure and production refer to the year 2017 and report for Apulia 242,899 farms and a total UAA of 1,328,051 hectares.

SWOT	**Agriculture and Bioeconomy in Puglia Region**
Strength	
S1.1	Propensity for diversification
S1.2	High natural biodiversity
S1.3	Economic performance of farms led by young people
S1.4	High specialisation in leading crops
S2.1	Sustainable and conservative farming techniques
S2.2	Reduced use of fertilisers and pesticides
S2.3	High incidence of organic farming
S2.4	Degree of employment in agriculture
S4.1	Presence of research institutions
S4.2	Presence of educational institutions
S4.3	Precision farming
S4.4	High added value production
Weaknesses	
W1.1	Access to finance
W1.2	Poor competitiveness
W1.3	Highly traditional livestock system
W1.4	Low investment in innovation
W1.5	Excessive bureaucracy
W1.6	Structural weakness of farms
W1.7	Poor supply chain integration
W3.1	Access to credit
W3.2	Access to land
W3.3	Limited generational change
W3.4	Depopulation
W3.5	Infrastructural deficiencies
W4.1	AKIS system too fragmented and uncoordinated
W4.2	Low level of associationism
W4.3	Obsolete company structures
Opportunities	
O1.1	Growing consumer awareness of food quality, typicality and sustainability
O1.2	New technologies adaptable to different business types
O1.3	Innovative relationships with consumers

O2.3	New technologies (agriculture 4.0 and big data)
O2.4	Adherence to sustainable production methods
O3.1	Cooperation-aggregation
O3.3	Short supply chain
O3.5	Promotion of adherence to forms of collective bargaining (networks, districts, LEADER)
O4.1	Development of environmentally friendly processes
O4.2	Technological development
O4.3	Investment in research and development
O4.4	Investment in renewable energy resources
O4.5	Digital transition
Threats	
T1.2	Depopulation
T1.3	Poor adherence to innovations
T1.4	Production risks related to crisis situations
T2.2	Increased energy costs
T2.3	Decreased carbon content in soils
T2.4	Instability of agricultural and forest ecosystems
T3.1	Soil consumption
T3.2	Poor access to markets
T3.3	Low remuneration of production factors
T3.4	Generational change
T3.5	Loss of local identity and sense of belonging
T4.1	Competitiveness of low production cost countries
T4.2	Risk of growing digital divide between rural and urban areas

Table 2 SWTO analyzis for Agriculture and Bioeconomy in Puglia Region

Biomass production and utilization

SNo	Feedstock	Cultivated Area (Hectare)	Wet_Yield(Tonnes / Hectare)	Arisings (Wet Tonnes)	Traditional End Use
1	Olive (pruning)	381.000	2	800.100	
2	Durum wheat (straw)	343.300	1	446.290	
3	Vineyard	111.949	3	313.457	
4	Wine dregs (skins, grape sones and stalks)	0	-	231.840	
5	Olive oil (exhausted olive cake)	0	-	162.758	
6	Tomato (skins, processing wastes)	0	-	86.456	
7	Cherry Tree	18.609	3	55.827	
8	Citrus fruits (pulp, peel)	0	-	41.621	
9	Barley (straw)	21.550	2	32.325	

10	Oat (straw)	24.050	1	28.860	
11	Soft wheat (straw)	15.550	2	23.325	
12	Almond	19.878	1	21.866	
13	Potatoes	3.038	7	19.747	
14	Waxy corn	1.995	7	13.167	
15	Broad bean	6.445	2	12.246	
16	Peaches	4.060	3	12.180	
17	Clementin	4.950	2	9.405	
18	Sunflower	1.895	4	7.770	
19	Orange	3.990	2	7.581	
20	Corn (corn stalk)	845	7	5.577	
21	Chickpea	1.820	2	3.458	
22	Apricot tree	1.085	3	3.255	
23	Pea	1.165	2	2.214	
24	Potato (skins, selection)	0	-	1.491	
25	Plum Tree	460	3	1.380	
26	Legumes (vegetable residues)	0	-	1.303	
27	Sorghum	100	12	1.220	
28	Drupaceae	0	-	939	
29	Lentil	482	2	916	
30	Fruit shells	0	-	853	
31	Beans	370	2	703	
32	Pistachios	273	2	519	
33	Pear Tree	390	1	468	
34	Apple Tree	230	1	322	
35	Tangerine	137	2	260	
36	Pear	0	-	54	
37	Apples	0	-	42	
38	Kiwi	0	-	21	
39	Grass (ryegrass)	580	-	-	
40	Other Cereal Straw	6.180	-	-	
41	Rape (Brassica napus+ B.rapa subsp. Oleifera)	155	-	-	
42	Linen	4	-	-	
43	Hemp	138	-	-	
44	prickly pears	323	-	-	
45	Kiwi	107	-	-	
46	Hazelnut	10	-	-	

Table 3 Biomass production and utilization in Puglia Region

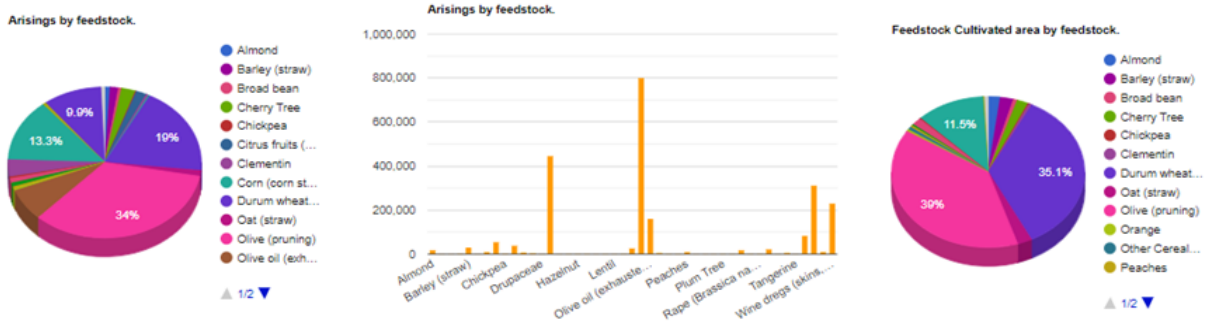


Figure 1 Analysis of feedstock in Pulglia Region

4.1.5 Conclusions from state of the art in the region

The regional strategy for bioeconomy-related development identifies a pathway that is not aimed at the search for new instruments but at 'process building' through the creation of synergies and integration using existing instruments that include both involvement and technical and operational aspects. According to the tools analysed, which make up the regional strategy, it is important, in addition to integrated regional planning, to create an environment conducive to the growth of the bioeconomy, which must also be developed through an integrated approach to governance and civil society involvement. An effective governance framework requires the development of the necessary policies, incentives, laws and plans through multi-actor and multi-sectoral approaches that fully take into account all relevant economic, social and environmental dimensions. Governance encompasses the efforts, means and instruments involved in managing the actions of the stakeholders (Region, local authorities, associations, individuals, etc.) towards common goals and implies the shared responsibility of the different levels involved and stimulates co-participation in the formulation of policies, planning and management for regional sustainable development. The region identifies a limited number of strategic choices that encompass all dimensions of sustainable development. These choices must always be read through an integrated development of the various constituent dimensions of sustainable development with an interdisciplinary and participatory approach. For this reason, the objectives of sectoral policies must be developed with the intersectoriality of strategic choices in mind.

The Apulia Region's AKIS strategy aims to foster the transfer of stable flows of knowledge capable of accelerating the adoption of innovations in the various rural contexts. The regional strategy, therefore, in line with the objectives defined at the national level, has the task of avoiding that the large number of subjects potentially involved in the processes of innovation dissemination, may generate a fragmentation of actions, favouring instead a greater coordination. The SWOT analysis highlighted some fundamental aspects for the realisation of the regional AKIS, in particular the presence in the region of a plurality of actors involved in the transfer of knowledge and innovation. In particular, five universities operate in the Apulia region

with training, third mission and research tasks. In addition, several regional bodies specialising in economic-agricultural research operate in the region, in particular the CREA, which provides knowledge, produces analyses and research and carries out scientific studies to support the definition and implementation of agricultural and rural development policies. As many as 14 technical agricultural institutes complete the educational offer in economic-agricultural disciplines, accounting for 9% of the national figure. The region thus ranks third in terms of the number of facilities dedicated to specialised training in the agricultural field. Training, information and advisory services are also provided by bodies accredited with the regional authority, although in the past programming the activation of measure 2 was not foreseen until the second half of 2021. In October 2021, in fact, the accreditation procedure of the consultancy bodies started, which should enable the activation of interventions linked precisely to the former measure 2 (training consultants). Other actors of a collective and individual nature offer activities to support the knowledge and adoption of innovations. Those of a collective nature include producer organisations and cooperatives, or innovation task forces, financed within the framework of Pei-Agri. At the individual level, there is an extensive network of consultants, agronomists and foresters, agricultural experts, agro-technicians and veterinarians.

In the face of this need, the activities carried out by the advisory services show some criticalities, which recall elements that have also been highlighted at the national level, including an offer of agricultural development services that is not always adequate to the explicit and potential demand, the disconnection and fragmentation between the actors in charge of knowledge transfer, the lack of awareness of the enormous potential offered by participatory approaches, and the lack of statistical data and information to support farm decisions. In order to address these critical issues, the region intends to act in coherence with the national strategy by activating a regional institutional coordination between the different actors that make up the regional AKIS. This will make it possible to identify and share the best and territorially most suitable tools for disseminating knowledge and adopting innovations. This will also result from the identification of needs on a provincial and local basis that enterprises and territories manifest in relation to the knowledge system objective.

4.1.6 Conclusions from stakeholder mapping

At the current stage, the HUB Puglia is composed of approximately 70 subjects belonging to Public Administrations (5 persons); Companies/Sector Associations; Research Institutions; Organisations of various types; Consultants and NGOs from civil society.

STAKEHOLDER GROUP	Indicate ALL INSTITUTIONS you have mapped so far (please also indicate if they are in the hub CORE TEAM[1] or have some other specific role in the hub)	Ideas to DESIGN OUTREACH ACTIVITIES to reach/inform/involve them (tools, formats, etc. - e.g. information leaflet...)	Do you have any REQUESTS to RuralBioUp to better reach out to stakeholders (e.g. specific information, dissemination material, etc.)?

policy/administration	4 managers and officials of the Apulia Region, Department of Agriculture		RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.
private sector/business	more than 50 agricultural, agro-industrial districts and energy companies		RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.
research and innovation	13 public research centres (universities; Council for Agricultural Research and Agricultural Economic Analysis; National Research Council)		RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.
farmer consultant	5 consultants or consulting companies		RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.
civil society (NGOs, associations, interest representation, etc.)	4 NGOs		RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.

Table 4 Analysis of stakeholders in Puglia Region

4.1.7 Added value for stakeholders

The analysis of the opportunities but also of the gaps and the identification of problems in the Apulia Region, identified in the SWOT analysis, are the basis of the value proposition for stakeholders, which illustrates how the RuralBioUp project through the Apulia HUB can support regional growth. The opportunity provided by the project is to network stakeholders, enable the sharing of good practices, provide links to research organisations and offer training focused on the bioeconomy and innovation management.

Added value proposition and tailored made for key stakeholder groups:

For the creation of the Hub Puglia, SPRING was inspired by the logic of GOs and we drew from the most efficient ones a good part of the Hub's stakeholders. GOs are in fact temporary partnerships, made up of local stakeholders such as farmers, researchers, consultants, agribusiness entrepreneurs. They therefore represent a target group capable of grasping innovation at short notice.

On the basis of this analogy, the Hub Puglia is made up of professional categories differentiated by experience and sphere of interests, from each of which the opportunities outlined below will arise:

1) Policy/administration
    - Cooperation for the planning and implementation of initiatives for the development of the bioeconomy in collaboration with the regional contact persons of the Department of Agriculture, Rural Development and Fisheries, Section - Competitiveness of agri-food chains;
    - Strengthen collaboration between the officials of the various Apulia Region Departments on transversal bioeconomy issues;
    - Establish a connection between the agricultural departments and associated research bodies of the three Italian regions (Marche, Puglia and Lombardy) where the RuralBioUp regional hubs have been set up;
    - promote good practices and provide comparative analyses with other national regions and other HUBs in the project;
    - organise study and training visits.
2) Research and innovation
    - Supporting the dissemination of research-based innovation (dissemination);
    - Facilitating dialogue between researchers and enterprises (needs and solutions)
    - Raising awareness of the tools and good practices available;
    - Participation in training within projects where research organisations are partners;
3) Private sector/business associations
    - Knowledge of local issues
    - Transfer of knowledge (best practices technical visits)
    - Training targets
4) Consultants (Education community)
    - Knowledge and management of local issues;
    - Relaunching the figure of the consultant as a reference and trusted expert for farms;
    - Training target

5) Civil society
    - Selection of stakeholders sensitive to issues concerning innovation and multifunctionality on farms;
    - Opportunities for comparison and exchange of experiences;
    - Networking opportunities for new innovative projects.

4.1.8 Proposition for stakeholders

(Defines the goals and objectives of the action plan, outlining what will be achieved. Outlines the strategies and tactics to be implemented to achieve the set goals and objectives).

In order to orientate this action plan SPRING - after setting up the Regional Hub of Apulia - organised two meetings (Kick-off meetings) with stakeholders, the first on a remote telematic platform (21 July 2023), the other in presence in Bari during the Agrilevante fair (5 and 6 October 2023). As preparatory work prior to the KoM, on the basis of the above-mentioned analysis, together with the Department of Agriculture, Rural and Environmental Development, Competitiveness Section of the Agri-food Chains, the following objectives and tasks of the HUB Puglia were prepared to be presented and discussed with the stakeholders, so that they could better interact with the people present and give some indications, on the basis of which the stakeholders made their choices. Co-creation techniques were used to make the choices by means of a questionnaire made in presence.

Objectives of the hub expected by the various stakeholders

- Exchange of good practices and useful information
- Establishment of a Regional Technical Table on the Bioeconomy
- Support for new initiatives
- Positive lobbying actions (may be a consequence of setting up the table)
- Training and new ideas

Selected value chains:

- Biofertilisers and bioactive compounds
- Agrivoltaics and bioenergy
- Hemp and minor crops

Obstacles identified by stakeholders:

- Weight of bureaucracy
- Limited experience
- Regulatory limitations
- Lack of (public) technical advice
- Lack of cohesion between enterprises
- Stakeholder vision and needs

Biofertilisers and Bioactive Molecules

Stimulation of greater transfer of research results
Greater participation of the scientific sector in decision-making in the European Commission
Circular and sustainable economy standards
Supply chain monitoring --> Data processing --> Participated and integrated proposals for action
Making this opportunity and its many advantages known
Greater uniformity in legislation (fewer differences between regions)
Sensitise the research world to a wider sharing of research
Bioenergy and Agrivoltaics
Seeing agricultural enterprises --> networking among themselves to produce and exchange energy (BER) and by-products (agri-food symbiosis), creating value on the territory and realising new production chains
Optimisation and knowledge between agricultural production and agri-voltaics
Achieving regulatory clarity
Promoting 'small' agri-voltaic plants
Increasing the value and quality of agricultural production with improved margins for farms in reducing water consumption
Integration of systems = balance
Accelerated authorisation procedures
Training for technicians and maintainers
Promoting integration between agriculture and renewable energy
Integration of agriculture and renewable energy with water recovery (viticulture)
Hemp and minor crops
Supply chain monitoring --> Data processing --> Participatory and integrated intervention proposals
Knowledge transfer --> Affirmation of the entire supply chain
Overcoming legislative limits
Use of hemp for the remediation of contaminated soils and subsequent use in other production sectors
Transfer and increase of areas dedicated to minor crops
Cooperation between stakeholders
Economic funds
Integration of minor crops and agri-voltaics

4.1.9 Implementation part

Stakeholders' reflection of bioeconomy deployment

Training activities identified at the first meeting

- RuralBioUp - RuralSpot
- Access to credit and financing in the bioeconomy
- Impact assessment of RuralBioUp
- Better recycling of nutrients in the circular bioeconomy
- Bioeconomy and key principles of sustainability
- Best practices in different value chains
- Technology trends in the bioeconomy
- Innovation in the bioeconomy and the "do no harm" principle
- Support for innovation and technology transfer
- How to co-create activities for the bioeconomy

Additional training topics such as:

- Creating a business model and start-up proposal
- Deepening and raising awareness on biodiversity
- Intellectual property and patents
- Integration of regional training towards stakeholders
- Creation of training through summer schools in cooperation with universities and companies

Definition of a networking event

- European Bioeconomy Forum 2024
- Ecomondo 2024
- Bioeconomy Day 2024
- EIMA 2024

Study visits:

- Pedone Factory

Tasks

1. Specific supply chain working groups with creation of position documents

2. Coaching Services:

   a. on access to the RuralSpot platform
   b. on topics of interest to value chains
   c. access to funds
   d. evaluation of proposals

3. Request for sharing of documents by stakeholders to create a specific regional database for the Puglia HUB and possibly also the other Italian HUBs.

4. Newsletters (where to indicate notices, news,..)

5. B2B between stakeholders of the Puglia HUB

6. Organization of periodic meetings

7. Reduce barriers and promote accessibility to strategic documents

4.1.10 Value Chains

The selection made on the range of supply chains of the bioeconomy has oriented the Hub Puglia's choice on the following three options.

1. **Bioenergy and Agrovoltaics**
   Farms aim to diversify traditional markets by producing 'Food/Feed' and 'Fuel'. Bioenergy is energy generated from residual biomass (agricultural, forestry, agro-industrial) or dedicated crops. Agri-voltaic systems are agricultural crops topped with photovoltaic panels that do not impede cultivation. The two activities (agricultural and energy) are not in competition with each other.

2. **Biofertilisers and bioactive compounds**

   An alternative and effective approach for plant defense is given by the application of plant molecules with high biological activity, especially if associated with significant contributions of organic substance. Green chemistry as a replacement for synthetic chemistry with a high economic and environmental impact today presents very interesting solutions such as: biopesticides, corroborants, microorganisms, biological activators, etc.

3. **Hemp and minor crops**
   Hemp is of great interest as a crop capable of being valorised in all the parts that make up the plant. The products that can be obtained are countless and range from fibers for textiles to oils for nutraceuticals or chopsticks for green building. Hemp is a very resistant crop that requires little input and can cope well with ongoing climate changes. Italy and also the Marche have an important tradition for this crop which deserves to be relaunched.

4.1.11 Objectives of the RuralBioUp Hub Puglia

Below is a very summary table describing the 3 + 1 GOALS of the Puglia Hub and the respective TASKS.

GOAL: Agroenergy	Description	Resouces needed
Duration	Gennaio 2024 - Ottobre 2025	
Collaboration Partners	Puglia Region/Research organisations/Experts	
Task 1 Expected impacts	***Select Stakeholders*** Cohesive working group on specific topics	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 2 Expected impacts	***Coachig, mentoring, training*** Technology innovation transfer, best practice models, design support, funding opportunities	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 3 Expected impacts	***Study visit*** Promoting the development of the circular bio-economy by showing concrete examples	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 4 Expected impacts	***Supporting the use of the 'Rural spot' tool*** Facilitating the use of the tool and the transfer of the information it contains	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 5 Expected impacts	***Co-working (Strategies)*** Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	

Table 5 Tasks for Agroenergies supply chain

GOAL: Biofertilisers	Description	Resouces needed
Duration	Gennaio 2024 - Ottobre 2025	
Collaboration Partners	Puglia Region/Research organisations/Experts	
Task 1 Expected impacts	***Select Stakeholders*** Cohesive working group on specific topics	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 2 Expected impacts	***Coachig, mentoring, training*** Technology innovation transfer, best practice models, design support, funding opportunities	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 3 Expected impacts	***Study visit*** Promoting the development of the circular bio-economy by showing concrete examples	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 4 Expected impacts	***Supporting the use of the 'Rural spot' tool*** Facilitating the use of the tool and the transfer of the information it contains	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 5 Expected impacts	***Co-working (Strategies)*** Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	

Table 6 Tasks for Biofertilisers and bioactive compounds supply chain

GOAL: Hemp	Description	Resouces needed
Duration	Gennaio 2024 - Ottobre 2025	
Collaboration Partners	Puglia Region/Research organisations/Experts	
Task 1 Expected impacts	***Select Stakeholders*** Cohesive working group on specific topics	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 2 Expected impacts	***Coachig, mentoring, training*** Technology innovation transfer, best practice models, design support, funding opportunities	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 3 Expected impacts	***Study visit*** Promoting the development of the circular bio-economy by showing concrete examples	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 4 Expected impacts	***Supporting the use of the 'Rural spot' tool*** Facilitating the use of the tool and the transfer of the information it contains	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 5 Expected impacts	***Co-working (Strategies)*** Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	

Table 7 Tasks for Hemp supply chain

Steps to achieve the above indicated objectives

SMART goals

- What – Workshops, courses, technical visits, webinars, etc.
- When – to be defined
- How –
- Where – at the Agriculture Department of the Puglia Region in Bari (BA)

- Who – Cluster SPRING in collaboration with ITABIA and Agriculture Department of the Puglia Region
-

4.1.12 Resource Allocation

(Identifies the necessary resources, such as budget, personnel, and equipment, required for successful implementation)

Budget

At the moment, since the activities that will make up this Action Plan have not been precisely defined, it is not possible to make a realistic estimate of the necessary budget.

Personnel

As a working group (personnel), the Puglia Hub is based on:

- SPRING staff (L. Gaiani, M. Bonaccorso, others)
- ITABIA staff (M. Monni, S. Mannelli, G. Croce, C. De Carolis, F. Scarpelli, V. Pignatelli)
- Agriculture Department of the Puglia Region staff (L. Trotta, G. Di Fiore, R. Di Terlizzi and A. Cilardi)
- Experts who are part of the SPRING, ITABIA and Agriculture Department network

Equipment

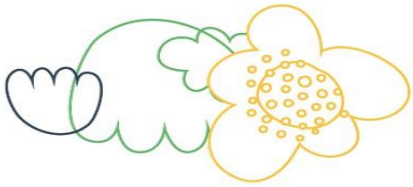
In the Puglia region, the Agriculture Department (Hub contact point) headquarters has multiple meeting rooms perfectly equipped for holding workshops or training courses (in person and remotely). These rooms will be made available free of charge for all Puglia Hub initiatives included in the Action Plan.

4.1.13 Monitoring and Evaluation

(Establishes a framework for monitoring progress and evaluating the effectiveness of the action plan (KPI))

To carry out a constant and effective "Monitoring and Evaluation" action of the Action Plan, specific tools widely available today will be used. Among these we are evaluating some possible options such as:

- Sospact (https://www.sopact.com/)
- Tool4dev (https://tools4dev.org/blog/monitoring-and-evaluation-tools-for-projects/)
- Connexus (https://cnxus.org/resource/monitoring-and-evaluation-tools-methods-and-approaches/)



4.1.14 Risk Assessment and Mitigation

(Identifies potential risks or obstacles and outlines measures to minimize or address them)

To be defined

4.1.15 Communication Plan

(Specifies how the action plan will be communicated to stakeholders)

Once the plan has been defined, it will be calendarized in an Excel file which will be sent to all stakeholders as a reminder.

SPRING and ITABIA will take care to promptly remind stakeholders of all the commitments included in the agenda via email. Following each activity, a specific report will be created and shared.

4.2 A RuralBioUp hub Action Plan – The Bretagne & Pays de la Loire Regional HUB

4.2.1 Introduction

Bretagne and Pays de la Loire Region consist of 9 departments. This territory, apart from some areas (around Cities) such as Lorient, Nantes and Saint-Nazaire, has never been heavily industrialised. Today, fishing and agriculture remain important activities. The number of farms tends to diminish, but as a result, they are merged into very large estates. Brittany is the first producer in France for vegetables (green beans, onions, artichokes, potatoes, tomatoes...). Cereals are mostly grown for cattle feeding. Wine, especially muscadet, is made in a small region south of Nantes and also near Angers. The bioeconomy is therefore very important in this area. The aim now is to develop a circular approach to the bioeconomy.

4.2.2 Preparation for the HUB Establishment

It is a group constituted by different actors : companies, public bodies, association, laboratories, universities. It is open to all public and private stakeholders and operates collaboratively. Its main objectives are to identify initiatives, generate projects and thereby promote implementation of the circular economy in the area by all those involved. In order to create the HUB WEST, we worked with Pays de la Loire council, which wants to develop bio economy. The HUB WEST is turned on biomass/plant based products.

The VEGEPOLYS VALLEY team did the following activities to prepare the HUB WEST

- Identify and organize Interviews with key stakeholders – representative of the regional development agency, members of the regional research and innovation advisory board, entrepreneurs and NGOs
- Organize meetings with other projects-group (European, national or regional)

- Identify the regional priorities related to circular bio economy transition - Organize a kick off meeting in June 2023

4.2.3 Bretagne & Pays de la Loire Region and its state of art

The hub is located in West part of France, it is two French administrative regions: Britain (red on the map) & Pays de la Loire (green on the map). It is an oceanic climate (Atlantic region). The coast is very indented, with many cliffs, rias and capes. The population is about 7,2 million of habitants (a population of 10 percent of France). Agriculture is a key sector with 3,8 million of ha. It is an interesting place to study because there is a wide range of different animal and plant productions.

4.2.4 Public strategies and policy instruments

The ambition of the Climate Plan to make France number 1 in the green economy involves directing economic development towards more sustainable and environmentally friendly activities. This involves creating a framework favorable to the emergence and then deployment of green technologies and responsible organizational methods. All sectors of activity can integrate their activities into the green economy. This notion in fact designates: on the one hand eco-activities, that is to say activities whose purpose is the protection of the environment such as for example water management, waste management or renewable energy production; on the other hand, economic activities; whatever their sector, which develop less polluting processes, less greenhouse gas emissions or less consumption of natural resources. The circular economy is one of the components of the green economy. This notion designates an economic model whose objective is to produce goods and services in a sustainable manner, by limiting: the consumption and waste of resources (raw materials, water, energy), the production of waste.

4.2.5 Biomass production and utilization in France

In France, in 2020, there was 496 000 farmers, co-operators and active partners with 389 800 farms disposing of an average agricultural area of 62 ha. The forest represents 17 million ha.

	2020
Agricultural producers	**496 000**
with agricultural land up to 10 ha	389 800
Utilised agricultural area (hectares)	**26 730**

Including cereals, oilseeds, protein cropts	42.8%
Meadows	41.4%
Permanent crops	3.8%
Plants productions in milliards of euroes	**43.4**
Cereales	9.5
Oilseeds, protein crops	2.3
Other industrials plants (ex: beetroot, linen, ..)	1.3
Fodder	5.6
Vegetables, potatoes, plants and flowers	10.1
Fruits	3.1
Wines	11.5
Animals production	**26.2**
Cattle	11.0
Poultry, eggs	4.7
Milk and other livestock products	10.5

Table 8 Agriculture production 2020 (French Ministry of agriculture Statistics)

	Percentage of utilized agricultural area in the territory in 2019	Production in the agricultural sector		Breakdown of raw and processed product production in 2018	
		Average between 2008-2018	2018	Plant production	Animal production
	(en %)	(en milliards d'euros)		(en %)	
France	52	71,58	76,64	59	35
Bretagne	62	8,34	8,66	26	65
Pays de la Loire	68	7,05	7,02	35	58

Table 9 Utilized agricultural area and economic value of production in the Hub West (Agreste French Ministry of agriculture Statistics)

As far as the West hub is concerned, a deal of data is already available on the production and use of biomass especially for Pays de la Loire area, thanks to a website called **TEO[2].**

[2] https://data.teohttps://data.teo-paysdelaloire.fr/explore/?refine.theme=Environnement&disjunctive.diffuseur&disjunctive.gestionnaire&disjunctive.publisher&source=shared&sort=modified&geonav=world/world_fr/fr_40_52&geonav-ascpaysdelaloire.fr/explore/?refine.theme=Environnement&disjunctive.diffuseur&disjunctive.gestionnaire&disjunctive.publisher&source=shared&sort=modified&geonav=world%2Fworld_fr%2Ffr_40_52&geonav-asc

Funded by the European Union

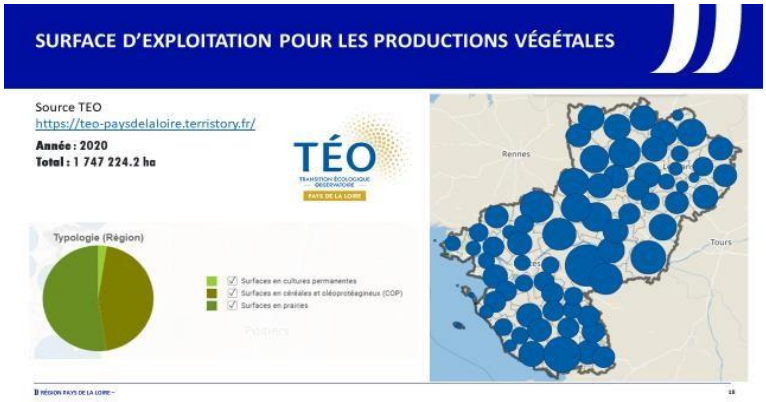
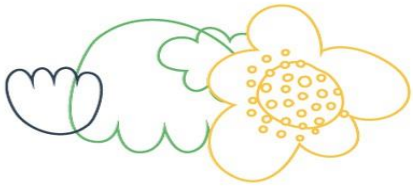


Figure 2 TEO website

Example of information available on the TEO website about biomass production

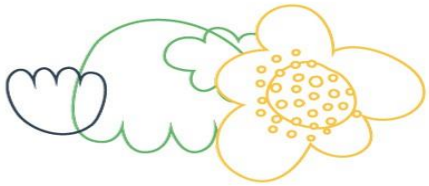
The slide below summarizes the challenges of the bioeconomy for the West of France

Figure 3 The challenges of the bioeconomy for the West of France



4.2.5 Conclusions from state of the art in region (strengths and gaps)

STRENGHTS in Bretagne & Pays de la Loire	GAPS in Bretagne & Pays de la Loire
Diversity of agricultural production Actors aware and invested in sustainable development and bio economy Many actors from: agri-food industry, research, health Regional policies invested on the circular economy subject Agricultural region	Diversity of products as a result diversity of questions/problems to resolve Not enough link between the actors



4.2.6 Objectives of the Hub

	Objective	Strategies (how ?)	Deadline	Status	Details
O.1	Establish a regional Hub	Mapping of actors and contact interested structures	31/01/2024	Achieved	✓ Mapping of 80 organisations & exhanges about the RBU project Organisation of the Hub K-O ✓ Meeting in Nantes on 20/06/2023
0.2	Involve at least 30 stakeholders	Looking all the time for new members	30/09/2025	Achieved	✓ Participation of 34 stakeholders to the KO meeting
0.3	Define at least 2 value chains + 6 intervalue chains	Finding similarities between the different actors about needs, materials, etc	30/09/2025	In progress	✓ definition of 2 value chains : – Food plant-based by-products – Non-food plant-based by-products
0.4	At least 444 attendances to trainings	networking and good practice	31/07/2025	In progress	2/444 attendance to trainings
0.5	Exchange as much as possible with hub members (111 assistance)	Keep informed the different members about the actions, steps and results of Rural Bio Up project	31/07/2025	Achieved	Already 704 by 30/11/2023
0.6	Events : organise 2 networking events Organise 2 study visits	1 networking event in 2023 1 networking event and 1 visit in 2024 1 visit in 2025	30/06/2025	In progress	✓ Organisation of 1 networking event : the Hub KO meeting (20/06/2023) ✓ Organisation of 1 study visit (SPRING – VEGEPOLYS VALLEY) on the 09/05/2023

0.7	Include Hub Followers (3/4)	Several Invitation sent in 2023 & 2024	30/06/2025	In progress	2 organisations are following the Hub's progressses: – AC3A (French representative of Scale Up project) – Valorial (French representative of BioRural Project)

O.1 Establish a regional Hub

Stakeholder mapping

STAKEHOLDER GROUP	Indicate ALL INSTITUTIONS you have mapped so far (please also indicate if they are in the hub CORE TEAM[1] or have some other specific role in the hub)
policy/administration	• ASSOCIATION DES CHAMBRES D'AGRICULTURE DE L'ARC ATLANTIQUE • CHAMBRE DE COMMERCE ET D'INDUSTRIE DES PAYS DE LA LOIRE • CHAMBRE REGIONALE D'AGRICULTURE DE BRETAGNE • CONSEIL REGIONAL BRETAGNE • CONSEIL REGIONAL DES PAYS DE LA LOIRE
private sector/business	• AGRIAL • AGRIMOOV • ALEGINA • ANJOU PLANTS • ANTOFENOL • AUBEPIN • BIOPLANTS FRANCE • BISCOTTE PASQUIER • BRETAGNE CHIMIE FINE LIFE SCIENCES • CÉRIENCE • CONSERVERIE OR NORME • COTOTERRA • CYCLEFARM • DEMIO NORMANDIE • ECO-SOL • ELEMENTA • EUREDEN INNOVATION • FLEURON D'ANJOU • FLORENTAISE • FOODINNOV DEVELOPMENT • G4DEC • GAIAGO • GDL • GROUPE ROULLIER • JCT PLANTS

	• LES ALCHIMISTES • LISAQUA • MALAKIO • MARAICHERS NANTAIS • NATURALOE • NOR-FEED • NUNHEMS FRANCE • PREMIER TECH GHA • SÉCHÉ ENVIRONNEMENT • SILL ENTREPRISES • SOCIETE D EXPLOITATION DE PRODUITS POUR LES INDUSTRIES CHIMIQUES SEPPIC • SOCIÉTÉ D'INITIATIVES ET DE COOPÉRATION AGRICOLES • TERRA INNOVA • UPCYCLINK • WASTE ME UP
Research and innovation	• CENTRE D'ETUDE ET DE VALORISATION DES ALGUES • LABORATOIRE ALVEND • LABORATOIRE COBIOTEX • LABORATOIRES GOEMAR • CRITT BIOTECHNO CHIMIE FINE BRETAGNE • ENSCR (ECOLE NATIONALE SUPERIEURE DE CHIMIE DE RENNES) • GROUPE ESA • INRAE • INSTITUT NATIONAL D'ENSEIGNEMENT SUPERIEUR POUR L'AGRICULTURE L'ALIMENTATION ET L'ENVIRONNEMENT • INSTITUT POLYTECHNIQUE UNILASALLE • ITEIPMAI • LABORATOIRE GEPEA • NANTES UNIVERSITE • ONIRIS ECOLE NATIONALE VÉTÉRINAIRE, AGROALIMENTAIRE ET DE L'ALIMENTATION • UMR 1253 - SCIENCE ET TECHNOLOGIE DU LAIT ET DE L'OEUF - STLO • UNION NAL. INTERPROF. LEGUMES TRANSF • UNIVERSITE D ANGERS • UNIVERSITE DU MAINE • UNIVERSITÉ GUSTAVE EIFFEL • UR 1268 - BIOPOLYMÈRES INTERACTIONS ASSEMBLAGES - BIA • VEGENOV-BBV
Education community	• Many of the research organisms are in the education community

Table 10 Mapping of stekeholders in Bretagne and Pays de la Loire Region

STAKEHOLDER GROUP	Indicate ALL INSTITUTIONS you have mapped so far (please also indicate if they are in the hub CORE TEAM[1] or have some other specific role in the hub)	Added value from joining RuralBioUp project
Research and innovation /education	ADRIA	research
private sector/business	ANIBED	valorisation
private sector/business	Chambre Régonale d'agriculture Pays de la Loire	production
private sector/business	Cobiotex-Dietaxion	
private sector/business	Comité départemental développement légumier	production
policy/administration	Conseil régional de Bretagne	valorisation
policy/administration	Conseil Régional des Pays de la Loire	valorisation
private sector/business	Cyclefarms	valorisation
private sector/business	Eco-sol	valorisation
private sector/business	Elementa	valorisation
private sector/business	Foodinnov	valorisation
reserach	INRAe BIA	research
research	INRAe SMART	research
private sector/business	Laboratoires Alvend	valorisation
private sector/business	Laboratoires Goëmar	valorisation
private sector/business	Nor-feed	valorisation
school	ONIRIS	Research education
Univesity	SATT	research
private sector/business	SEPPIC	

Civil society (NGOs, associations, interest representation, etc.))	Solaal Pays de la Loire	valorisation
private sector/business	Upcyclink	valorisation
reserach	Végénov	research
private sector/business	Waste me Up	valorisation

Table 11 Stakeholders in Bretagne and Pays de la Loire Regions

Conclusions from mapping of stakeholders' needs:

- **Education and R&D**: selection of adapted plants matters, conservation of humid matter, fast degradation, stability, quality, characterization, standardization, traceability, storage, transport, providing security, behavior changes
- **Funding**: valorization research
- **Networks:** visibility about (local) partners, co-product to be valorized, identification of the resources, territorial scale mapping, create synergies
- **Potential for value chains:** find a chain value of co-product with a controlled and traceability quality, knowledge about the digestates of crops, co-products with controlled and continuous quality, dried coproducts (storage), transport system, drying, legisslation

O.2 Involve at least 30 stakeholders

Hub Kick Off meeting

The 20th of June the Hub kick off has been organized in Nantes . 35 actors participated physically to the event. The event has been organized inside the regional council.

Program of the kick off:

- Reception and distribution of the HUB WEST actors' booklet
- Presentation of the day
- Presentation of the regional policy on the circular bioeconomy by Mr. Buf
- Presentation of the RURALBIOUP project
- Introduction to the circular bioeconomy and presentations of actions in the Region including existing mapping by Héloïse Even (Source TEO) https://teohttps://teo-paysdelaloire.terristory.fr/ paysdelaloire.terristory.fr/

- Presentation sessions
    - ADRIA
    - CDDM-ARELPAL
    - Cyclefarms
    - Ecosol
    - Foodinnov
    - INRAE
    - Laboratoire Alvend
    - Laboratoires Goëmar
    - Norfeed
    - ONIRIS
    - SATT
    - SEPPIC
    - Solaal
    - Upcyclink
    - Végénov
    - Waste me up
- Working groups on current difficulties and needs of trainings
- Lunch
- Networking and information on the BtoB meetings table
- Presentation of projects related to non-food:
    - Bioloop (regional)
    - Rustica (EU project)
    - RAFFUT(regional)
- Presentation of projects related to food:
    - Eccop (regional)
- Conclusion of de day
- Match making sessions

List of participants

N°	Participant	Structure	Type of organisation
1	Laure ANCELLET	Elémenta Ingrédiens	private sector/business
2	Laurent BAFFREAU	Laboratoires GOEMAR	private sector/business ; research & Innovation
3	Adrien BILY	Upcyclink	private sector/business

4	Patricia BRUNEAU	Conseil régional des Pays de la Loire	Territorial collectivity
5	Jean-Michel BUF	Conseil régional des Pays de la Loire - élu	Territorial collectivity
6	Céline BURGAUD-BEDOUET	Cobiotex-Dietaxion	private sector/business research & Innovation
7	Isabelle CAPRON	INRAE	research & Innovation
8	Marie-Pierre CASSAGNES	VEGEPOLYS VALLEY	cluster
9	Clémentine CHAUVEAU	SOLAAL Pays de la Loire	Civil society (NGOs, associations, interest representation, etc.))
10	Marie CHUPIN	Laboratoire Alvend	private sector/business
11	Nathalie COUSIN	Conseil régional de Bretagne	Territorial collectivity
12	Klervi CRENN	Végénov	Civil society (NGOs, associations, interest representation, etc.)) research & Innovation
13	Héloïse EVEN	Conseil régional des Pays de la Loire	Territorial collectivity
14	Valentin FOUQUENET	INRAE	Research and innovation
15	Henry FREULON	VEGEPOLYS VALLEY	cluster
16	Sandrine GARY-TREHIN	SATT	private sector/business research & Innovation
17	Christian GOMBERT	SEPPIC (filiale d'Air liquide)	private sector/business
18	Karen GOMIS	Eco-sol	private sector/business research & Innovation
19	Géraldine GOURLAOUEN	Foodinnov	private sector/business , research & Innovation
20	Kamal KANSOU	INRAE	Research and innovation
21	Serge JANVIER	ANIBED	private sector/business
22	Léa LEMONNIER	CDDM-ARELPAL	private sector/business , research & Innovation
23	Marc-Antoine LURASCHI	Cycle Farms	private sector/business
24	Céline MARJOLET	Chambre régionale d'Agriculture Pays de la Loire	Consular chamber
25	Frédéric MAUNY	Waste me up	private sector/business
26	Léa MINIER	VEGEPOLYS VALLEY	cluster

27	Laura MOREL	Laboratoires GOEMAR	private sector/business , research & Innovation
28	Charlotte NOBLOT	Conseil régional des Pays de la Loire	Territorial collectivity
29	Claudine RAVET	ANIBED	private sector/business
30	Camille RENAUD	ADRIA Développement	Civil society (NGOs, associations, interest representation, etc.)) research & Innovation
31	Samira ROUSSELIERE	ONIRIS Nantes	research & Innovation
32	Cécile ROUVERAND-MALGORN	VEGEPOLYS VALLEY	cluster
33	Nicolas TESSIER	Nor-feed	private sector/business
34	Catherine TOUZARD	Eco-sol	private sector/business , research & Innovation

Table 12 List of participants of KoM

Reporting about B2B Matchmaking > 37 matchmaking realized during the afternoon

total **37 B2B**	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6	Table 7
15h20	Foodinnov / Solaal PdL	Anibed / Cobiotex	Labo Goëmar / Upcyclink	CDDM / Waste me up	Elémenta / SATT	Nor-feed / SEPPIC	CRAPL / INRAE
15h30	Foodinnov / Anibed	Upcyclink / Waste me up	Labo Gaëmar / Végénov	CDDM / Solaal PdL	CRAPL / SATT	Cobiotex / INRAE	Elémenta / SEPPIC
15h40	Foodinnov / Végénov	Anibed / Waste me up	CDDM / Upcyclink	CRAPL / Labo Goëmar	Nor-Feed / SATT		
15h50	CDDM / Elémenta	Cycle Farms / Waste me up	Labo Goëmar / SEPPIC	Anibed / Végénov	INRAE / Upcyclink	Cobiotex / SATT	
16h	Cycle Farms / Labo Goëmar	CDDM / Foodinnov	Nor-Feed / Waste me up	CRAPL / Upcyclink	INRAE / SATT		
16h10	CDDM / SATT	SEPPIC / Waste me up	Labo Goëmar / INRAE				

16h20	SATT / Waste me up						
RV tenus en marge ou pendant le déj	Foodinnov / Waste me up (déj)	Labo Goëmar / SEPPIC (déj)	INRAE / SEPPIC (déj)				

Table 13 Reporting about B2B Matchmaking

Figure 4 Presentation of RuralBioUp Project

Figure 5 Presentation of RuralBioUp Project

Figure 6 Products degustation

Figure 7 Working group discussions

Figure 8 Matchmaking discussions

Feedback on the K-O meeting:

The participants showed a true interest and needs to create a territorial group about bio economy and to develop actions related to the valorization, identification of co-products.

2 value chains were identified:

- Food plant-based by-products
- Non-food plant-based by-products

O.3 Define at least 2 value chains + 6 intervalue chains

2 value chains were identified after the KO meeting:

- Food plant-based by-products
- Non-food plant-based by-products

O.4 Events: organise 2 networking events

Networking event 1: Hub meeting in Spring 2024 – on going planning

Networking event 2:
Planning of a networking event linked to a study visit in January 2025 at the SIVAL fair (A forum for exchange and information on viable, sustainable plant production. An event for business & innovation meeting in France (held in Angers) for all professionals in specialized plant production.)

O.5 At least 444 attendances to trainings

Proposition to participate in the following training sessions:

DATE	January 2024	DATE	February 2024	DATE	March 2024	DATE	April 2024
	MAND: RuralSpot training (online/all hubs)	06.02	**INT:** Digitalization in the Bioeconomy (online, project ScaleUp)	TBC	**MAND:** Access to public funding (online/all hubs)	04.04	**INT:** Improved nutrient recycling (online, project ScaleUp)
16.01	**INT:** Digitalization in the Bioeconomy (online, project ScaleUp)	27.02	**INT:** Digitalization in the Bioeconomy (online, project ScaleUp)	TBC	**MAND:** Access to private funding (online/all hubs)	23.04	**INT:** Improved nutrient recycling (online, project ScaleUp)
		09.02	**INT:** Technological trends in bioeconomy	TBC	**MAND:** Access to funding Q&A (online/all hubs)	12.04	**INT:** Technological trends in bioeconomy
				07.03	**INT:** Co-creating activities for Bioeconomy (online)		
				12.03	**INT:** Improved nutrient recycling (online, project ScaleUp)		
					INT: Bioeconomy and key principles of sustainability. The EU bioeconomy ecosystem		
				08.03	**INT:** Technological trends in bioeconomy		
DATE	**May 2024**	**DATE**	**June 2024**	**DATE**	**July 2024**	**DATE**	**August 2024**
14.05	**INT:** Practices of Social Innovation (online, project ScaleUp)	04.06	**INT:** Practices of Social Innovation (online, project ScaleUp)				
10.05	**INT:** Technological trends in bioeconomy	25.06	**INT:** Practices of Social Innovation (online, project ScaleUp)				

		07.06	**INT:** Technological trends in bioeconomy				
DATE	**September 2024**	**DATE**	**October 2024**	**DATE**	**November 2024**	**DATE**	**December 2024**
05.09	**INT:** Governance of Regional Bio-based systems (online, project ScaleUp)	17.10	**INT:** Governance of Regional Bio-based systems (online, project ScaleUp)	21.11	**INT:** Strategies to address social, ecological and economic tradeoffs (online, project ScaleUp)	12.11	**INT:** Strategies to address social, ecological and economic tradeoffs (online, project ScaleUp)
26.09	**INT:** Governance of Regional Bio-based systems (online, project ScaleUp)	31.10	**INT:** Strategies to address social, ecological and economic trade-offs (online, project ScaleUp)				

Table 14 Proposition to participate in the following training sessions

Promotion of the training sessions accessible to the hub members on VEGEPOLYS VALLEY's website: https://www.vegepolys-valley.eu/leshttps://www.vegepolys-valley.eu/les-projets/les-projets-europeens/rural-bio-up/session-d-informations-rural-bio-up/projets/les-projets-europeens/rural-bio-up/session-d-informations-rural-bio-up/

Figure 9 Presentation of sessions in HUB´s website

O.6 Exchange as much as possible with hub members (111 assistance)

Person in charge	Action	Date	Topic	N° of stakeholders reached
ROUVERAND Cécile	email	04/01/2023	Bioéconomie circulaire filières du végétal	1
ROUVERAND Cécile	email	06/01/2023	Bioéconomie circulaire filières du végétal	2
FREULON Henry	email	19/01/2023	Bioéconomie circulaire - prise de contact	1

FREULON Henry	email	23/01/2023	Bioéconomie circulaire - prise de contact	1
ROUVERAND Cécile	email	24/01/2023	Présentation du projet européen RURALBIOUP	2
LEHERISSEY Solen	email	25/01/2023	Bioéconomie circulaire	2
ROUVERAND Cécile	email	26/01/2023	Présentation du projet européen RURALBIOUP	2
CASSAGNES Marie-Pierre	meeting	02/02/2023	Organisation future réunion 20 juin	4
CASSAGNES Marie-Pierre	meeting	09/02/2023	Présentation du projet européen RURALBIOUP à la Région Bretagne	3
CASSAGNES Marie-Pierre	meeting	10/02/2023	Caractérisation du Hub West et préparation réunion 20 juin	2
CASSAGNES Marie-Pierre	email	10/02/2023	Invitation 1ère réunion projet - lien Hub bioéconomie	5
ROUVERAND Cécile	email	10/02/2023	Projet RURAL BIO UP proposition de réunion	1
ROUVERAND Cécile	email	10/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes1	4
ROUVERAND Cécile	email	10/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes2	4
ROUVERAND Cécile	email	10/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes3	2
CASSAGNES Marie-Pierre	email	10/02/2023	RE Invitation Projet RuralBioUp - 20 juin à Nantes	4
CASSAGNES Marie-Pierre	meeting	13/02/2023	Préparation réunion 20 juin	2
CASSAGNES Marie-Pierre	meeting	13/02/2023	Présentation du projet européen RURALBIOUP à Actfood	2
ROUVERAND Cécile	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes1	2
ROUVERAND Cécile	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes2	2
ROUVERAND Cécile	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes3	1
CASSAGNES Marie-Pierre	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin Hotel de la Région1	8
ROUVERAND Cécile	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes4	4
ROUVERAND Cécile	email	13/02/2023	RE Projet RURAL BIO UP proposition de réunion	5
ROUVERAND Cécile	email	13/02/2023	Projet Rural Bio UP envoi de documents	1
ROUVERAND Cécile	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes5	2
ROUVERAND Cécile	email	13/02/2023	RE Invitation Projet RuralBioUp - 20 juin à Nantes	1

ROUVERAND Cécile	email	13/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes6	7
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes1	25
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes2	2
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes3	2
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes4	2
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes5	2
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes6	2
ROUVERAND Cécile	email	16/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes7	2
CASSAGNES Marie-Pierre	meeting	17/02/2023	Présentation du projet européen RURALBIOUP à la Région Bretagne	3
CASSAGNES Marie-Pierre	email	17/02/2023	Projet européen RURALBIOUP-Invitation 20 juin	2
ROUVERAND Cécile	email	20/02/2023	Invitation Projet RuralBioUp - présentation du projet en visio	1
LEHERISSEY Solen	email	23/02/2023	RE Bioéconomie circulaire - Projet RuralBioUp	2
ROUVERAND Cécile	email	23/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes	1
CASSAGNES Marie-Pierre	meeting	27/02/2023	Fresque de l'éco circulaire	2
CASSAGNES Marie-Pierre	email	28/02/2023	Projet européen RURALBIOUP-Invitation 20 juin	1
CASSAGNES Marie-Pierre	meeting	01/03/2023	Participation au food tour - recherche de partenaires et contacts	
ROUVERAND Cécile	email	01/03/2023	Projet européen RURALBIOUP-Réunion 15 mars	1
CASSAGNES Marie-Pierre	email	01/03/2023	Projet européen RURALBIOUP-Invitation 20 juin1	1
CASSAGNES Marie-Pierre	email	01/03/2023	Projet européen RURALBIOUP-Invitation 20 juin2	1
ROUVERAND Cécile	email	01/03/2023	Demande d'informations sur Rural BioUp	1
CASSAGNES Marie-Pierre	email	01/03/2023	Contact Bioéconomie circulaire	1
ROUVERAND Cécile	email	03/03/2023	Projet européen RURALBIOUP-Invitation 20 juin1	1
ROUVERAND Cécile	email	03/03/2023	Projet européen RURALBIOUP-Invitation 20 juin2	1

ROUVERAND Cécile	email	03/03/2023	Projet européen RURALBIOUP-Invitation 20 juin3	1
ROUVERAND Cécile	email	03/03/2023	Projet européen RURALBIOUP-Invitation 20 juin4	1
CASSAGNES Marie-Pierre	meeting	06/03/2023	Présentation du projet européen RURALBIOUP à Air liquide	3
CASSAGNES Marie-Pierre	meeting	07/03/2023	Présentation du projet européen RURALBIOUP à Naturaloe	2
ROUVERAND Cécile	email	07/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	1
ROUVERAND Cécile	email	08/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes1	1
ROUVERAND Cécile	email	08/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes2	1
ROUVERAND Cécile	email	08/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes3	1
ROUVERAND Cécile	email	08/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes4	1
CASSAGNES Marie-Pierre	email	08/02/2023	Invitation Projet RuralBioUp - 20 juin à Nantes	1
ROUVERAND Cécile	email	13/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	1
ROUVERAND Cécile	email	14/03/2023	Projet européen RURALBIOUP-Rappel réunion 15 mars	1
CASSAGNES Marie-Pierre	meeting	15/03/2023	Présentation du projet européen RURALBIOUP à CEEI Bzh Compétitivité	2
ROUVERAND Cécile	email	15/03/2023	Rappel Présentation RURALBIOUP valorisation des co produits végétaux - 16 mars	2
CASSAGNES Marie-Pierre	email	15/03/2023	Projet européen RURALBIOUP-Demande noms d'entreprises	1
CASSAGNES Marie-Pierre	meeting	16/03/2023	Présentation du projet européen RURALBIOUP au CEVA	3
CASSAGNES Marie-Pierre	email	16/03/2023	Invitation Projet RuralBioUp - 20 juin à Nantes	2
ROUVERAND Cécile	email	16/03/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	1
CASSAGNES Marie-Pierre	meeting	17/03/2023	Participation à la journée inno agricole - recherche de partenaires et contacts	
ROUVERAND Cécile	email	23/03/2023	Demande d'informations sur Rural BioUp - réunion 31 mars	1
CASSAGNES Marie-Pierre	meeting	28/03/2023	Organisation future réunion 20 juin	3
CASSAGNES Marie-Pierre	meeting	31/03/2023	Présentation du projet européen RURALBIOUP au G4DEC	2
ROUVERAND Cécile	email	14/04/2023	Invitation Projet RuralBioUp - 20 juin à Nantes	1
ROUVERAND Cécile	email	18/04/2023	Invitation Projet RuralBioUp - 20 juin à Nantes	11

CASSAGNES Marie-Pierre	email	25/04/2023	Invitation Projet RuralBioUp - 20 juin à Nantes	1
CASSAGNES Marie-Pierre	meeting	26/04/2023	Prééparation de la réunion du 20 juin avec Foodinnov	2
ROUVERAND Cécile	email	03/05/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	1
CASSAGNES Marie-Pierre	meeting	05/05/2023	Point de suivi projets CIRCBIO - SCALE-UP / RURAL BIO UP / BIO RURAL	
ROUVERAND Cécile	email	11/05/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	1
CASSAGNES Marie-Pierre	meeting	12/05/2023	Organisation future réunion 20 juin	3
CASSAGNES Marie-Pierre	meeting	16/05/2023	Prééparation de la réunion du 20 juin avec Foodinnov	3
ROUVERAND Cécile	email	22/05/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	1
ROUVERAND Cécile	email	23/05/2023	Inscription Projet RuralBioUp - 20 juin à Nantes	2
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire1	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire2	2
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire3	2
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire4	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire5	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire6	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire7	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire8	3
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire9	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire10	2
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire11	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire12	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire13	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire14	1

ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire15	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire16	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire17	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire18	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire19	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire20	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire21	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire22	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire23	2
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire24	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire25	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire26	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire27	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire28	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire29	1
ROUVERAND Cécile	email	23/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire30	1
ROUVERAND Cécile	email	24/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire	1
ROUVERAND Cécile	email	26/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire1	1
ROUVERAND Cécile	email	26/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire2	1
ROUVERAND Cécile	email	29/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire	1
ROUVERAND Cécile	email	30/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire1	1
ROUVERAND Cécile	email	30/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire2	1
ROUVERAND Cécile	email	30/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire3	1

ROUVERAND Cécile	email	30/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire4	1
ROUVERAND Cécile	email	30/05/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire5	1
ROUVERAND Cécile	email	01/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Participation du partenaire	1
ROUVERAND Cécile	email	01/06/2023	Réunion du 20 juin à Nantes - RuralBioUp Présentation du partenaire	1
ROUVERAND Cécile	email	01/06/2023	Rappel - Réunion du 20 juin à Nantes - RuralBioUp1	16
ROUVERAND Cécile	email	01/06/2023	Rappel - Réunion du 20 juin à Nantes - RuralBioUp2	1
ROUVERAND Cécile	email	01/06/2023	Rappel - Réunion du 20 juin à Nantes - RuralBioUp3	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Participation du partenaire	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Participation du partenaire1	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire4	1
ROUVERAND Cécile	email	02/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire5	1
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	2
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire4	2
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire5	2
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire6	2
ROUVERAND Cécile	email	05/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire7	2
ROUVERAND Cécile	email	06/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
ROUVERAND Cécile	email	06/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1

ROUVERAND Cécile	email	06/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1
ROUVERAND Cécile	email	06/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire4	1
ROUVERAND Cécile	email	06/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire5	1
ROUVERAND Cécile	email	07/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire	1
ROUVERAND Cécile	email	08/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
ROUVERAND Cécile	email	08/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1
ROUVERAND Cécile	email	09/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire	1
CASSAGNES Marie-Pierre	email	12/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
CASSAGNES Marie-Pierre	email	12/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1
CASSAGNES Marie-Pierre	email	12/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Participants de la structure	1
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Rappel organisation1	7
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
CASSAGNES Marie-Pierre	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Rappel organisation2	6
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1
CASSAGNES Marie-Pierre	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire4	1
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - Organisation	2
ROUVERAND Cécile	email	13/06/2023	Réunion du 20 juin à Nantes - Précision sur l'organisation de votre pitch	17
CASSAGNES Marie-Pierre	email	13/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire5	1
ROUVERAND Cécile	email	14/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
ROUVERAND Cécile	email	14/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	2
ROUVERAND Cécile	email	14/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1

FREULON Henry	email	14/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire4	2
ROUVERAND Cécile	email	15/06/2023	Réunion du 20 juin à Nantes - Précision sur les présentations	1
ROUVERAND Cécile	email	15/06/2023	Réunion du 20 juin à Nantes - Organisation	1
ROUVERAND Cécile	email	15/06/2023	Réunion du 20 juin à Nantes - Confirmation de participation	1
ROUVERAND Cécile	email	16/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire	1
ROUVERAND Cécile	email	19/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire1	1
ROUVERAND Cécile	email	19/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire2	1
ROUVERAND Cécile	email	19/06/2023	Réunion du 20 juin à Nantes - RuralBioUP Présentation du partenaire3	1
CASSAGNES Marie-Pierre	meeting	20/06/2023	Réunion lancement du HB West et bourse aux co-produits	35
ROUVERAND Cécile	email	23/06/2023	Réunion du 20 juin à Nantes - Diaporama	27
ROUVERAND Cécile	email	26/06/2023	Suite Réunion du 20 juin à Nantes	1
ROUVERAND Cécile	email	30/06/2023	Réunion du 20 juin à Nantes - Diaporama	1
ROUVERAND Cécile	email	23/08/2023	Recherche de mise en contact deux partenaires	1
ROUVERAND Cécile	email	04/09/2023	Mise en contact deux partenaires	1
ROUVERAND Cécile	email	14/09/2023	Changement interlocuteur partenaire	1
CASSAGNES Marie-Pierre	email	14/09/2023	Prochain Hub Bioéco Participation	6
CASSAGNES Marie-Pierre	meeting	21/09/2023	Réunion interne valorisation des co-produits de la viticulture	2
ROUVERAND Cécile	email	22/09/2023	Proposition session de formation Bioéconomie Projet RURALBIOUP1	39
ROUVERAND Cécile	email	22/09/2023	Proposition session de formation Bioéconomie Projet RURALBIOUP2	38
ROUVERAND Cécile	email	22/09/2023	Proposition session de formation Bioéconomie Projet RURALBIOUP3	40
ROUVERAND Cécile	email	22/09/2023	Proposition session de formation Bioéconomie Projet RURALBIOUP4	1
ROUVERAND Cécile	email	22/09/2023	Proposition session de formation Bioéconomie Projet RURALBIOUP5	4
CASSAGNES Marie-Pierre	email	22/09/2023	Projet européen RURALBIOUP Invitation meeting en Roumanie	1

ROUVERAND Cécile	email	03/10/2023	Projet européen RURALBIOUP Invitation meeting en Roumanie1	39
ROUVERAND Cécile	email	03/10/2023	Projet européen RURALBIOUP Invitation meeting en Roumanie2	43
ROUVERAND Cécile	email	03/10/2023	Projet européen RURALBIOUP Invitation meeting en Roumanie3	30
CASSAGNES Marie-Pierre	meeting	10/10/2023	Réunion projet avec le CRPL	2
CASSAGNES Marie-Pierre	email	03/11/2023	Suite Réunion du 20 juin à Nantes	1
CASSAGNES Marie-Pierre	email	08/11/2023	Proposition d'un premier point visio >Projet valorisation des co produits	2
CASSAGNES Marie-Pierre	email	09/11/2023	Premier point visio >Projet valorisation des co produits	3
CASSAGNES Marie-Pierre	meeting	16/11/2023	Premier point visio >Projet valorisation des co produits	4
CASSAGNES Marie-Pierre	meeting	20/11/2023	Réunion suite journée 20/06 Nantes	1
CASSAGNES Marie-Pierre	email	21/11/2023	Rappel - Suite journée 20 juin Nantes RuralBioUp-Réunion 20/11 16h	1
ROUVERAND Cécile	email	28/11/2023	RuralBioUp - Informations AAPs + session d'information	29
CASSAGNES Marie-Pierre	meeting	30/11/2023	Réunion Hub bio éco-lien RURALBIOUP (organisé par CRPL)	13

Table 15 Exchange done by HUB facilitators

O.5 Organise 2 study visits

May 2023 Study visit SPRING – VEGEPOLYS VALLEY

VEGEPOLYS VALLEY and SPRING organised a study visit 9th to 11th May 2023.

SPRING travelled with representatives from 6 European organisations from the Hemp Club consortium The group visited VEGEPOLYS VALLEY offices in Angers for knowledge exchange and networking including discussion of RuralBioUp (presentation of the Italian and French Hubs). Linked to sister projects Bio Rural & Scale up were made (funded in the Pays de la Loire region) as well as a communication of RuralBioUp throughout the visit.

Figure 10 Study Visit in May 2023

Day 1

- SPRING and Hemp Club delegation travel to VGV offices in Angers for knowledge exchange and networking.
- Presentation of French stakeholders.
- VGV began presentations with an introduction of the Plant Intercluster Network, the French cluster and their EU projects including RuralBioUp.
- This was followed by presentations the Hemp Club Members.
- And a presentation of the sister projects BioRural and Scale Up (by their French representatives)

Figure 11: Day 1 presentation of the French & Italian Hubs

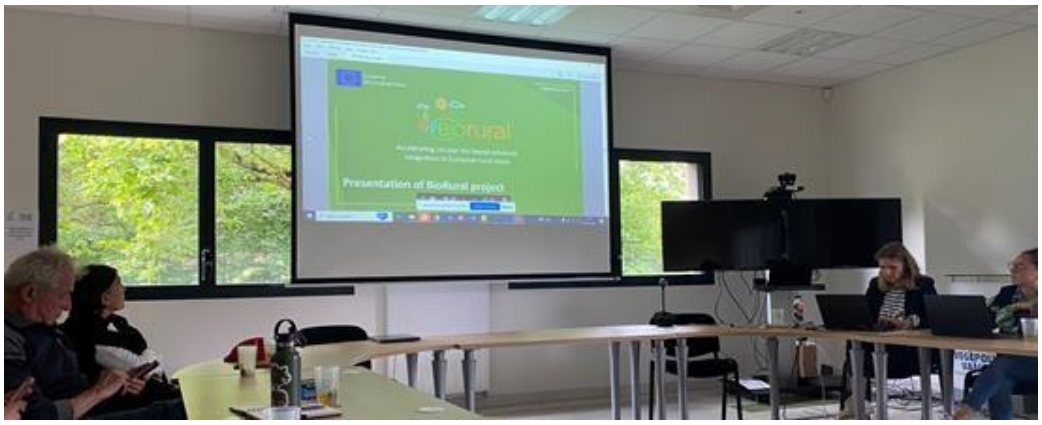


Figure 12 Day 1 Introduction to Biorural project

Day 2

- Knowledge Exchange & training on stakeholder engagement

Figure 13 Day 2 Training on stakeholder engagement

Name of visit	Region	On-site/Online	No. Attended	Facilitators	Attendies	Visit locations
Hemp Club study visit	Pays de la Loire/Auvergne Rhône Alpes	On-site 9-11th May 2023	19	SPRING and VGV	1. LOMBARDY GREEN CHEMISTRY CLUSTER 2. CZECH HEMP CLUSTER 3. PRODUTECH - PRODUCTION TECHNOLOGIES CLUSTER 4. STANDORTAGENTUR TIROL GMBH: CLUSTER MECHATRONICS TIROL 5. IND-AGRO-POL 6. FEDERCANAPA 7. VALORIAL 8. Association des Chambres d'agriculture de l'Arc Atlantique (AC3A)	1. VEGEPOLYS VALLEY Headquarter 2. remote: VALORIAL 3. remote: AC3A

Table 16 Study visit summary

O.6 Include Hub Followers (3/4)

2 organisations are following the Hub's progresses:

- AC3A (French representative of Scale Up project)
- Valorial (French representative of BioRural Project)

4.3 A RuralBioUp hub Action Plan – The Auvergne-Rhône-Alpes Regional HUB

4.3.1 Introduction

The Auvergne-Rhône-Alpes Region consists of 12 department and includes a large area of economic activity around Lyon.

This region gathers spaces that are very different from each other: geographic, climate, sociology, economic, cultural, production sense.

The Auvergne-Rhone-Alpes region covers an area of 69 711 km2. It is the second most populated region in France with more than 8 000 000 inhabitants.

4.3.2 Preparation for the HUB Establishment

HUB AURA is led by VEGEPOLYS VALLEY. It is the first bio economy group in Auvergne Rhone Alpes. It is a group constituted by different actors: companies, public bodies, association, laboratories, universities.

Among different structures present on this region, CIRIDD is an actor at the HUB AURA level. CIRIDD's actions aim to engage stakeholders in the appropriation and implementation of collective processes of change anchored territorially and based on cooperation models such as the circular economy, the functional economy, industrial and territorial ecology, biomimicry, eco-design, extending the lifespan of products, and innovation through use. The Eclaira Platform is one of CIRIDD's tools. ECLAIRA is run by CIRIDD with support from the Auvergne-Rhône-Alpes Region. It is open to all public and private stakeholders and operates collaboratively. Its main objectives are to identify initiatives, generate projects and thereby promote implementation of the circular economy in the area by all those involved.

Even if the HUB AURA is mainly turned on biomass/plant-based products, Eclaira and CIRIDD are relevant to gather actors and improve networking.

The VEGEPOLYS VALLEY team did the following activities to prepare the HUB AURA:

Desk research of the public strategies, statistical data analysis focused on the regional priorities related to circular bio economy transition, identifying key stakeholders

Providing a data base from public resources of entrepreneurs and NGOs focused on areas related to circular bio economy

Interviews with key stakeholders – representative of the regional development agency, members of the regional research and innovation advisory board, entrepreneurs and NGOs

4.3.3 AURA Region and its state of art

Agriculture has a strong presence in the Auvergne Rhone Alpes region; its 3 million hectares of arable land rank it 4th in France. It has 54,000 farms, which account for some 102,000 workers in permanent employment.

Auvergne Rhone Alpes is at the 3rd rank in France for jobs in the agri-food industry with 41000 employees.

4.3.4 Public strategies and policy instruments

The ambition of the Climate Plan to make France number 1 in the green economy involves directing economic development towards more sustainable and environmentally friendly activities. This involves creating a framework favorable to the emergence and then deployment of green technologies and responsible organizational methods. All sectors of activity can integrate their activities into the green economy. This notion in fact designates: on the one hand eco-activities, that is to say activities whose purpose is the protection of the environment such as for example water management, waste management or renewable energy production; on the other hand, economic activities; whatever their sector, which develop fewer polluting processes, less greenhouse gas emissions or less consumption of natural resources. The circular economy is one of the components of the green economy. This notion designates an economic model whose objective is to produce goods and services in a sustainable manner, by limiting: the consumption and waste of resources (raw materials, water, energy), the production of waste.

4.3.5 Biomass production and utilization in France

In France, in 2020, there was 496 000 farmers, co-operators and active partners with 389 800 farms disposing of an average agricultural area of 62 ha. The forest represents 17 million ha.

	2020
Agricultural producers	**496 000**
with agricultural land up to 10 ha	389 800
Utilised agricultural area (hectares)	**26 730**
Including cereals, oilseeds, protein cropts	42.8%
Meadows	41.4%
Permanent crops	3.8%
Plants productions in milliards of euroes	**43.4**
Cereales	9.5

Oilseeds, protein crops	2.3
Other industrials plants (ex: beetroot, linen, ..)	1.3
Fodder	5.6
Vegetables, potatoes, plants and flowers	10.1
Fruits	3.1
Wines	11.5
Animals production	**26.2**
Cattle	11.0
Poultry, eggs	4.7
Milk and other livestock products	10.5

Table 17 Agriculture production 2020 (French Ministry of agriculture Statistics)

Among the solutions that can be displayed in order to increase more sustainable practices, anaerobic digestion is a technology for producing biogas and digestate from biomass. This technology is one of the solutions to decarbonize energy and achieve France's climate objectives. The digestate can be spread as fertilizer and allows non-methanized organic matter to be returned to the soil.

The biomass used in methanization includes:

- agricultural products (crop residues, chaff, livestock effluent, intermediate crops for energy purposes (CIVE), etc.)
- sludge from sewage treatment plants - waste from agri-food industries - household bio-waste...

agriculture	2020
Permanent actives in farms	81 000
Farms	50 000
Forest surface	2 600 000 ha, with 89% of productive forest
student in agriculture sector	24 000
Surface only in grass	23%

Table 18 Data in Agriculture - 2020 – Auvergne Rhone alpes (French Ministry of agriculture Statistics)

Industrial sectors	Number of employees
Metallurgy and metal product	79 110
Agri-food industry	58 730
Rubber, plastics and other products	52 850
Manufacturing, repair marches and equipment	46 100

Transport material	36 840
Informatic, electronic and optic product	26 160
Chemistry	23 560
Textile, clothing, leather	23 300
Electrical equipment	22 690
Wood, paper and printing	22 300
Pharmaceutical industry	16 550

Table 19 Industry data - 2020 – Auvergne Rhone Alpes (Acos-Urssaf)

4.3.6 Conclusions from state of the art in the region (strengths & gaps)

STRENGHTS in AURA

Large consumption area with Lyon
Agricultural region
Diversity of agricultural production
Actors aware and invested in sustainable development and bio economy
Many actors from: agri food industry, rese arch, health
Regional policies invested on the circular economy subject
Huge forest area
Big agriculture event in AURA region
1st tourism sector in France

GAPS in AURA

Huge territory
Actors and sectors which are not working together

4.3.7 Objectives of the Hub

	Objective	Strategies (how ?)	Deadline	Status	Details
O.1	Establish a regional Hub	Mapping of actors and contact interested structures	31/01/2024	Achieved	✓ Mapping of 47 organisations & exhanges about the RBU project Organisation of the Hub K-O ✓ Meeting in St Etienne on 20/06/2023
0.2	Involve at least 30 stakeholders	Looking all the time for new members	30/09/2025	In progress	Participation of 17 stakeholders to the KO meeting
0.3	Define at least 2 value chains + 6 intervalue chains	Finding similarities between the different actors about needs, materials, etc	30/09/2025	In progress	✓ definition of 2 value chains : – Food plant-based by-products – Non-food plant-based by-products
0.4	At least 444 attendances to trainings	networking and good practice	31/07/2025	In progress	2/444 attendance to trainings
0.5	Exchange as much as possible with hub members (111 assistance)	Keep informed the different members about the actions, steps and results of Rural Bio Up project	31/07/2025	Achieved	✓already 330 by 06/12/2023
0.6	Events : organise 2 networking events Organise 2 study visits	1 networking event in 2023 1 networking event and 1 visit in 2024 1 visit in 2025	30/06/2025	In progress	✓ Organisation of 1 networking event : the Hub KO meeting (20/06/2023) ✓ Organisation of 1 study visit (SPRING – VEGEPOLYS VALLEY) on the 09/05/2023
0.7	Include Hub Followers (3/4)	Several Invitation sent in 2023 & 2024	30/06/2025	In progress	2 organisations are following the Hub's progressses: – AC3A (French representative of Scale Up project) – Valorial (French representative of BioRural Project)

O.1 Establish a regional Hub

STAKEHOLDER GROUP	INSTITUTIONS MAPPED	ADDED VALUE FROM JOINING RURALBIOUP PROJECT
private sector/business	ACTIV' HOME	Possibility of a product valorization
Civil society (NGOs, associations, interest representation, etc.)	ADEME AUVERGNE RHONE ALPES	Global vision, influence
private sector/business	ALTO PHYTO	Potential contacts with plant coproducts to be valued
private sector/business	BEERSCUIT	Possibility of a product valorization
private sector/business	BIO-VALO	New deposit with high methanogenic power
private sector/business	BRUEGGEN FRANCE SNC	Possibility of a product valorization
private sector/business	CAPILLUM	Possibility of a product valorization or use of new co-products of interest
private sector/business	CEINTURE VERTE GROUPE	Mass co-product
Research and innovation	CENTRE DE RECHERCHE DE L'INSTITUT PAUL BOCUSE	
Civil society (NGOs, associations, interest representation, etc.)	CENTRE INTERNATIONAL DE RESSOURCES ET D'INNOVATION POUR LE DÉVELOPPEMENT DURABLE	resource actor and valorization
Research and innovation	CENTRE TECHNIQUE INDUSTRIEL DE LA PLASTURGIE ET DES COMPOSITES	Feasibility study, formulation, assessment of biodegradability
Research and innovation	CENTRE VALORISATION AGRO RESSOURCES	Capacity for evaluation and characterization of co -products
Civil society (NGOs, associations, interest representation, etc.)	COMITÉ INTERPROFESSIONNEL DE LA NOIX DE GRENOBLE	Potential mass co-product to be valorized

Civil society (NGOs, associations, interest representation, etc.)	CONSEIL REGIONAL AUVERGNERHONE-ALPES	
private sector/business	COSMAUVERGNE	Possibility of a product valorization
private sector/business	CRUZILLES	Possibility of a mass product to be lalorized
Research and innovation	CTCPA	Technical contribution
Research and innovation	ECOLE NATIONALE SUPERIEURE DES MINES DE SAINT ETIENNE	Network, territorial vision of the existing
private sector/business	FERME DES VOLCANS	Co -products to identify (onions)
private sector/business	FREEDGE BEAUTY	Co-products to identify
private sector/business	GREENTECH	Extraction residues to be valorized, searching for co-products with new properties
Research and innovation	GROUPE ISARA-ISEMA	Fermentation, processes, searching for active molecules in new co - products
private sector/business	GRT GAZ	Important actor in the territory
private sector/business	H.E.L.P.A.C. (HUILES ESSENTIELLES DU LIVRADOIS POUR LA PHARMACOLOGIE, L'AROMATHERAPIE ET LA COSMETOLOGIE)	800 m3 of non valorized co-product
private sector/business	HERBAL T	Searching co-product with new properties
private sector/business	HOLISTE LABORATOIRES ET DEVELOPPEMENT	Co-product from pine sap
private sector/business	HORIZOM	Co-product from bamboo
private sector/business	INVERS	Possibility of a product valorization for animal feed
private sector/business	LA TANNERIE VEGETALE	Searching for co-product to compose vegetable leather

private sector/business	LABORATOIRE D'ANALYSE DES EXTRAITS VÉGÉTAUX ET ARÔMES	Molecule analysis capacity (essential oils)
private sector/business	LIMAGRAIN COOPERATIVE	co-products wheat, other cereals, others to be identified
private sector/business	LIMAGRAIN INGREDIENTS	co-products wheat, other cereals, others to be identified
private sector/business	NATURADDS	Formulation and evaluation of the characteristics of new compounds. Integration of molecules of interest (anti-oxidants, fillers, etc.) in plastics
private sector/business	NUTRIFIZZ	proposal for opportunities
private sector/business	NYMPHEA - AGIR POUR L'AVENIR - EN CREATION	overview and network
private sector/business	OXYANE	co-products wheat, other cereals, hemp and others to be identified
private sector/business	PHILIBERT SAVOURS	
private sector/business	PHYTOSYNTHÈSE	potential co-products, to be identified
private sector/business	PREDIV	potential co-products, to be identified
private sector/business	SIGMA CLERMONT	Formulation of plastics, Evaluation of the characteristics of new compounds
private sector/business	SOC EXTRUSION DU POLYETHYLENE A.BARBIER	Portential industrial opportunity for co-products
private sector/business	SOCIETE NOUVELLE PEPINIERES & ROSERAIES DELBARD	non-recycled rose petals, co-products with value to be identified

private sector/business	SOLU'NATURE	potential co-products, to be identified
Research and innovation	UNIVERSITÉ CLERMONT AUVERGNE	Overview
Research and innovation	UNIVERSITE SAVOIE MONT BLANC	Extraction, search for active molecules in new co-products
private sector/business	VALRHONA	network, potential co-products
Civil society (NGOs, associations, interest representation, etc.)	XYLOFUTUR	Network, wood sector

Table 20 Stakeholder mapping in region

Conclusions from mapping of stakeholders' needs:

- **Education and R&D**: selection of adapted plants matters, conservation of humid matter, fast degradation, stability, quality, characterization, standardization, traceability, storage, transport, providing security, behavior changes
- **Funding**: valorization research
- **Networks:** visibility about (local) partners, co-product to be valorized, identification of the resources, territorial scale mapping, create synergies
- **Potential for value chains:** find a chain value of co-product with a controlled and traceability quality, knowledge about the digestates of crops, co-products with controlled and continuous quality, dried coproducts (storage), transport system, drying

O.2 Involve at least 30 stakeholders

Kick Off of the Hub

The 20th of June the Hub kick off has been organized in St Etienne. 22 actors participated physically to the event. Program of the kickoff:

1) Presentation of 'RuralBioUp' project
2) Introduction to the bio economy by Cindy DERAIL – Nymphea society
3) Presentation of the different present actors

Every participant present himself, the activity of its company/lab and the needs referring to co-products and bio economy

4) Working group (identification of the obstacles, needs, actions, trainings with klaxon) for the Action Plan.

The main actions mentioned were : creation a co-product platform (supply and demand), list of the biomass according to their origin, technical files and product characteristics, realize a life circle analysis , create a sample bank, to raise awareness the user/Consumer, synergy event, gather people interested by little molecules of plants, development of new used.

5) Presentation of the ECLAIRA platform by Sebastien BECLIN from the CIRIDD 6) B2B Matchmaking (17 matchmaking realized)

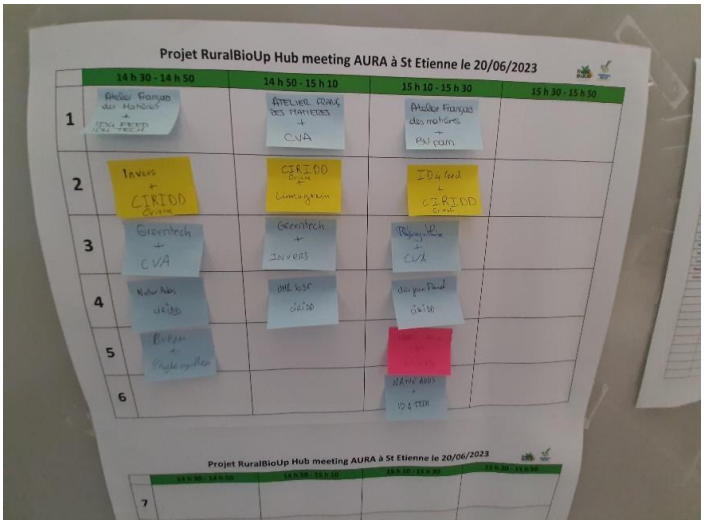


Figure 14 Matchmaking table

ORGANISATION
INVERS
ATELIER FRANÇAIS DES MATIÈRES
CENTRE INTERNATIONAL DE RESSOURCES ET D'INNOVATION POUR LE DÉVELOPPEMENT DURABLE
LA TANNERIE VEGETALE
NYMPHEA - AGIR POUR L'AVENIR - EN CREATION
REGION AUVEGNE-RHONE-ALPES
BIO-VALO

CENTRE INTERNATIONAL DE RESSOURCES ET D'INNOVATION POUR LE DÉVELOPPEMENT DURABLE
PHYTOSYNTHÈSE
LIMAGRAIN INGREDIENTS
CENTRE VALORISATION AGRO RESSOURCES
CENTRE INTERNATIONAL DE RESSOURCES ET D'INNOVATION POUR LE DÉVELOPPEMENT DURABLE
UMR 1095 - GÉNÉTIQUE, DIVERSITÉ ET ECOPHYSIOLOGIE DES CÉRÉALES
ID4FEED
NATURADDS
UNIVERSITÉ JEAN MONNET DE SAINT ETIENNE
GREENTECH
HOLISTE LABORATOIRES ET DEVELOPPEMENT
NATURADDS

Table 21 List of participants (1 representative/organisation)

Figure 15 Working groups discussion

Figure 16 Presentation of RuralBioUp Project

Feedback on the K-O meeting:

The participants showed a true interest and needs to create a territorial group about bio economy and to develop actions related to the valorization, identification of co-products.

2 value chains were identified:

- Food plant-based by-products
- Non-food plant-based by-products

O.3 Define at least 2 value chains + 6 intervalue chains

2 value chains were identified after the KO meeting:

- Food plant-based by-products
- Non-food plant-based by-products

O.4 Events: organise 2 networking events

Networking event 1: Hub meeting in Spring 2024 – on going planning

Networking event 2:
Planning of a networking event linked to a study visit in January 2025 at the SIVAL fair (A forum for exchange and information on viable, sustainable plant production. An event for business & innovation meeting in France (held in Angers) for all professionals in specialized plant production.)

O.5 At least 444 attendances to trainings

Proposition to participate in the following training sessions:

DATE	January 2024	DATE	February 2024	DATE	March 2024	DATE	April 2024
	MAND: RuralSpot training (online/all hubs)	06.02	**INT:** Digitalization in the Bioeconomy (online, project ScaleUp)	TBC	**MAND:** Access to public funding (online/all hubs)	04.04	**INT:** Improved nutrient recycling (online, project ScaleUp)
16.01	**INT:** Digitalization in the Bioeconomy (online, project ScaleUp)	27.02	**INT:** Digitalization in the Bioeconomy (online, project ScaleUp)	TBC	**MAND:** Access to private funding (online/all hubs)	23.04	**INT:** Improved nutrient recycling (online, project ScaleUp)
		09.02	**INT:** Technological trends in bioeconomy	TBC	**MAND:** Access to funding Q&A (online/all hubs)	12.04	**INT:** Technological trends in bioeconomy
				07.03	**INT:** Co-creating activities for Bioeconomy (online)		
				12.03	**INT:** Improved nutrient recycling (online, project ScaleUp)		
					INT: Bioeconomy and key principles of sustainability. The EU bioeconomy ecosystem		
				08.03	**INT:** Technological trends in bioeconomy		
DATE	**May 2024**	**DATE**	**June 2024**	**DATE**	**July 2024**	**DATE**	**August 2024**
14.05	**INT:** Practices of Social Innovation (online, project	04.06	**INT:** Practices of Social Innovation (online, project				

	ScaleUp)		ScaleUp)				
10.05	**INT:** Technological trends in bioeconomy	25.06	**INT:** Practices of Social Innovation (online, project ScaleUp)				
		07.06	**INT:** Technological trends in bioeconomy				
DATE	**September 2024**	**DATE**	**October 2024**	**DATE**	**November 2024**	**DATE**	**December 2024**
05.09	**INT:** Governance of Regional Bio-based systems (online, project ScaleUp)	17.10	**INT:** Governance of Regional Bio-based systems (online, project ScaleUp)	21.11	**INT:** Strategies to address social, ecological and economic tradeoffs (online, project ScaleUp)	12.11	**INT:** Strategies to address social, ecological and economic tradeoffs (online, project ScaleUp)
26.09	**INT:** Governance of Regional Bio-based systems (online, project ScaleUp)	31.10	**INT:** Strategies to address social, ecological and economic trade-offs (online, project ScaleUp)				

Table 22 Proposition to participate in training sessions

Promotion of the training sessions accessible to the hub members on VEGEPOLYS VALLEY's website: https://www.vegepolys-valley.eu/leshttps://www.vegepolys-valley.eu/les-projets/les-projets-europeens/rural-bio-up/session-d-informations-rural-bio-up/projets/les-projets-europeens/rural-bio-up/session-d-informations-rural-bio-up/

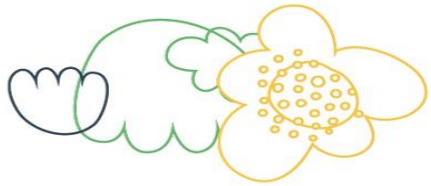
Figure 17 Promotion of the training sessions in HUB´s website

O.5 Exchange as much as possible with hub members (111 assistance)

By 06/12/23: 330 assistance

Person in charge	Action	Date	Topic	N° of stakeholders reached
ROUSSET Maïti	email	10/03/2022	présentation project	1
ROUSSET Maïti	email	03/02/2023	Hub construction	25
ROUSSET Maïti	email	06/02/2023	Hub construction	1
ROUSSET Maïti	email	08/02/2023	discussion about the hub/project	2
ROUSSET Maïti	email	13/02/2023	Hub construction	1
ROUSSET Maïti	email	21/02/2023	discussion about the hub/project	1
ROUSSET Maïti	email	06/03/2023	Reminders hub construction	14
ROUSSET Maïti	email	10/03/2023	discussion about the hub/project	1
ROUSSET Maïti	email	24/03/2023	Reminders hub construction	9
ROUSSET Maïti	email	24/03/2023	discussion about the hub/project	1
ROUSSET Maïti	email	28/03/2023	Organisation hub's meeting	2
ROUSSET Maïti	email	31/03/2023	discussion about the hub/project	1
ROUSSET Maïti	email	04/04/2023	Organisation hub's meeting AURA	3
ROUSSET Maïti	email	05/04/2023	Organisation hub's meeting AURA	2
ROUSSET Maïti	email	07/04/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	11/04/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	14/04/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	18/04/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	24/04/2023	Organisation hub's meeting AURA	2

ROUSSET Maïti	email	26/04/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	05/05/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	09/05/2023	Organisation hub's meeting AURA	2
ROUSSET Maïti	email	09/05/2023	Invitation hub's meeting	26
ROUSSET Maïti	email	10/05/2023	Discussion about the invitation for the hub's meeting	1
ROUSSET Maïti	email	15/05/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	16/05/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	17/05/2023	Invitation hub's meeting	54
ROUSSET Maïti	email	22/05/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	23/05/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	06/06/2023	Reminders hub's meeting invitation	19
ROUSSET Maïti	email	06/06/2023	Registration hub's meeting	2
ROUSSET Maïti	phone call	07/06/2023	Presentation project, hub and meeting	1
ROUSSET Maïti	email	12/06/2023	Organisation hub's meeting AURA	1
ROUSSET Maïti	email	13/06/2023	Organisation hub's meeting AURA	2
ROUSSET Maïti	email	13/06/2023	Discussion about the invitation for the meeting	1
ROUSSET Maïti	email	13/06/2023	Invitation meeting	2
ROUSSET Maïti	email	13/06/2023	Registration hub's meeting	1
ROUSSET Maïti	email	15/06/2023	Discussion about the hub's meeting	1
ROUSSET Maïti	email	30/06/2023	Thanks for the hub's meeting intervention	2
ROUSSET Maïti	meeting	05/07/2023	Presentation of the project	1
ROUSSET Maïti	email	06/07/2023	Send of the hub's meeting report	38



ROUSSET Maïti	email	20/09/2023	RBU platform	1
ROUSSET Maïti	email	20/09/2023	Invitation european meeting	1
ROUSSET Maïti	email	17/10/2023	Invitation european meeting	1
PERCHET Geoffrey	email	30/05/2023	Organisation hub's meeting AURA	1
PERCHET Geoffrey	email	02/06/2023	Organisation hub's meeting AURA	5
PERCHET Geoffrey	email	05/06/2023	Organisation hub's meeting AURA	1
PERCHET Geoffrey	email	06/06/2023	Organisation hub's meeting AURA	3
PERCHET Geoffrey	email	08/06/2023	Organisation hub's meeting AURA	1
PERCHET Geoffrey	email	09/06/2023	Organisation hub's meeting AURA	8
PERCHET Geoffrey	email	12/06/2023	Organisation hub's meeting AURA	1
PERCHET Geoffrey	email	14/06/2023	Organisation hub's meeting AURA	2
PERCHET Geoffrey	email	16/06/2023	Organisation hub's meeting AURA	4
PERCHET Geoffrey	email	19/06/2023	Organisation hub's meeting AURA	4
PERCHET Geoffrey	email	21/06/2023	Send of the hub's meeting report	1
PERCHET Geoffrey	email	27/06/2023	Send of the hub's meeting report	1
PERCHET Geoffrey	email	13/09/2023	Invitation european meeting	3
PERCHET Geoffrey	email	14/09/2023	Invitation european meeting	2
PERCHET Geoffrey	meeting	21/11/2023	Presentation of the project	1
PERCHET Geoffrey	meeting	23/11/2023	Presentation of the project	1
ROUSSET Maïti	email	07/12/2023	Visit hub organisation	1
ROUSSET Maïti	email	06/12/2023	communication about RBU trainings	57

Table 23 Exchange done by HUB facilitators till 6th December 2023

O.6 Organise 2 study visits

1st study visit : May 2023 Study visit SPRING – VEGEPOLYS VALLEY

VEGEPOLYS VALLEY and SPRING organised a study visit 9th to 11th May 2023.

SPRING travelled with representatives from 6 European organisations from the Hemp Club consortium The group visited VEGEPOLYS VALLEY offices in Angers for knowledge exchange and networking including discussion of RuralBioUp (presentation of the Italian and French Hubs). Linked to sister projects Bio Rural & Scale up were made (funded in the Pays de la Loire region) as well as a communication of RuralBioUp throughout the visit.

Figure 18 Study Visit in May 2023

Day 1

- SPRING and Hemp Club delegation travel to VGV offices in Angers for knowledge exchange and networking.
- Presentation of French stakeholders.
- VGV began presentations with an introduction of the Plant Intercluster Network, the French cluster and their EU projects including RuralBioUp.
- This was followed by presentations the Hemp Club Members.
- And a presentation of the sister projects BioRural and Scale Up (by their French representatives)

Figure 19 Day 1 presentation of the French & Italian Hubs

Figure 20 Day 1 Introduction to Biorural project

Day 2

- Knowledge Exchange & training on stakeholder engagement

Figure 21 Day 2 Training on stakeholder engagement

Name of visit	Region	On-site/Online	No. Attended	Facilitators	Attendies	Visit locations

Hemp Club study visit	Pays de la Loire/Auvergne Rhône Alpes	On-site 9-11th May 2023	19	SPRING and VGV	1. LOMBARDY GREEN CHEMISTRY CLUSTER 2. CZECH HEMP CLUSTER 3. PRODUTECH - PRODUCTION TECHNOLOGIES CLUSTER 4. STANDORTAGENTUR TIROL GMBH: CLUSTER MECHATRONICS TIROL 5. IND-AGRO-POL 6. FEDERCANAPA 7. VALORIAL 8. Association des Chambres d'agriculture de l'Arc Atlantique (AC3A)	1. VEGEPOLYS VALLEY Headquarter 2. remote : VALORIAL 3. remote : AC3A

Table 24 Summary of study visit

O.6 Include Hub Followers (3/4)

2 organisations are following the Hub's progresses:

- AC3A (French representative of Scale Up project)
- Valorial (French representative of BioRural Project)

4.4 A RuralBioUp hub Action Plan – Irish Regional HUB

4.4.1 Introduction

Tipperary

Tipperary is a county in the Munster region in Republic of Ireland. It is the sixth-largest of the 32 counties by area and the 12th largest by population. Tipperary is part of the 'Golden Vale', an area of Ireland with rich grasslands that is the location of the most extensive dairy farming activity. Irish Bioeconomy Foundation (IBF), is headquartered on the National Bioeconomy campus in Lisheen, Co. Tipperary. This 455-hectare property is a converted mining site and boasts an impressive infrastructure including roads, electrical substation, wind turbines, weighbridges, water, buildings. IBF and Tipperary County Council are among several stakeholders that are working on delivering the campus as the centre of the bioeconomy in Ireland including biorefinery facilities with a view to exploiting the significant opportunities which exist to produce high-value bio-based chemicals from available low-value biomass residues.

The National Bioeconomy Campus at Lisheen is located centrally to the location of the Mid-Tipperary Decarbonising Zone (designated by the Local Authority as part of its Climate Action Plan 2024), this is a unique rural area which will act as a demonstration area for possible decarbonising and positive climate action at a local and community level. Within the this area, it is the purpose of Tipperary County Council to work collaboratively with stakeholders and communities, and help to promote exploration, co-creativity, innovation and new learnings in delivering climate action, as well as the economic and social benefits of decarbonising, such as just transition, biodiversity and health."

Irish Bioeconomy Foundation

IBF is Ireland's national bioeconomy association and innovation cluster. It was founded in mid-2017 to establish a forum of industry, academia and policy leaders around Ireland's emerging bioeconomy. IBFs mission is to promote the conversion of Irelands' natural resources to high-value products for the development of a sustainable bioeconomy. IBF is currently working on three European projects: BioeconomyVentures, BIObec and RuralBioUp.

Figure 22 Logo of Irish Bioeconomy Foundation

Tipperary County Council

Tipperary Countil Council is the Hub Contact point for Irish regional Hub in RuralBioUp. Tipperary Countil Council is the local authority which is responsible for for housing and community, roads and transportation, urban planning and development, amenity and culture, and environment including bioeconomy.

Comhairle Contae Thiobraid Árann
Tipperary County Council

Figure 23 Logo of Tipperary County Council

National Bioeconomy Campus

Irish Bioeconomy Foundation (IBF) and Tipperary County Council will soon operate a modern Bioprocess pilot plant covering 1,700 sq. metres floor area. Our facility will contain the most up-to-date and versatile pilot-scale processing equipment. The plant now has a wide range of capabilities for developing bio-based products. IBF is arranging a modular structure of self-contained processing areas. This guarantees single client access and total confidentiality. IBF can provide practical technical supports and advice for companies to solve issues related to Bioprocess design and scale-up. Businesses involved in the bio-based economy face constant challenges to be competitive, sustain existing markets, discover new markets and comply with a demanding regulatory environment.

Figure 24 National Bioeconomy Campus in Lisheen

4.4.2 Public Strategies and Policy Instruments

Ireland has several bioeconomy policies and strategies led by the Irish Government departnments: Department of Agriculture, Food and Marine (DAFM) and Department of the Environment, Climate and Communications (DECC). Thee landmark Irish bioeconomy policy documents are the National Policy Statement on Bioeconomy (2018, 2022) and the Bioeconomy Implementation Group Progress Report (2019). These two policy documents demonstrate a clear commitment from the Government to monitor and support the development of the Irish Bioeconomy within the context of “rural renaissance” under the Rural Development Action Plan.

Pre-2018 Irish Bioeconomy activities that culminated into the development of the two policy documents included several collaborative academic-led bioeconomy related research projects

funded by the Department of Agriculture, Food and the Marine (DAFM), as well as a National Workshop on Bioeconomy organized by the National Department of the Taoiseach and the Interdepartmental Group on the Bioeconomy.

Recently released Irish government bioeconomy documents include the second progress report on the implementation of the National Policy Statement on the Bioeconomy, and the first report of the Bioeconomy Stakeholder Forum. The reports are complemented by a recent EPA report on Circular Bioeconomy in support of Climate Action, Sustainable Food and Biobased Systems.

Bioeconomy Action Plan 2023-2024 was released during Bioeconomy Ireland Week 2023 and contains and is is the first national action plan for an Irish bioeconomy.
The purpose of this plan is to further develop Ireland's bioeconomy in delivering the vision of the 2018 National Policy Statement on the Bioeconomy; for Ireland "to be a global leader for the bioeconomy through a coordinated approach that harnesses Ireland's natural resources and competitive advantage and that fully exploits the opportunities available while monitoring and avoiding unintended consequences

4.4.3 Stakeholder mapping

There are a number of clusters, research centres and government departments working on developing the bioeconomy and related sectors in Ireland. These bioeconomy actors are highly diverse and strongly interconnected collaborating on EU and national projects. BIObec is an example of an EU project in which IBF and MTU are collaborating to build a Biobased Education Centre in Ireland. Bioeconomy Ireland Week is an annual week-long event held each October to highlight and raise awareness of Ireland's rapidly growing bioeconomy. The celebration is a collaboration of events and awareness raising initiatives involving industry, local communities, producers, researchers and students throughout Ireland.

For the RuralBioUp Irish Regional Hub it was important to include stakeholders from Government, Academia, and Industry including representatives such as primary producers, clusters, co-operatives and research centres.

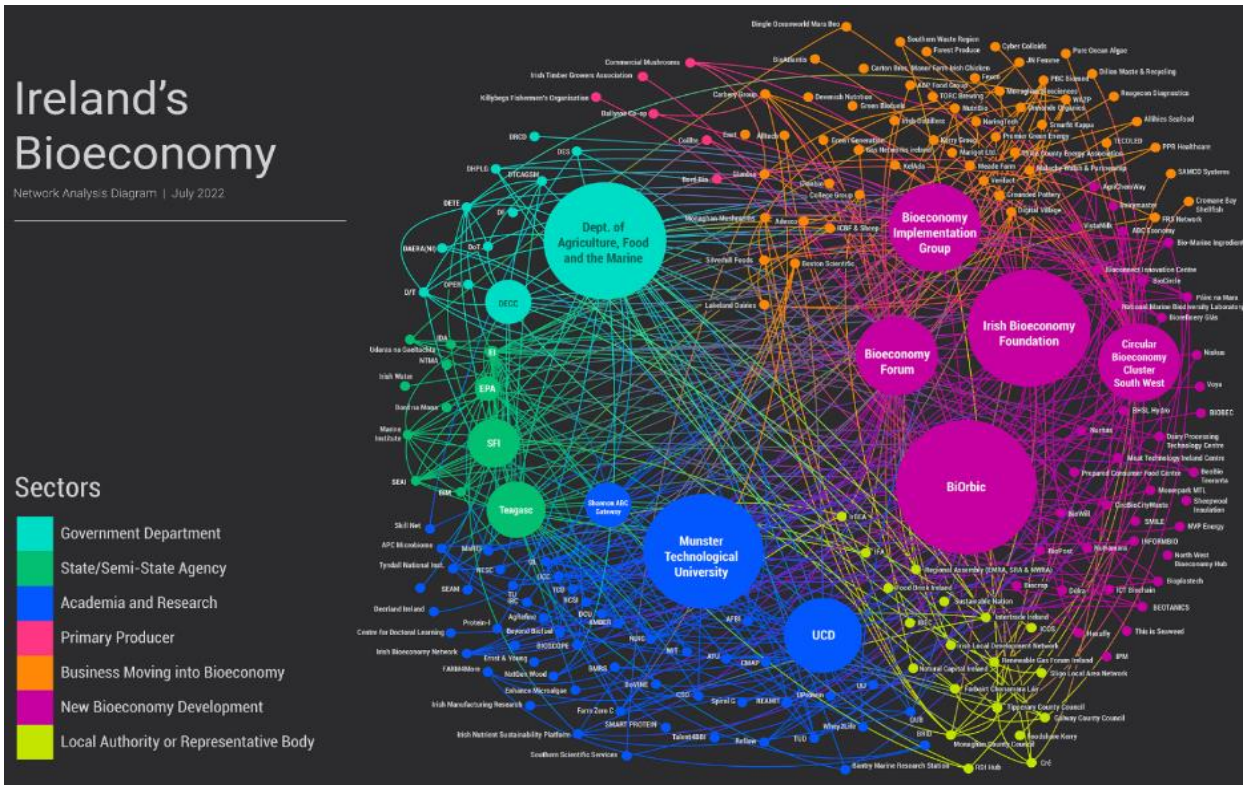


Figure 25 Irish Bioeconomy network

4.4.4 Kick-off Meeting

Irish Regional Hub kick-off meeting took place on 16th November 2023. The meeting started with a Study Visit to the National Bioeconomy Campus in Lisheen Tipperary to give the stakeholders an idea of what can be done with feedstocks to valorise waste such as dairy processing residues. After visiting the National Bioeconomy Campus, participants travelled to the Horse & Jockey hotel for the remainder of the day. The meeting began with participants introducing themselves which organisations such as research centres, co-operatives, banking organisations and dairy industry. IBF provided an overview of the organisation including the RuralBioUp project and the objectives. The agenda was discussed which included four separate workshops:

- Bioeconomy Potential in Rural Ireland
- Support Services (Study Visits, Networking Events and Training)
- Value Chains
- Funding Opportunities

Figure 26 IBF CEO Stephen Napier gives a tour of the pilot plant at National Bioeconomy Campus

RuralBioUp Irish Regional Hub Kick-off meeting Thursday 16th November 2023	
11:00 - 11:15 (10 min)	Introduction to the participants Location: The Horse & Jockey Hotel, Thurles
11:15- 11:30 (15 min)	• Irish Bioeconomy Foundation presentation • RuralBioUp project presentation • Agenda and discussion of day
11:30- 12:00 **(30 min)**	Introduction to Workshop 1
12:00 – 13:00 **(60 min)**	Workshop 1 • Bioeconomy Potential in Rural Ireland • Support Services in Rural Ireland
13:00 – 13:45 (45 min)	Lunch
13:45 – 14:00 (15 min)	Introduction to Workshop 2
14:00 – 15:00 (60 min)	Workshop 2 • Value Chains • Funding Opportunities
15:00 – 15:15 (15 min)	Next steps
15:15 – 15:30 (15 min)	Closing remarks

Table 25 Agenda for the Irish Kick-off meeting

Figure 27 Kick-off meeting in Horse & Jockey Hotel

Figure 28 Stakeholder engagement results were collected on A0 posters

4.4.5 Implementation

Value Chains

The value chains discussed at the Kick-off meeting were related to dairy and forestry. The most popular discussion were around dairy value chains particularly Whey and Dairy Processing Sludge (DPS).

<u>Whey</u>

Whey is a by-product of the dairy industry obtained during cheese production. It is a rich source of nutrients including protein, carbohydrates and micronutrients. Whey can be valorised using biotechnology techniques such as fermentation to produce such as bioactive peptides and enzymes. This can in turn be used to make value-added bio-based products for growing global markets, including biodegradable plastics, bio-based fertiliser and other minerals.

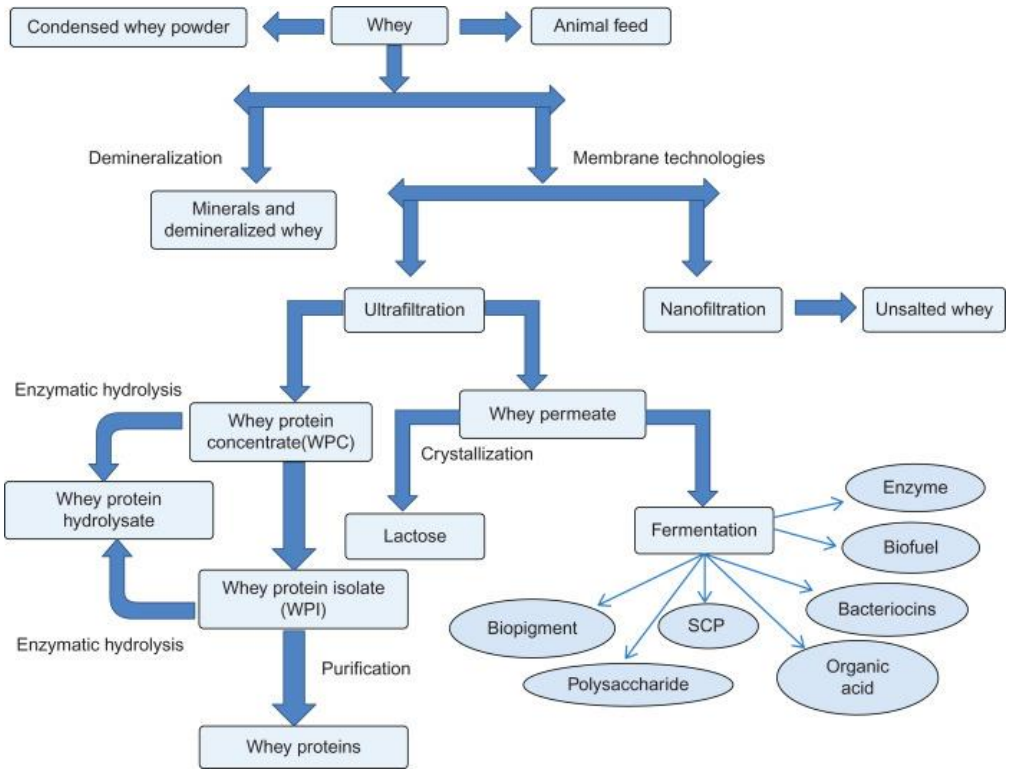


Figure 29 Whey value chain

Dairy Processing Sludge (DPS)

Dairy Processing Sludge (DPS) is a by-product of the dairy industry wastewater treatment process. Due to its nutrient content it is currently applied to agricultural land as an organic fertiliser for crop production, however, this is seen as only a short to medium term solution for disposal of waste. DPS has the potential to be converted into biofertilisers, however, there is not much research on this and DPS nutrient profile can vary significantly.

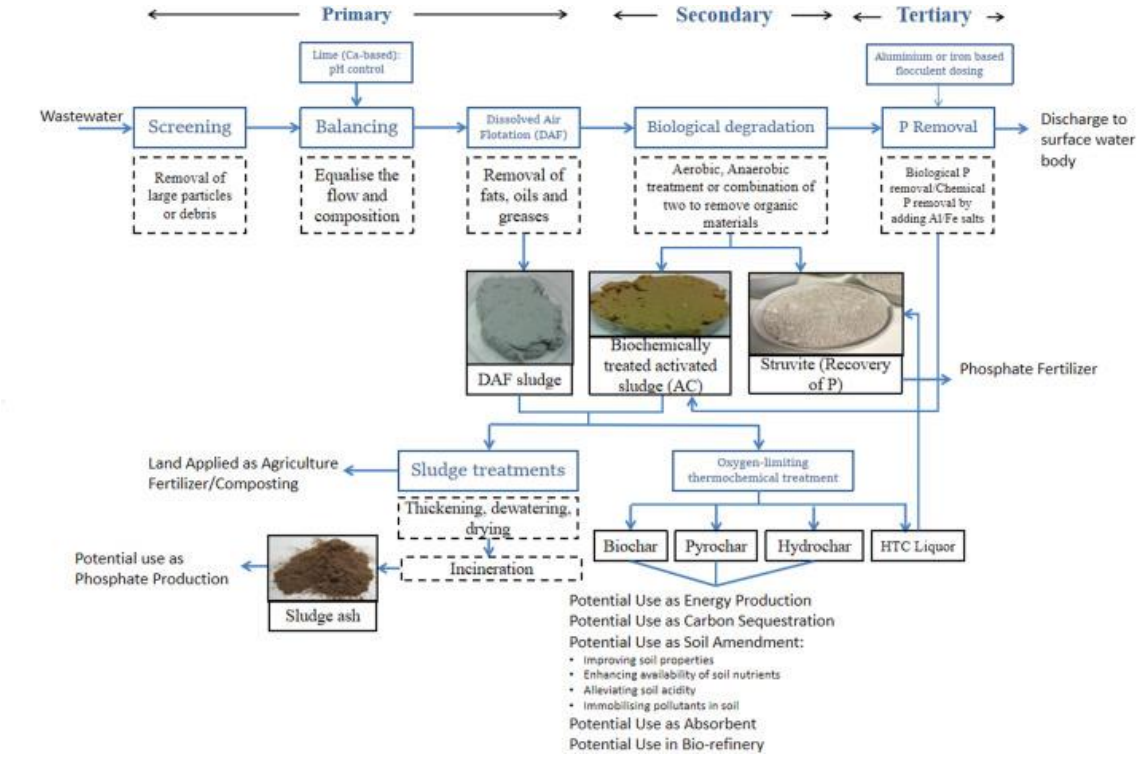


Figure 30 Dairy Processing Sludge value chain

Objectives:

1. Organise Networking/Matchmaking Events.
2. Organise Study Visits in Ireland and Europe
3. Provide training on relevant bioeconomy topics

O1. Networking/Matchmaking Events

There are plans for three Networking Events in 2024 that RuralBioUp Irish Hub will be involved.

- *All-Island Bioeconomy Summit is an annual event bringing all the key bioeconomy stakeholders from across the island of Ireland together. The event will take place March 2024 and is included as a Satellite Event of the European Commission* Bioeconomy Changemakers Festival.
- The Irish Hub is also organising an event in April/May 2023 which will be located on the border of Ireland and Northern Ireland. The event will bring stakeholders from bioeconomy and agriculture together to provide information on funding opportunities and cross-border collaboration.
- There will be a Rural Development networking event organised as part of Bioeconomy Ireland Week in October 2024. This event will showcase rural development projects including EU funded projects such as RuralBioUp and National projects.

O2. Study Visits in Ireland and Europe

Irish Hub have plans for several study visits throughout Ireland as well as two international visits.

- IBF organised in collaboration with SPRING Cluster the pilot study visit which took place March 2023. As part of this an Irish delegation visited bioeconomy sites in Milan, Novarra and Turin in Northern Italy.
- IBF will also organise a second international study trip which is yet to be decided.

The Irish hub will also organise visits to locations in Ireland such as National Bioeconomy Campus, Farm Zero C as well as organising Farm Walks.

- The first visit to the National Bioeconomy Campus took place at the RuralBioUp Irish Hub kick-off meeting in November 2023. There will be further visits to the site as it develops in 2024.
- Irish Hub will organise vists to Farm Zero C which is a climate-neutral, economically-viable dairy farm. The project takes a holistic approach, combining a range of technologies and practices to reduce greenhouse gas emissions and increase the productivity and resilience of the farm.
- Another topic that was discussed during kick-off meeting was Farm Walks. This idea was to have farmers bring bioeconomy researchers for walks on the farm to have discussions on how to implement small-scale biobased solutions.

Figure 31 Irish delegation at Novamont in Novarra

O3. Provide training on relevant bioeconomy topics

Training topics were discussed at kick-off meeting and it was agreed that the most beneficial topics would be focussed on general knowledge and communication on bioeconomy and funding as well as topics aimed at a younger audience.

- RuralSpot
- Access to finance & funding in bioeconomy
- RuralBioUp Impact Assessment
- Better in circular bioeconomy nutrient recycling
- Bioeconomy in agriculture and forestry
- How to pitch (to impact investors)

- Awareness raising & education in bioeconomy
- Communicate the bioeconomy: tools & methodologies
- Bioeconomy in Education for young ones

4.5 A RuralBioUp hub Action Plan – Lombardy Regional HUB

4.5.1 Introduction

Provides an overview of the action plan and its purpose.

The aim of the Action Plan of the Lombardy Hub is to provide the framework of the activities that the facilitator (Lombardy Green Chemistry Association - LGCA) and the regional contact point (Vanguard Initiative) of the Hub will organise in order to facilitate the development of the bioeconomy in the rural context.

The Action Plan supports the overcoming of specific problems, identifying and finding solutions to particular challenges or obstacles in the Lombardy territory that may hinder the progress towards foresting the growth and scalability of inclusive and small-scale biobased solutions in the rural areas (with a focus on two identified value chains), promoting innovation, sustainable practices, and economic development. This document is a key tool for the Hub to define a strategy that can guarantee its autonomous continuation structure and activities after the end of the project.

For this purpose, the Action Plan of the Lombardy Hub provides first of all a regional context assessment specific to the rural areas of Lombardy, identifying challenges, opportunities, and unique characteristics that influence the adoption of biobased solutions in the region. A SWAT analysis and an overview of the Public strategies and policy instruments enhance understanding of the factors that could potentially prevent the progress of the bioeconomy in the rural area. Once the problems have been identified, the document develops solutions to overcome these obstacles, strategizing and designing appropriate actions to address the identified challenges.

The Action Plan's main objectives and target groups are also defined in the document to outline what is intended to reach and benefits, but also guide the customization of the strategy and contribute to its overall long-term success and sustainability.

The document outlines the strategy of the Action Plan, providing direction, clarity, and a systematic approach that enhances the likelihood of achieving the objectives and desired outcomes. The strategy guides the implementation process providing the structure, organization, and guidance needed to successfully execute the proposed initiatives.

The Action Plan is responsible for managing the Lombardy Hub's activities, utilizing resources efficiently, and achieving objectives systematically and strategically.

4.5.2 Goals and Objectives

Defines the goals and objectives of the action plan, outlining what will be achieved.

The Lombardy Hub has established five "Goals" with specific targets and an appropriate method for monitoring progress at each step of the process and define clear time frames, resources, and stakeholders to be involved. Indeed, all this was conceived with a view to ensuring an S.M.A.R.T. approach, i.e. Specific, Measurable, Achievable, Relevant and Time-bound.

O1. Environmental Sustainability

The first objective of this paper is to support and provide theoretical and practical solutions that contribute to reducing the impact and increasing the environmental sustainability of the agricultural sector in the Lombardy region, with a special focus on the agrifood and biomass enhancement sectors.

The key points that are addressed are:

- Reducing the use of non-renewable resources and increasing the adoption of sustainable agricultural practices, eco-friendly production processes, and efficient resource management.
- Promoting sustainable agriculture by supporting farmers and operators in shifting to sustainable practices, such as organic farming, crop diversification, and reducing the use of pesticides and chemical fertilizers.
- Development of the biobased supply chain, fostering the growth of the biomass supply chain, and encouraging the production, harvesting, processing, and marketing of biobased products.
- Reducing carbon emissions by promoting energy efficiency practices and promoting sustainable transportation options.
- Encouraging the use of biofuels and other renewable energy sources derived from biomass, while reducing the use of fossil fuels in the sector.
- Implementing monitoring systems to assess the impact of initiatives taken and allow for course corrections if necessary.

O2. Education and awareness

The second objective of this document is to inform and raise awareness of the importance of biobased and sustainable solutions, promoting awareness and adoption of more eco-friendly behaviors and practices in the agricultural sector, focusing on the two chosen value chains. These actions are key to encouraging the adoption of more sustainable behaviors and practices in rural, industry, and economic activities, thus contributing to the fulfillment of the goals of the Lombard Hub and the RuralBioUp project.

The key points that are addressed are:

- Organizing awareness and information campaigns that illustrate the benefits of biobased and sustainable solutions for both the environment and human health. Our objective is to use various communication methods, such as online platforms, traditional media, and local events, to reach a wide range of individuals.
- Promoting the benefits of sustainable practices by involving the local community in events, fairs, markets, or conferences that showcase biobased and sustainable products, and encouraging direct interaction with farmers and producers.

- Providing training and courses for professionals, producers, and operators of the two chosen supply chains to encourage the use of sustainable methods in their daily activities.
- Using clear and accessible communication to explain concepts related to sustainability and biobased solutions in simple terms, avoiding technicalities that might be difficult to understand.
- Using surveys, periodic evaluations, and feedback from stakeholders, to measure the effectiveness of activities and adjust communication strategies based on the results obtained.

O3. Collaboration and Partnership

A third key point that needs to be developed in the context of the Lombard Hub is to foster collaboration and partnerships between various entities, such as public, private, and academic institutions. By doing this, innovation will be stimulated, knowledge and resources will be shared, industry challenges will be overcome, and the adoption of biobased and sustainable solutions in the two selected value chains.

The key points that are addressed are:

- Fostering strategic alliances between public institutions and private companies to promote innovation and investment through funding, knowledge exchange, and collaborations to develop new technologies.
- Promoting collaboration among academic institutions, research centers, and companies to conduct joint research projects on biomass, agrifood, and sustainable agriculture-forestry technologies. This can speed up innovation and facilitate the conversion of scientific discoveries into practical applications.
- Creating knowledge exchange platforms that involve key players (such as farmers, producers, researchers, government institutions, and nongovernmental organizations), facilitates the dissemination of best practices and access to crucial information for the sector. These platforms can be physical or digital and foster the creation of synergies among stakeholders.
- Developing consortiums or cooperatives among small farmers or biomass producers to access shared resources, such as processing infrastructure or distribution channels, will improve efficiency and competitiveness in the market.
- Organizing tables for discussion and dialogue between government institutions and the private sector to develop policies and regulations that encourage the adoption of sustainable practices, considering the needs and perspectives of both parties.

O4. Economic development

The Action Plan developed by the Lombardy Regional Hub aims to achieve sustainable economic development, which is not only about economic growth, but also about market diversification and competitiveness, job creation, and the ability to take advantage of new opportunities, contributing to the overall goal of environmental and social sustainability.

Key points that will be addressed include:

- Informing about financial incentives, funds, or tax breaks from public and/or private entities for companies and industry players who engage in partnerships or collaborations to research, develop and implement sustainable technologies.
- Promote the creation of new economic opportunities through the development of new sectors or the diversification of existing ones. The introduction of biobased solutions can promote the development of new products and markets, such as sustainable food, environmentally friendly packaging, or innovative biomass-derived materials.
- Improve the competitiveness of local businesses by promoting the adoption of sustainable practices. This can result in an increased appeal to consumers who are increasingly concerned about the environmental impact of the products they buy, as well as an enhanced position of the region as a leader in sustainable innovation, simplifying access to international markets and elevating the region's global competitiveness.
- The development of sectors related to biobased solutions can generate new jobs. For example, the expansion of sustainable agriculture, biofuel production, or biomass management may require new skills and create job opportunities.
- Investing in biobased and sustainable solutions may incur additional costs initially, but in the long run, it could lead to reduced operating costs through efficient use of resources and more efficient production processes.

O5. Social equality

The goals that the Lombard Hub will strive to achieve also address social equity, which is key to ensuring that the benefits from the biobased and sustainable solutions proposed and pursued by the Hub are not focused only on specific groups, but are accessible and beneficial to the entire community, contributing to a more equitable and sustainable future for all.

Key points that will be addressed include:

- Ensuring equitable and sustainable access to resources for all stakeholders, including small farmers and rural communities. This helps reduce inequalities in access to resources and supports local actors.
- Actively involve local communities in decisions and initiatives regarding sustainable development by listening to their needs, traditional knowledge, and perspectives. This can lead to solutions that are better suited to the specific needs of different realities.
- Promote training programs that are accessible to all actors in the sector, regardless of their socio-economic background, to ensure that everyone can benefit from the new opportunities and skills offered by the Hub.
- Encourage policies and programs that safeguard and encourage family farming and small-scale producers, leading to the preservation of cultural diversity and reducing economic inequalities.
- Ensure that the benefits of adopting sustainable solutions are distributed equally among all actors in the supply chain, avoiding disparities in access to markets, financing, or sustainable technologies.

4.5.3 Target Audience

Identifies the specific group or individuals the action plan is intended to reach and benefit.

Identifying the target audience to whom the Action Plan is directed is essential to ensure its effectiveness, designing target strategies to meet the needs and perspectives of each group, and creating synergies to promote biobased and sustainable agricultural solutions in the two selected value chains effectively and inclusively.

General target audience

The Lombardy Hub's Action Plan, which is based on the principles of equality and inclusiveness, encompasses the entire industrial, research, and agricultural community and all stakeholders involved in the two selected value chains (agri-food, enhancement of biomass in high value-added products).

Farmers and agricultural producers

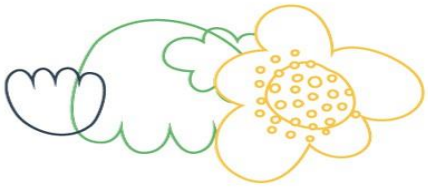
This group is a key element in the development and implementation of the Action Plan, as they are directly involved and are the primary actors in agricultural production, being at the base of the two value chains considered. The decisions that farmers and agricultural producers make directly influence the production, quality, and sustainability of intermediate and final products.

They are an integral part of local communities and understand the social, economic, and environmental dynamics of their context, having a practical knowledge of the conditions and challenges of the area. Therefore, their role in outlining the Action Plan is crucial to propose solutions that adequately address their needs and those of the local context. Additionally, the proposed policies and initiatives will have a direct impact on their activities and economic livelihoods. The importance of integrating farmers' and agricultural producers' knowledge into sustainable solution planning is essential for their effectiveness and acceptance, preventing solutions that may be difficult to implement in practice and that are sustainable in the long term. Farmers can become ambassadors for sustainable practices, influencing other actors in the sector and promoting cultural change towards more eco-friendly practices. Providing training, technical support and access to information resources is crucial to help farmers understand the benefits and adopt new sustainable techniques and technologies.

It's necessary to overcome certain challenges in the sector in order to carry out their activities to the best of their ability. First, increase income sustainability, which means the ability to generate income on an ongoing basis over time while ensuring sustainable management of natural resources (such as soil, water, and biodiversity) and compliance with social and community principles. Also crucial will be low-impact crop management, which is to increase farming practices that minimise the environmental impact of farming while maximising crop yields. The objective of this approach is to achieve environmental sustainability by minimising the use of harmful inputs and encouraging practices that conserve natural resources. To do this, is required increased knowledge in terms of quality control and the criticality of cultivation under environmental stress. Also critical is the availability of clear and actionable guidance.

The Action Plan will contribute to this on several levels:

- facilitating contact with different experts in the field, allowing for technical-specific meetings, exchange of knowledge and best practices, and efficient scientific



communication. This will also ensure a more integrated view of all essential aspects: critical issues, quality control, parameters, products to be grown, and tools to be used.

- creating collaborations with the network of stakeholders, including research and academia, to help develop new innovative techniques and instruments as well as more resistant or productive genetic hybrids; industry to share and exchange resources, materials, energy, and waste; policymakers and regional authorities to have financial support that can respond to the needs of primary producers, and require the adoption of clear and actionable directions.
- contributing to the diversification of income sources and new business opportunities, in fact, the introduction of biobased solutions will enable farmers to diversify their activities. For example, the production and use of biomass could provide an additional source of income in addition to traditional cultivation, such as the production of biofuels or biodegradable materials.
- promoting technological innovation and research in the agricultural sector, encouraging the development of new sustainable processes and products.
- improving natural resource management, soil conservation, and reducing greenhouse gas emissions by promoting the introduction of sustainable practices.
- reducing waste and maximising the use of available resources through the promotion of biomass use as an energy source or feedstock for biobased products.
- spreading knowledge about and increasing access to funding, incentives, or tax breaks for farmers who adopt sustainable and biobased practices, encouraging them to make the transition to more environmentally sustainable models.

Industrial sector, especially the Agri-food and processing industry

Involving industries in the development of an action plan is essential because they have a huge influence on the process of procuring resources, processing them, and producing the final product. In particular, the agri-food and processing industry has a big effect on food production and biomass use. Decisions made by industry have a significant impact on the entire supply chain, influencing agricultural production, processing raw materials, and distribution of final products, and having a significant impact on the environment, economy, and consumer choices.

Companies involved in agri-food and biomass processing could be targeted for adopting more sustainable technologies and processes along the entire production chain, from raw material management to distribution, making them at the forefront of technological innovation and production practices toward reduced environmental impact. Action in this area can then serve as an example and model for other companies along the supply chain, demonstrating that economic success can be achieved by adopting sustainable practices. It is precisely because of the close connection between these two industries and other types of industrial sectors that we can extend what will be said for these categories to others.

It is crucial to establish strong collaborations and networks among actors throughout the supply chain to enhance industrial sustainability. The application of circular economy principles makes it possible to eliminate waste and maximize the use of resources. Understanding the extraction, production, and processing of raw materials while minimizing environmental impact is crucial, as well as designing processes that minimize waste and maximize the use of available materials and resources.

The symbiotic industry approach is an excellent way to apply these principles by linking industries to share resources, materials, energy, and waste. An example of this is how what is thought of as a by-product or waste in some industries can be a valuable source material for others. The use of by-products or waste as energy sources is another example, as biomass can be made from organic waste to generate renewable energy.

This process reduces dependence on virgin raw materials, reduces waste disposal, and contributes to a more sustainable cycle. Practical implementation of these strategies often requires collaboration between different industries and redesign of production processes to maximize efficiency and reduce waste. Research and development of new sustainable technologies and processes are key to promoting the circular economy at the industrial level.

A well-defined action plan is a practical and strategic framework that can support and guide the agrifood and processing industry in transitioning to more sustainable practices, providing incentives, technical support, potential partnerships, and useful tools for embracing biobased and environmentally friendly solutions. Specifically:

- fostering collaboration and interaction among the different entities involved in value chains, to promote the exchange of knowledge and best practices and create a collaborative and mutual learning environment.
- promoting the creation of sustainable supply chains, encouraging the industry to partner with suppliers who adopt eco-friendly practices, such as sourcing from farmers using sustainable agricultural techniques, or creating synergy with other businesses or companies to share resources, materials, energy, and waste.
- incentivizing technological innovation that enables more sustainable approaches and more energy-efficient and environmentally friendly production and processing processes also through training courses and information meetings.
- promoting the development and production of eco-friendly products and promoting a wider range of sustainable products in the marketplace, whilst boosting market competitiveness.
- informing about access to funding and incentives, to encourage and reduce the costs of acting on sustainable practices and technologies within companies, which are key to promoting the circular economy at the industrial level.

Regional entities and policymakers

Regional entities and policymakers are essential in creating an enabling environment and providing strategic, financial, and regulatory support to promote sustainable solutions in the agrifood and biomass sector, guiding the path to a more sustainable and resilient future.

Strategic-in that they can set clear goals and long-term strategies to encourage and guide the adoption of sustainable practices in the sector; financial-in that they can allocate funding, resources, and incentives to support projects and initiatives that promote sustainable technologies, processes, and practices, encouraging investment and development in this area; and regulatory-in that they have the authority to implement policies and regulations that promote sustainability in the area.

To carry out these tasks, local governments and policymakers must have a comprehensive understanding of the current scenario, including the actors involved, resources, and the current impact of the region's production and processing sectors. Policymakers and local authorities can only support the region at the strategic, financial, and regulatory levels through effective communication and interaction with all stakeholders in Lombardy.

The Action Plan will be developed to help such realities:

- providing data and information based on scientific research to support the decisions of regional agencies. These data can demonstrate the effectiveness and impact of biobased solutions, facilitating informed policy decisions.
- collaborating actively to outline the Action Plan, considering the needs, resources, and peculiarities of Lombardy. This means that the proposed solutions are specific to the region, making them more realistic and implementable.
- offering specific recommendations for the development of policies, regulations or incentives that encourage the adoption of biobased solutions. These suggestions can be used by regional bodies to design targeted and consistent policies.
- highlighting possible funding and incentives that regional authorities can implement to support the adoption of sustainable practices. These may include tax breaks, research funds, or incentives for businesses to adopt eco-friendly technologies.
- fostering contact and collaboration with local stakeholders, farmers, academic institutions, industries, and all other interested parties. This can promote synergies and partnerships that accelerate the implementation of sustainable solutions, as well as enable regional authorities to implement informed strategies.

Academia and research community

Involving researchers, academics and scientific institutions can contribute to innovation and development of new sustainable technologies and practices. Lombardy's universities and research centres are the starting point for implementing sustainability in rural areas. Yhey are the place where research and development of practices, technologies, and processes are concentrated, which will be later used, developed, and implemented by other stakeholders throughout the value chain. These entities represent the primary holders of knowledge, able to find innovative solutions and methodologies, new products, and processes, and discover the potential of resources not currently exploited, which decrease environmental impact and introduce sustainable and biobased solutions in the agricultural, food, and biomass sectors.

The scientific and academic community must connect with cross-sector expertise and collaborate with others to facilitate development and technology transfer to achieve the best possible outcome. In addition, collaborating with farmers and local realities will enable a better understanding of the territorial requirements and resources of end users, and thus tailor research to solutions that are useful and applicable in the Lombardy region, responding carefully to the territory’s needs.

Another relevant issue that needs to be considered for the research community is access to funding, both public and private, and collaboration with other research and projects currently underway.

The Action Plan will be developed to help such realities:

- making awareness about the funding currently available for R&S projects focused on the development of sustainable technologies and practices in the rural, agricultural, and forestry sectors. This funding would support scientific research conducted by local academic institutions.
- promoting collaborative programs between local entities, academic institutions, research centres, and public or private entities involved in the Hub. These partnerships can facilitate cross-cutting knowledge exchange, access to data, and sharing of best practices. In addition, contact with agricultural and industrial experts will ensure that end users' needs are clearly understood.
- collaboration among different stakeholders will ensure easier access to technology and resources needed for research and development of sustainable solutions. This could include access to advanced research infrastructure or the sharing of relevant data and information.
- creating training and skills development programs for students, researchers, and practitioners in the field of sustainability, thereby encouraging innovation and knowledge growth.
- supporting the publication and dissemination of scientific research results, promoting the visibility of studies and projects developed by the local scientific community.
- involving the scientific community in the design, implementation, and evaluation phases of the action plan, thus ensuring that decisions are informed by scientific data and in-depth knowledge.

Innovation Hubs and Foundations

First of all, these entities often support and facilitate research and development activities. They provide a space for collaboration between researchers, academia, industry, and government, fostering innovation in bio-based technologies, processes, and products. For this reason they serve as hubs for knowledge exchange and networking. Innovation Hubs and Foundations often provide resources, mentorship, funding opportunities, and incubation programs for startups and entrepreneurs working on bio-based innovations. This support accelerates the development and commercialization of new bio-based products and technologies. In this way they contribute to economic growth and job creation, by fostering a thriving ecosystem of bio-based businesses. Finally, these entities often advocate for policies that support the growth of the bioeconomy. They work with governments and regulatory bodies to create an enabling environment, including supportive regulations, incentives, and funding mechanisms for bio-based industries.

To effectively promote the bioeconomy, Innovation hubs and Foundations require several key elements. Adequate Research and Development Funding is crucial to support research initiatives focused on bio-based technologies, processes, and products, but also access to state-of-the-art laboratories, testing facilities, and pilot-scale production units. Providing mentorship programs, access to experts, and advisory support helps entrepreneurs and startups navigate the complexities of developing and commercialising bio-based innovations, but also programs that nurture talent, offer training, and educate the workforce in bioeconomy-related fields are essential to building a skilled workforce capable of driving innovation. In addition, platforms that facilitate collaboration between academia, industry, startups, policymakers, and investors - such as networking events, conferences, workshops, and online forums - are important to encourage knowledge sharing and partnership building. Finally, better regulatory support to create a

favourable environment to incentivize bio-based industries, facilitate market access, and promote sustainability is crucial.

This Action Plan aims to support these needs:

- providing practical examples of how innovative solutions can be applied in the local context, illustrating the feasibility, effectiveness, and value of biobased solutions.
- providing knowledge sharing through reports, case studies or workshops, which can provide relevant data and information to better understand the performance of innovations, identify challenges and solutions, and test new technologies.
- attracting interest from investors and potential partners for further development.
- ensuring opportunities for collaboration with all the other partners involved in the project, which will allow not only the exchange of technical and innovative knowledge but also the possibility of future partnerships.
- enabling continuous innovation and its scalability, as the outcomes and lessons below are driving continuous innovation and fostering the development of more advanced, scalable, and adaptable biobased and more sustainable solutions.
- increasing policy support, helping to promote incentives, regulations, or government support for biobased solutions.

Investors and funders

Investors and funders play a key role in the development of the Action Plan as they provide the financial resources, expertise and connections needed to turn ideas into reality, supporting the economic sustainability and feasibility of proposed initiatives. Implementing planned strategies and actions can be a challenge without financial support. Investors and funders are present to ensure the economic sustainability of initiatives, as they assess the financial feasibility of projects and ensure that proposed actions are economically feasible. Finally, investors can successfully implement an action plan due to their extensive access to networks and resources. To conclude, their involvement can lead to the creation of new markets, innovation, and the growth of emerging sectors, including sustainability-related ones.

Investors require clear financial feasibility and risk analysis, which is, a clear understanding of the costs, cash flows, funding sources, and risks associated with a project. They also look for opportunities that have strong growth potential and can generate adequate returns over the long term, with a focus on having a positive impact on the environment or community.

The Action Plan will address the needs of these professionals:

- promoting sustainable agricultural and industrial practices, which will contribute to the development of projects geared toward sustainability and positive environmental impact. In this way, funders could see an opportunity to invest in projects that respond to the growing market demand for sustainable and biobased products, supporting technological innovations and new business models in the sector.
- reducing investment risk is possible as sustainable practices tend to offer greater stability and reduce long-term risks related to fluctuations in commodity prices and environmental regulations. This can make investments in biobased and sustainable projects more attractive.

- increasing growth potential, as biobased solutions often involve technological innovations and new business models that provide opportunities for economic growth and development of emerging industries.
- providing opportunities for collaboration with other funders and investors or other stakeholders along the value chain.
- disseminating knowledge about the incentives and facilities available for sustainable projects, making investments more attractive and fostering economic returns.

4.5.4 Stakeholder of the Lombardy Hub

Regional Facilitator and Hub Contact Point

The Hub Facilitator of the Lombardy Hub is the **Lombardy Green Chemistry Association (LGCA)** which is the reference point for the Lombard bioeconomy both at the national and European level.

The development of the bioeconomy, the heart of which is represented by green chemistry, is a compulsory step to face major technological, scientific, economic, social, and political global challenges. The bioeconomy is not a regional or national idea, but it is a strategy that Europe, individual countries, and regions are pursuing.

The Lombardy Green Chemistry Association proposes itself as an active part of this convergence in the process of involvement of all stakeholders interested, through the promotion of meetings and opportunities as well as interlocutor of the Region, national government and the European Union in the definition of policies and initiatives to support innovation, competitiveness, and the bioeconomy. LGCA intends to dialogue with Europe to make visible Lombardy's resources and expertise in the field of bioeconomy, to promote new business, collaboration, and growth opportunities.

In Europe, LGCA is an associate member of **Vanguard Initiative Bioeconomy Pilot** - the Hub Contact Point of the Lombardy Hub - as it coordinates with the Lombardy Region the pilot "Bioeconomy" and participates in EUSALP-European Macro-regional Strategy for the Alpine Region. In Italy, LGCA is a member of the National Technological Cluster of Green Chemistry (SPRING) and of the Italian Circular Economy Stakeholder Platform (ICESP). In addition, the LGCA is the interlocutor of the Lombardy Region for the initiatives supporting the Lombard bioeconomy. It has already contributed to inserting the theme in the Smart Specialization Strategy (S3) that the Lombardy Region has proposed to the European Union for the assignment of structural funds in the period 2014-2020.

Finally, LGCA is part of the network of Technological Clusters wanted by the Lombardy Region, to strengthen the thematic areas considered to be a priority at the national and international level. The Technological Clusters are organized aggregations of companies, universities, and other public and private research/innovation institutions, capable of contributing to the international competitiveness of both the territories of reference and the national economic system (Article 1, paragraph 4, Call MIUR D.D. 30.5. 2012, No. 257).

Following the many skills and contacts that LGCA has, it will be the bearer of the interests, skills, aspirations, and ideas of the bioeconomy sector to decide how, how, and where to invest the resources of public aid in research and innovation.

Considering the nature of the cluster and his position on the bioeconomy at the local, regional, and national levels, the Lombardy Green Chemistry Association - as the Hub Facilitator of the Lombardy Hub - is committed to encouraging the development of new innovative projects, leveraging the activities conducted through the RuralBioUp project, and establish a Technical Table on the Bioeconomy as a permanent working group, ensuring ongoing advice and collaboration for decision-makers in the Lombardy region even after the project concludes. This structure would represent an outstanding legacy of the project, benefiting both the involved PAs and stakeholders.

Selection of stakeholders of the Lombardy Hub

The research and selection of stakeholders were made from a close collaboration between LGCA, Consorzio Italbiotec, and SPRING, with the support of regional entities.

First of all, was carried out a study and analysis of opportunities by understanding the critical issues and innovative projects in the territory. This step has been based on the discussion with the regional administration and analysis of their strategies (e.g. CSR and PAC 2023-2027, AKIS, regional laws, and other reference tools).

At this point, a database has been created including all possible stakeholders to invite within the Lombardy Hub. The selection has included:

- Map and analysis of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) Operation Groups[3] (OGs) as a functional unit for the social and economic development of the territory[4] (Figure 32). The OGs were selected based on the Lombardy area and themes of interest for the project and classified within a single database.
- The Hub's list of possible stakeholders is enhanced by the contacts and members of LGCA, Consorzio Italbiotec, and SPRING. Consideration was also given to collaborations with partners involved in past and ongoing projects related to the context of interest.

[3] https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go

[4] An Operational Group (GO) of the European Innovation Partnership on Agricultural Productivity and Sustainability (EIP AGRI) is a tool for the dissemination of innovations in the agri-food and forestry sector, which aims to identify innovative solutions to specific problems or to promote opportunities for agricultural enterprises. The creation of the GOs is financially supported by the Regional Rural Development Programmes (RDPs) under sub-measures 16.1 and 16.2. In GO projects, the actors in the innovation chain - agricultural, forestry, agro-food, research centres, universities, consulting organisations, etc. - act together to test and disseminate one or more innovations in a given context, also involving other local businesses through advisory and dissemination activities.
https://www.innovarurale.it/it/pei-agri/gruppi-operativi-italia

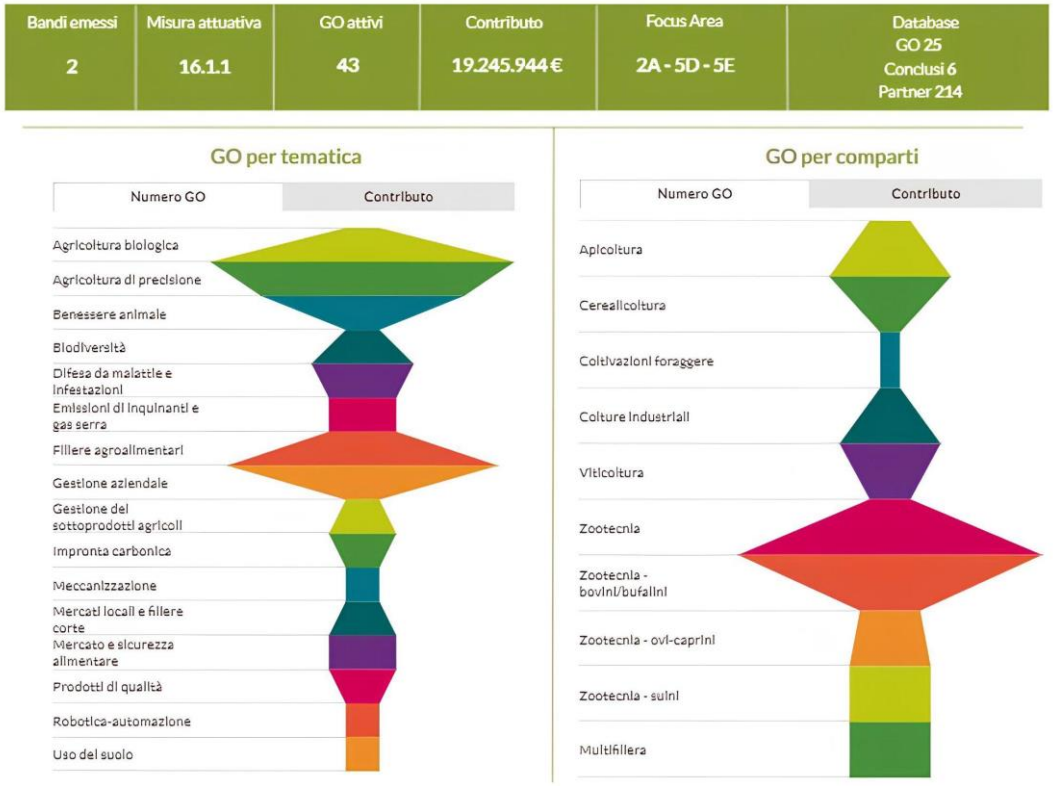


Figure 32 Map of the Lombardy Operation Groups (OGs)

The first approach with stakeholders was via email to present the project in a broad outline and understand their interest in being part of the Lombardy Hub. A first online meeting (pre-kick off meeting) was organised on the 31st of October 2023 to further explore the themes and objectives of RuralBioUp and to introduce how the Hub aims to be useful in the development of the bioeconomy and the implementation of biobased solutions at the rural level, assisting stakeholders with their needs and objectives.

The Lombardy Hub was launched with the Kick-off Meeting on the 19th of December 2023 in Milan, Italy. During this occasion, it was possible to learn about the progress of the project and the services offered by the Hub but also to gain more in-depth knowledge of the stakeholders and initiatives and projects that involve them, which would be useful for possible future collaborations. Organising a working table was necessary to identify the two specific value chains on which the hub's activities will be focused and to comprehend the needs and proposals of the stakeholders, which were essential for the outline of the present Action Plan.

The stakeholder of the Lombardy Hub

Currently, **51 stakeholders** have expressed interest in joining the Lombardy Hub. The objective is to expand the initiative and enable new realities to be included in the working group.

According to a general estimate, the professional field belonging to the realities involved mainly concerns: research and innovation bodies (33%), agricultural enterprises (17%) and sector associations (8%). Other realities are shown in Figure 33.

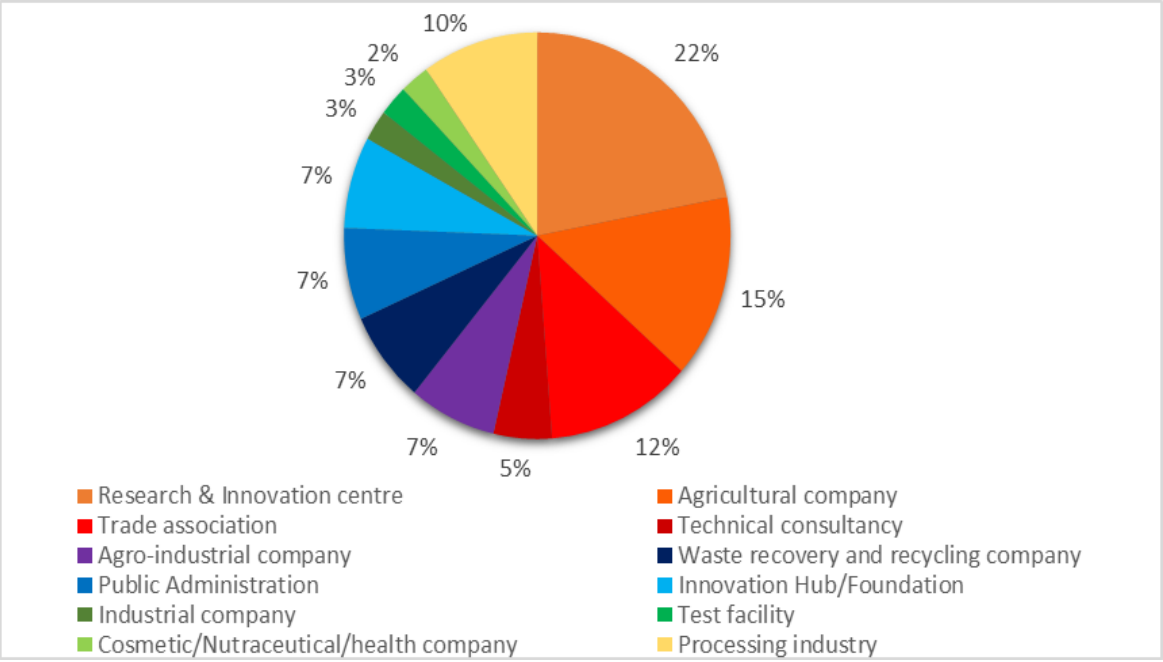


Figure 33 Professional field of the Lombardy Hub's stakeholders

The stakeholder categories can be grouped into:

- Research & Innovation Centers, including university and local research bodies involved in the study and development of more sustainable practices, technologies, products and/or bioproducts.
- Trade associations in agri-food, bioenergy and hemp sectors that can extend stakeholder involvement and dissemination of the outcomes of the RuralBioUp Project.
- Companies operating within agricultural and agro-industrial economic chains.
- Public Administrations that represent a direct reference for local development strategies
- Industrial and Processing industry, including textile, bioenergy, building and polymers sectors.
- Cosmetic/nutraceutical and health companies that operate within the realms of beauty, wellness, and health, often integrating aspects of science, innovation, and consumer demands.
- Technical consultants, a professional figure that serves as a vital interface between governance, research and companies and can provide new ideas and innovative opportunities to introduce important changes.
- Waste recovery and recycling companies, essential to the loop of resource utilisation, promoting sustainability, and providing valuable inputs for the bioeconomy's various sectors, fostering a more efficient and environmentally friendly economic model.
- Innovation Hub and Foundation serve as catalysts for driving innovation, collaboration, and growth within the bioeconomy. Their support, facilitation, and advocacy are instrumental in advancing bio-based solutions to address global challenges while promoting economic and environmental sustainability.
- Test facilities, including bioremediation and environmental analysis.

The main fields of interest of the stakeholders of the Lombard Hub are innovation and technology transfer, the agricultural crops and food production (Figure 34).

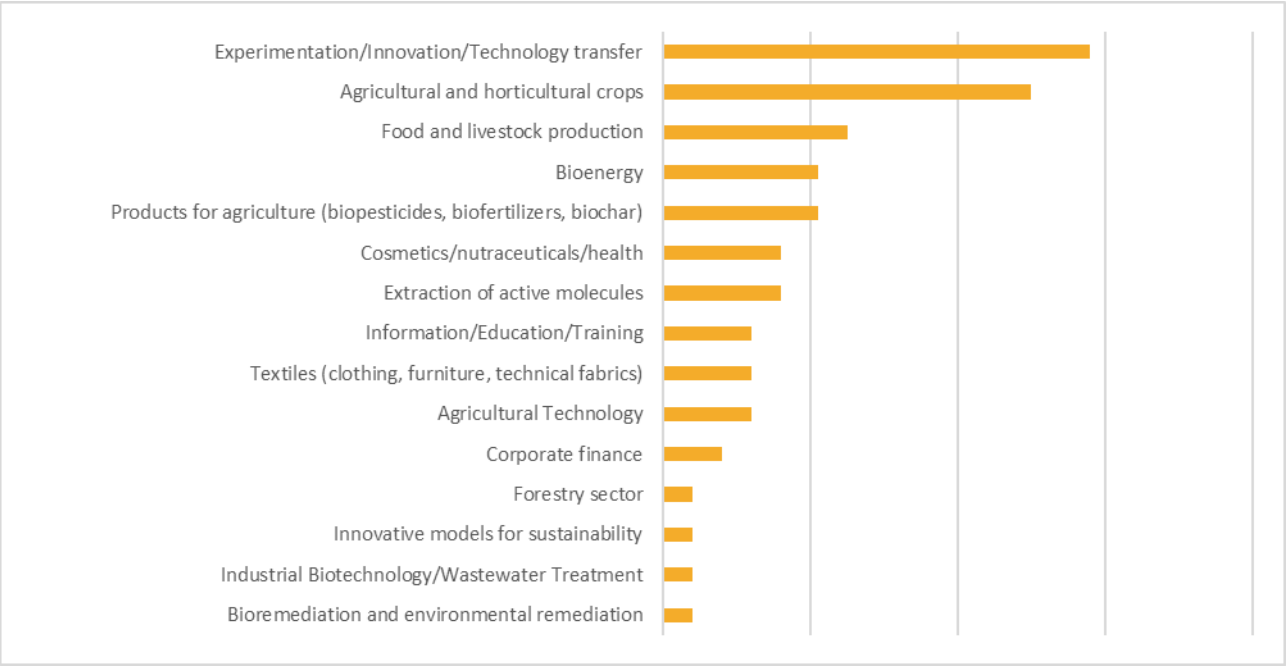


Figure 34 Main fields of interest of the Lombardy Hub's stakeholders

LGCA has attempted to fully understand the interests, needs, and opportunities of stakeholders through an analysis among them. First, we tried to understand what **opportunities** stakeholders identify as closely related to the bioeconomy.

- The *ecological transition*, as the bioeconomy offers a sustainable approach to addressing environmental, economic, and social challenges, providing solutions that mitigate environmental impact, promote resource circularity, and create economic opportunities tied to more sustainable production and consumption patterns. Can be mentioned: reduction of carbon footprint, promotion of sustainable processes and products, circularity and waste reduction, biodiversity and environmental conservation, creation of new markets and green jobs, and energy security and food sovereignty.
- *Innovation* is crucial for driving sustainable growth, addressing environmental concerns, meeting market demands for eco-friendly products, and creating a more resilient and competitive economy based on renewable resources and advanced technologies. Innovation ensures the advancement of sustainable solutions, efficiency improvements, market competitiveness, economic growth and job creation, resource diversification, and environmental impact mitigation.
- *Diversification of agricultural holdings* plays a pivotal role in enhancing sustainability, resilience, and economic opportunities within the agricultural sector, offering multiple entry points for supporting and advancing the bioeconomy. For example, it increases resource efficiency and resilience to risks but also expands market opportunities and rural economies, enhances ecosystem services and local development, and finally fits the changing consumer demands.

- The *development of local renewable resources* offers a multitude of opportunities for economic growth, environmental sustainability, job creation, and innovation within the bioeconomy, while also contributing positively to energy transition and climate mitigation efforts.
- *Territorial development*, leverages local resources, supports economic diversification, fosters environmental sustainability, and promotes social and economic development, creating a framework for balanced and resilient regional growth.

The stakeholders believe that to strengthen the opportunities, it would be fundamental to strengthen collaboration between various actors, public and private entities to better manage the territory, as well as with the region to better understand the themes and needs of the bioeconomy. In this sense, it would be essential to increase opportunities for the exchange of information, knowledge, experience, and contacts to increase the transfer of knowledge and the possibility of collaborations and partnerships. Greater interaction with regulators would ensure greater awareness of the economic and legislative instruments available, and could also require reduced bureaucracy and support, identified as one of the major obstacles to the development of the bioeconomy. An increase in training opportunities, greater support for innovative agro-industrial supply chains and the circularity and transparency of information are also important points to consider. Finally, the development and selection of a few major pilot projects would be crucial to increasing the experimentation and innovation of technologies.

Finally, we tried to understand what **obstacles** stakeholders identify as closely related to the bioeconomy.

- Almost all stakeholders identified the *lack and complexity of regulations and bureaucratic practices* as the main limit. Addressing these challenges involves streamlining regulations, enhancing regulatory harmonisation, promoting innovation-friendly regulatory frameworks, and fostering collaboration between stakeholders to create a conducive environment for the growth and success of the bioeconomy.
- The lack of collaboration and cohesion between enterprises is another important identified point. Enhancing cohesion between enterprises in the bioeconomy involves fostering partnerships, networks, and collaborative initiatives. Encouraging knowledge sharing, establishing industry clusters, promoting cooperative research projects, and creating platforms for joint ventures are essential steps in overcoming these obstacles and fostering a more vibrant and interconnected bioeconomy.
- *Limited access to funding*, due to lack of specialised funding sources, valuation challenges, regulatory uncertainty, and technical and market risks. Initiatives such as public-private partnerships, government funding schemes, venture capital investments, and support from specialised bioeconomy-focused funds or accelerators can play a crucial role.
- *Limited experience*, due to access to networks and resources, the complexity of biobased technologies, and the interdisciplinary nature of the bioeconomy. Addressing the challenges of limited experience in the bioeconomy involves initiatives such as mentorship programs, knowledge exchange platforms, specialised training, and partnerships between experienced and inexperienced professionals.

The stakeholders believe that to overcome the obstacles, it would be necessary to facilitate access to technology knowledge, training, and financial resources - improving the management of available funds and streamlining the bureaucratic process, especially for SMEs. Fundamental is also the valorization of the R&D centres like points of reference for the enterprises and the local authorities, but also of all the stakeholders involved (companies, nets of enterprises, institutions, R&I bodies) to know concretely the R&I opportunities. In this sense, cohesion and cooperation between the various entities must be critical. It is essential to launch initiatives aimed at stimulating cooperation between the agricultural sector and the production sector, but also to support public bodies with technical advice and the organisation of thematic tables to make the timing of regulatory updates more consistent with the themes of innovation.

These statements have been taken into consideration to elaborate the strategy of the Lombardy Hub, which will be exposed in the present document.

4.5.5 Situation Analysis

Analyse the current state of affairs, including strengths, weaknesses, opportunities, and threats.

Rural context of the Lombardy region

Lombardy is a region located in northern Italy with a very advantageous location, situated at the foot of the Alps and in the centre of the Po Valley. This strategic location makes it a connecting point between the Mediterranean area and central Europe. The region covers an area of 23,860 square kilometres, which is almost equally divided between plains, mountains, and hills. The plains cover about 47% of the territory, while the mountainous areas cover 41%, with the remaining 12% being hilly. Lombardy has 9.991.554 inhabitants (data as of 01.01.2022, last ISTAT update), the first in Italy in terms of resident population with an activity rate of residents aged between 15 and 64 years of 72% and an unemployment rate of 5.5%.[5] The total growth of the resident population from 2000 to 2021 was approximately 1 million (with a cumulative increase of more than 10%).[6] Regarding this context, one of the challenges faced by the agriculture industry is the lower income of farmers compared to other economic sectors. This poses a difficulty in bringing innovation into this sector, as innovation brings with it costs that cannot be borne.

The value of Lombardy's agricultural and forestry production in 2021 increased by 8.3% compared to 2020, while the added value of the sector grew by 5.1%, in contrast to the added value of the food industry, which is estimated to fall by 2.5%. In 2021, the value of regional agro-industrial production exceeded EUR 14 billion (by summing the value of agricultural, forestry, and fishery production at basic prices and the added value of the food industry), an increase of 3.9% compared to 2020, while the national figure grew by 3.4%. This value represents approximately 3.6% of the regional GDP, but the share rises to 10.2% when trade and transport margins are considered. Agricultural production, related activities, and food processing take

[5] www.regione.lombardia.it

[6] L'AGRICOLTURA NELLA LOMBARDIA IN CIFRE 2023 - CREA

place in about 53,000 production facilities, involving more than 200,000 workers, of whom 137,000 are permanently employed, or 2.8% of the Lombardy total.[7]

At the national level, Lombardy agriculture occupies a significant position, ranking first in the ranking of Italian regions, followed by Sicily, Emilia-Romagna, and Puglia. Lombardy's agricultural enterprises represent a significant part of the regional and national productive fabric, for a total of approximately 44.337 units (InfoCamere-Movimprese, 2021).[4] Companies in the agricultural sector use around 1 million hectares of Utilised Agricultural Area (UAA) and represent 4.1% of the universe of agricultural holdings farms in the country. Comparison with data from the previous ISTAT survey shows how the sector has undergone a restructuring process characterised by the exit of a substantial number of companies (around 13%) and the simultaneous increase of the UAA (+2%). This increased the average farm size in the 2010-2020 decade from 18 hectares to about 22 hectares of UAA, which is about double the national average (of 11.1 hectares).[4]

Livestock is the most important agricultural sector in this region and has seen an increase compared to 2010. The most commonly grown arable crops are cereals, which are predominantly used for animal feed. According to the "Agricultural Census", cereals cover 54% of the regional UAA, other arable crops occupy approximately 34.1% of the regional UAA and woody crops are not very common, covering only 4.3% of the UAA. The most common tree crops are vines, olive trees, nursery trees, apple trees, and pear trees, which together cover 88% of the UAA of tree crops. The cultivation of hazel and chestnut is also on the rise.[4]

In the arable crops sector, Lombardy contributes significantly to national production for cereals (17.0%), oilseeds (17.2%) and temporary fodder crops (34.9%). However, its contribution for tuber crops and vegetables is more modest. The productivity differences and variations in the cereal areas have led to an average cereal production of 8.5 t/ha in Lombardy, which is higher than the national average of 5.5 t/ha. This has resulted in Lombardy having a 17% share in the production, with peaks of 40.8% for rice and 25.8% for maize, next to 12.2% for soft wheat and 11.9% for barley.[5]

Forage areas, which are closely linked to the rearing of herbivores, cover a total of approximately 615,000 hectares (including the second harvest). Out of this, around 203,000 hectares are permanent forage areas, primarily situated in hill and mountain areas. These areas mainly consist of permanent meadows and have a smaller presence of pastures.[5]

A major issue is the existence of "marginal lands" wherein farming is unprofitable due to unfavourable soil characteristics or lack of water. In Lombardy, for example, 20,000 hectares of abandoned land can be a valuable resource that can be used for the production of biomass to supply biorefineries. This can lead to sustainable economic development. For this reason, a very important aspect in the Agricultural context is the valorisation of biomass into high-value-added products. In this regard, effective raw material procurement plans play a vital role in sustaining any production chain by ensuring a reliable and cost-effective supply of high-quality materials. This significance is amplified in the bio-economy sector, where competition with less expensive fossil-based production necessitates meticulous management of procurement and transportation expenses. Hence, having precise information about the accessibility of residual

[7] Sistema agroalimentare regione Lombardia 2022

biomasses in the local vicinity becomes imperative. The "Process Flow platform" - a legacy of the H2020 “Enabling” Project - serves as a valuable database, offering insights into the potential biomass available in numerous European countries. The Table 1 presented below presents data specifically related to the Lombardy Region.

SNo	Feedstock	Cultivated Area (Hectare)*	Wet_Yield (Tonnes / Hectare)*	Arisings (Wet Tonnes) *	Traditional End Use
1	Corn (corn stalk)	145.567	11	1.630.350	Cattle breeding
2	Rice (straw)	101.691	4	386.426	Cattle breeding
3	Soy	53.344	5	282.723	Burying in land
4	Soft wheat	56.556	3	180.979	Cattle breeding
5	Rice (straw)	713.500	20	142.700	-
6	Barley (straw)	21.346	4	78.980	Cattle breeding
7	Vineyard	23.998	3	69.594	Burning out, Energy
8	Durum wheat (straw)	17.121	4	59.924	Cattle breeding
9	Sorghum	3.489	12	41.170	Cattle breeding
10	Wine dregs (skins, grape sones and stalks)	174.743	18	31.454	Soil fertilisation
11	Tomato (skins, processing wastes)	521.315	5	27.630	-
12	Sugar Beet	1.024	17	17.510	Animal feed, Burying in land
13	Sunflower	1.417	6	8.077	Burying in land
14	Pea	2.512	3	7.536	Burying in land
15	Potatoes	750	10	7.350	Burying in land
16	Apple Tree	1.616	3	4.202	Burning out
17	Chickpea	1.381	3	4.143	Burying in land
18	Olive (pruning)	2.417	2	3.867	Burning out, Energy
19	Oat (straw)	1.299	2	2.468	-
20	Pear Tree	762	2	1.753	Burning out

21	Beans	473	3	1.419	Burying in land
22	Kiwi	628	2	1.256	Burning out
23	Potato (skins, selection)	5.394	23	1.241	-
24	Legumes (vegetable residues)	13.091	9	1.165	-
25	Peaches	373	3	1.082	Burning out
26	Olive oil (exhausted olive cake)	4.332	17	736	-
27	rye (straw)	472	1	472	Cattle breeding
28	Apples	8.567	5	428	-
29	Cherry Tree	142	3	355	Burning out
30	Pear	3.635	5	182	-
31	Lentil	60	3	180	Burying in land
32	Kiwi	3.236	5	162	-
33	Plum Tree	76	2	152	Burning out
34	Broad bean	50	3	150	Burying in land
35	Apricot tree	54	3	135	Burning out
36	Hazelnut	47	3	118	Burning out
37	Drupaceae	1.502	5	75	Biogas, CHP, Distillation for ethanol
38	Almond	2	2	4	Burning out
39	Fig	2	2	4	Burning out
40	Fruit shells	17	8	1	-
41	Grass (ryegrass)	82.618	-	-	-
42	Hemp	43	-	-	Burying in land
43	Linen	52	-	-	Burying in land
44	Rape (Brassica napus+ B.rapa subsp. Oleifera)	3.756	-	-	Burying in land

Table 26 Biomass availability in the Lombardy region

*Data are referred to the biomass database of Enabling Project (2017 – 2020) and may have inaccuracies.[link]

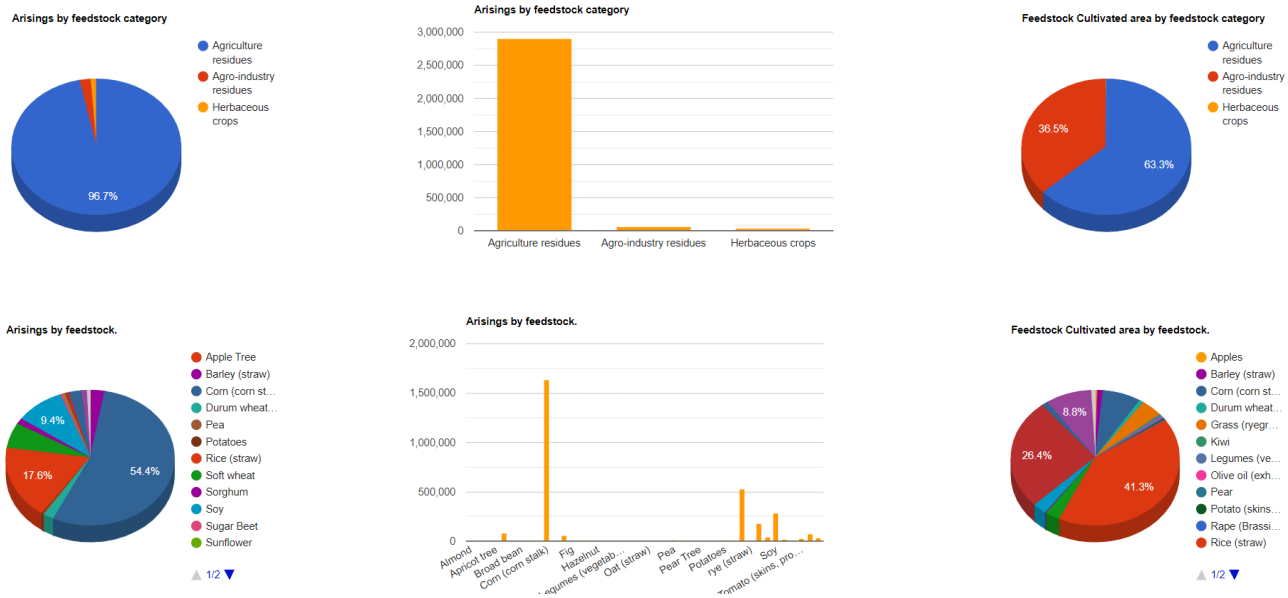


Figure 35 Graphical representations of biomass availability in the Lombardy region. Source: Enabling Project (2017 – 2020)

Table 26 shows that there are significant amounts of lignocellulosic biomass available in the Lombardy Region, primarily corn stalks and straw from various crops but also skins, grape sones and stalks, tomato skins and other tomato processing wastes. These resources are only partially utilised, with straw often being used as animal bedding or simply discarded by burning or burial in the field. Therefore, the most suitable technologies for utilising these biomasses vary depending on their type, while also considering the current state of the conversion plants in terms of quantity and location.

In 2021, around 725 "bioenergy" plants were operating in the region, producing electricity from renewable sources, according to the GSE-Atlaimpianti interactive geographical atlas 2023. Most of these plants are biogas plants (596 in number), out of which 95% are classified as medium-small sized (<1 $MW_{el.}$). There are also 62 bioliquid plants, out of which 83% have a medium-small size, and 56 solid biomass plants, out of which 71% have a medium-small size. Only 11 plants use waste as a source of energy, and out of these, only 18% were classified as medium-sized plants.[8]

Many horticultural and fruit crop wastes and residues can be used to generate biogas. This is already happening in many cases where they are being fed to biogas plants along with manure and sewage from livestock farms and processing residues from agri-food industries. Considering the utilisation of residues such as straw and stalks from cereal and oilseed crops is crucial. However, their high silica content poses challenges in employing them in conventional combustion plants. Additionally, their suitability for biogas or biomethane production is hindered unless specific pre-treatments are administered to enhance their digestibility by

[8] https://www.gse.it/dati-e-scenari/atlaimpianti

microorganisms during the anaerobic digestion process. The substantial difficulty in utilising straw for energy purposes contributes to its limited usage. Nevertheless, this challenge serves as a compelling motivator to explore alternative solutions through technological innovation.

SWOT Analysis

A SWOT analysis concerning the agri-cultural sector in the Lombardy region follows.

STRENGTHS	
1	Diverse range of agricultural activities, including crop cultivation, dairy farming, and viticulture. This diversity contributes to the resilience of the sector.
2	The region's lowlands contain highly fertile soils of great agricultural value.
3	Presence of a plentiful supply of irrigation water and a widespread network for irrigation.
4	Territorial proximity between raw materials, users and industry.
5	Agricultural and agri-food cooperation, realised through different contractual forms, is rather developed at regional level.
6	High presence and value of quality production (DOP, IGP, STG, DOC e DOCG recognitions).
7	Presence of research institutions and educational facilities focusing on agriculture contributes to the continuous improvement of farming practices and knowledge transfer within the sector.
WEAKNESSES	
1	Intensive farming practices may contribute to environmental issues which could impact the long-term sustainability of the sector.
2	High variability in terms of quality and quantity of crops.
3	Young people only lead a small portion of companies.
4	Limited entrepreneurial capacity in marketing.
5	Inadequate use of water resources in the area.
6	Inadequate agricultural machinery.
7	High fragmentation of the system.
8	Unequal distribution of profitability along the production chain.
OPPORTUNITIES	
1	Development of innovative techniques for maintaining soil quality and fertility.
2	Development of techniques for precision agriculture to increase input efficiency and reduce environmental impact.
3	Development and fine-tuning of molecules and microorganisms to control plant diseases.
4	Upgrading of agricultural machinery to support new production practices.
5	Raise awareness among consumers regarding quality, traceability, and sustainable production methods is on the rise.
6	Encouraging compliance with different forms of collective bargaining, such as networks and districts.
7	More efficient use of water resources.
THREATS	

1	Global economic fluctuations and market uncertainties can impact the prices of agricultural commodities, affecting the income of farmers.
2	Outbreaks of pests and diseases can have devastating effects on crops and livestock.
3	Climate change, erosion and loss of soil organic matter can lead to drastic drops in production yields.
4	Competition over land use due to the growth of infrastructure (Lombardy is already one of the regions with the highest soil sealing rate).
5	Increased imports and competition from European and international markets.
6	Weak defence of quality products (PDO, PGI, TSG, DOC and DOCG) abroad from counterfeiting and agro piracy.
7	Low economic growth and birth rate in Italy.
8	Lack of adaptation of agricultural equipment to new agricultural production techniques.

Table 27 SWOT analysis of Lombardy region

4.5.6 Public strategies and policy instruments

The Complement for Rural Development (CSR) of the Lombardy region is a regional document implementing the national strategy approved with the Community Decision on the CAP National Strategic Plan (PSP). With the PSP, almost EUR 37 billion will be made available to Italy's agri-food and forestry sector and rural areas over five years. The CSR of the Lombardy region can be considered the main strategic instrument of reference for the agricultural, agro-industrial, and territorial system of Lombardy in the programming period from 2023 to 2027 making available a total of EUR 834.5 million over 5 years to support agriculture in Lombardy. The Common Agricultural Policy (PAC) 2023-2027 has the following objectives General Objectives (OG):

- OG 1: Promoting a smart, competitive, resilient, and diversified agricultural sector that ensures food security.
- OG 2: Maintain and strengthen environmental protection and contribute to the achievement of the EU's environmental and climate goals.
- OG 3: Strengthening the socio-economic fabric of rural areas.

The objectives to be pursued are divided into 6 types of intervention:

- SRA: Commitments on climate and environment
- SRB: Natural constraints allowance
- SRD: Investments
- SRE: Setting up young farmers and start-up rural businesses
- SRG: Cooperation
- SRH: Knowledge Exchange and dissemination of information (Agricultural Knowledge and Innovation System (AKIS) which is the place for the elaboration, exchange and dissemination of knowledge and innovation)

The CSR Lombardy 2023-2027 envisages the activation of 39 intervention sheets, of which 12 surface interventions and 27 structural productive and green interventions.[9] To enhance the AKIS the CSR of the Lombardy region intends to act with the following interventions:

- SRH01 Provision of consultancy services
- SRH02 Training of consultants
- SRH03 Training of agricultural entrepreneurs, workers in enterprises operating in the agriculture, animal husbandry, food food industries, and other private and public actors functional to the development of rural areas
- SRH04 Training actions
- SRH05 Demonstration actions for agriculture, forestry, and rural areas
- SRH06 Back-office services for AKIS

The AKIS interventions of CSR will receive enhanced support from initiatives endorsed by various policies, funds, and programs. The alignment with the RuralBioUp Project within this Action Plan presents a cohesive opportunity for synergy.

Additional reference tools from the Lombardy Region that should be considered include:

- **PR FSE+ 2021-2027**: With a budget of more than EUR 1.5 billion, the "PR ESF+ 2021-2027" finances key regional policy topics such as education, training, and employment. Themes geared, first and foremost, to the development of the individual while addressing three fundamental challenges: The challenge of work, The competitiveness of the system, and The fight against inequalities.[10]
- **PR FESR 2021-2027**: The Regional Programme under the European Regional Development Fund "PR FESR" provides for the allocation of EUR 2 billion over the period 2021-2027, aimed at promoting economic recovery and business competitiveness in the area, which was deeply affected by the effects of the 2020 health emergency.[11]

4.5.7 Strategy Development

Outlines the strategies and tactics to be implemented to achieve the set goals and objectives.

The overview of the rural context and the public strategies and policy instruments of the Lombardy Region, together with the analysis of the opportunities and the obstacles for the development of the bioeconomy identified by stakeholders and the SWOT analysis, are the basis of the strategy development. The strategy illustrates how the RuralBioUp project through the Lombardy Hub can support regional growth. The project aims to provide opportunities for networking stakeholders, enabling the sharing of good practices, providing links to research organisations, and offering training focused on the bioeconomy and innovation management.

[9] https://www.regione.lombardia.it/wps/portal/istituzionale/HP/DettaglioRedazionale/istituzione/direzioni-generali/direzione-generale-agricoltura-sovranita-alimentare-e-foreste/red-psr-2023-2027/red-psr-2023-2027

[10] https://fse.regione.lombardia.it/it/pc2127/prlombardiafse2021-2027/il-programma-4

[11] https://fesr.regione.lombardia.it/it/pc2127/prlombardiafesr2021-2027/il-programma-5

Stakeholders in the Lombard Hub expect it to be a regional technical table for the bioeconomy. In particular:

- a good opportunity for the exchange of best practices and useful information
- a support for new initiatives
- a support for the development of innovative ideas
- a chance to improve positive lobbying practices.

This strategy aims to meet all these expectations and provide additional benefits.

Selection of the two value chains

The selection of the two value chains on which the activities of the Lombardy Hub will mainly focus has been carried out with a comparison and active interaction with all stakeholders, trying to understand their major fields of interest and areas of belonging (see Chapter 3.2.3), but also by investigating directly on which specific supply chains their interest was focused.

Before the kick-off meeting (December 19, 2023 | Milan, Italy), stakeholder interest was investigated through an online questionnaire. The value chains of greatest interest for stakeholders were: agri-food supply chain, waste, and waste recovery (plastic, OFMSW, organic waste), biomass enhancement in high value-added products, biofertilizers and bioactive compounds for agriculture, bioenergy (biogas, biomethane, biodiesel), forest supply chain and development of forestry products.

During the kick-off meeting, a workshop was organized to conduct a guided analysis of the 5 pre-selected value chains and select 2 definitive value chains. The workshop was divided into 5 groups, and each participant decided which group to work in based on their interests (one value chain per participant). Each group completed a poster to summarise the resources, potential, and needs of the value chain under consideration, as well as proposing activities for the future development of the hub and identifying the impacts that these activities could have on the supply chain.

The two selected value chains were the **agri-food supply chain** and the **enhancement of biomass in high value-added products**.

<u>Agri-food supply chain</u>

Expected development

- Improvement of the sustainability of the supply chain with a focus on the reduction, recycling, and valorisation/reuse of waste. For a virtuous valorisation, it is fundamental to develop partnerships of industrial symbiosis, preferring the so-called 'short supply chains' to reduce the impacts associated with the transport of these raw materials. It's important to ask yourself: who buys the waste? Who owns the waste to sell?
- Improvement of the nutritional and health quality of agri-food products. It is also crucial to understand the consumer's need for quality to develop products that are bought.

- The enhancement of biodiversity in terms of genetic resources not yet exploited can be useful both to improve the sustainability of crops in terms of required inputs and to improve their nutritional and health quality (see also challenges).

Available resources, potential, and infrastructure

- It is important to exploit the potential of research bodies, universities, and local authorities that make a scientific contribution not only to projects but also to management.
- Lombardy is one of the main agricultural regions of Italy and Europe, therefore the potential of the supply chain is intrinsic to this fact.

Collaborations

Some expertise of the participants and interesting projects for the possible future enhancement of this chain:

- *CNR (National Research Council)* and the bodies/companies with which they collaborate can functionalize high-added-value molecules to obtain antioxidant waste; we also point out the use of inorganic matrices to disperse controlled-release pesticides.
- *CREA (Council for agricultural research and analysis of agricultural economics)* indicates the possibility of collaborating with the *Mine Land Div* and *GEMMA project*.

Future activities

To meet the expected developments, the following activities were considered relevant in the context of the supply chain under consideration:

- Data sharing for valorisation purposes (e.g., nutritional information, availability of waste, available genetic varieties).
- A practical survey of the production waste of industries and also farmers: what waste is available and where? What happens to these scraps? What is the price that companies are willing to pay to acquire these scraps? For this to be effective and efficient, however, it is important not to repeat the usual waste mapping work but to contact farmers directly to understand their availability, using interviews or questionnaires, and exploiting the wide network of contacts of the hub stakeholders.
- Development of shared projects.
- Analysis and interviews with companies to understand where the industry is willing to invest.

Challenges

- Valorisation of waste with a view to greater sustainability.
- Enhancement of biodiversity of untapped genetic resources.

<u>Enhancement of biomass in high value-added products</u>

Some elements of this value chain have been considered complementary and similar to those of the agri-food chain, especially the exploitation of waste for the production of high-added-value products.

This sector also includes marginal biomass for non-food use such as hemp for textile production.

Expected development

- Intending to valorise waste in high-value-added products, the expected development for this sector is certainly moving towards greater circularity and sustainability.
- Pursuing non-energy exploitation of biomass and waste to increase the value of the finished product (and therefore the starting biomass). Given the different incentives, programs, and strategies already present in the Lombardy Region for the energy enhancement of biomass and waste, it would be interesting for the hub to focus on alternative types of exploitation that could also target biomass such as rice and tomato for which energy exploitation is not possible.
- Within this chain, it is important to consider the enhancement of new and minor biomass such as hemp that can be used at 360 degrees, also to improve the sustainability of crops.
- Alternative valorisation, such as the cultivation of mycelium on waste (see the example of the company Mogu srl, included in the Lombardy Hub).

Available resources, potential, and infrastructure

It takes up the concept of the previous chain, so it is important to exploit the potential of research bodies, universities, and local authorities that make a contribution not only to scientific projects but also to management.

Future activities

Future activities for this sector resume those foreseen for the agro-industrial sector:

- Data sharing for valorisation purposes (e.g., nutritional information, availability of waste, available genetic varieties).
- A practical survey of the production waste of industries and also farmers: what waste is available and where? What happens to these scraps? What is the price that companies are willing to pay to acquire these scraps? For this to be effective and efficient, however, it is important not to repeat the usual waste mapping work but to contact farmers directly to understand their availability, using interviews or questionnaires, and exploiting the wide network of contacts of the hub stakeholders.
- Development of shared projects.
- Finally, the possibility of including a focus on hemp at 360°.

Challenges

The farmer must recognize the economic value of waste in order to ensure its non-energy use. The waste must be purchased at a reasonable price that is competitive for the farmer with respect to energy. Otherwise, it would be more convenient for the farmer to make their own balloon for the production of bioenergy rather than giving the waste.

4.5.8 Conclusion

In the choice of the two supply chains, it is interesting to consider two chains that have common points (as in the case of the two analysed in the workshop) in order to create synergies between the various actors.

The two value chains considered are very wide and could cover the interests of all (or at least a good part) of the stakeholders of the hub.

Compared to the supply chains analysed in the preliminary questionnaire, it was reported that the waste and waste recovery chain (plastic, OFMSW, organic waste) does not seem to be very relevant for the rural area, especially regarding the plastic. The recovery of elements such as mulch sheeting may indeed be a topic of concern from the point of view of sustainability, but it would be necessary to understand its impact. In any case, it could remain a minority compared to other sectors listed.

The 'biofertilizers and bioactive compounds' chain may be affected but is still partly considered by the 'enhancement of biomass in high added value product' chain.

In the context of the RralBioUp project, the supply chains must have a regional focus (Lombardy region). The main activities of the supply chain (supply of raw material, industry that enhances raw material, etc.) must be present in the hub region. However, interregional links and relationships are also possible, especially with regard to the exchange of knowledge and expertise. This is particularly relevant to the other two Italian hubs (Marche and Puglia) with which the Lombard hub will work in close contact in terms of shared methodology and knowledge exchange (with any meetings and events shared). However, it is important to point out that the sectors will remain short, that is, within the same region, while encouraging the exchange of knowledge between these regions.

Value chain: Agri-food chain		
TASK 1: Supporting the use of the "Rural spot" tool	Expected impacts:	Facilitate the use of the tool and optimise the transfer of the information it contains.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 2: Networking, contacts, and collaborations	Expected impacts:	Promote the network of stakeholders to obtain a comprehensive picture of the current scenario. Promote collaboration among stakeholders to enhance the beginning of new projects.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 3: Coaching, mentoring, and training	Expected impacts:	Technology transfer of information, best practice models, design support, funding opportunities
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 4: Study visit	Expected impacts:	Promoting the development of the circular economy by visiting concrete examples in the area. Exchange experiences and good practices. Establish new

		opportunities for cooperation within the value chain.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 5: Promoting the improvement of the sustainability of the supply chain	Expected impacts:	Develop partnerships for industrial symbiosis, prioritizing short supply chains to reduce the environmental impact of transporting raw materials.
	Target group of action:	Farmers, Sector companies

Table 28 Agri-food value chain goals

Value chain: Valorisation of biomass into high value-added products		
TASK 1: Supporting the use of the "Rural spot" tool	Expected impacts:	Facilitate the use of the tool and optimise the transfer of the information it contains.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 2: Networking, contacts, and collaborations	Expected impacts:	Promote the network of stakeholders to obtain a comprehensive picture of the current scenario. Promote collaboration among stakeholders to enhance the beginning of new projects.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 3: Coaching, mentoring, and training	Expected impacts:	Technology transfer of information, best practice models, design support, funding opportunities.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 4: Study visit	Expected impacts:	Promoting the development of the circular economy by visiting concrete examples in the area. Exchange experiences and good practices. Establish new opportunities for cooperation within the value chain.
	Target group of action:	Farmers, Researchers, Local authorities, Sector companies
TASK 5: Create demand for the market	Expected impacts:	Creating new value chains for biomass and by-products.
	Target group of action:	Farmers, Sector companies

Table 29 Valorisation of biomass into high value-added products value chain goals

4.5.9 Implementation Plan

Provides a detailed timeline and step-by-step instructions on how the action plan will be executed.

Training activities

The stakeholders of the Lombardy Regional Hub can participate in at least 10 training courses. The training will cover various topics in the field of bioeconomy, entrepreneurship, and education. The 10 trainings include 4 pre-defined info sessions and 6 trainings that have been selected according to a survey carried out among stakeholders to identify which topics were most interesting to them.

Pre-defined info sessions

- ***RuralSpot***: tutorial on how to use the digital tool implemented by the RuralBioUp project. The platform contains information on the best small-scale bio-based solutions adoptable in regions, including available biomass, business models, market applications, technologies, practical knowledge, financial opportunities, information on nutrient recycling, and soil improvement.
- ***Access to finance & funding in bioeconomy***: online webinar with two modules (Access to Public Funding, Access to Private Funding) and an interactive session (Q&A session).
- ***RuralBioUp Impact Assessment***: online training about the RuralBioUp impact assessment system and KPIs relating to your Action Plans.
- ***Better nutrient recycling in circular bioeconomy***: International lecture series made up of two online lectures (The quality and safety using waste for maintaining and improving soil fertility, Green chemistry for improving soil health).

Selected training

- ***Relevant policies in bioeconomy***: Interactive presentation with Q&A, shared good practices and shared materials.
- ***Bioeconomy in the agriculture & forestry sector***: Scientists and professionals from agriculture sharing ideas, innovative technologies, and best practice cases for bioeconomy. In particular, there were two focus topics and fields: bioenergy conversion systems in a wider bioeconomy context and forestry and agricultural biomass supply chains with available solutions.
- ***Best practices in different value chains***: Interactive online webinar with shared good practices
- ***Technological trends in bioeconomy***: Series of webinars with each webinar focused on a different technological trend relevant to bioeconomy.
- ***Innovation support & technology transfer***: Online webinar with case studies and a Q&A session
- ***How to co-create activities for Bioeconomy***: Online Training on how to engage stakeholders for collaborative activities and actions targeted to specific regions.

Networking events

- Ecomondo 2024
- Bioeconomy Day 2024
- Other networking events - TBD

Study Visits
TBD

Resource Allocation
Identifies the necessary resources, such as budget, personnel, and equipment, required for successful implementation.

Budget

At the moment, since the activities that will make up this Action Plan have not been precisely defined, it is not possible to make a realistic estimate of the necessary budget.

Personnel

As a working group (personnel), the Lombardy Hub is based on:

- LGCA staff (Maria Elena Saija, Sara Daniotti, Ilaria Re, others)
- Consorzio Italbiotec (Bioeconomy PM Unit)
- SPRING staff (L. Gaiani, M. Bonaccorso, others)
- ITABIA staff (M. Monni, S. Mannelli, G. Croce, C. De Carolis, F. Scarpelli, V. Pignatelli)

Equipment

In the Lombardy region, the Lombardy Green Chemistry Association headquarters has multiple meeting rooms perfectly equipped for holding workshops or training courses (in person and remotely). These rooms will be made available free of charge for all Lombardy Hub initiatives included in the Action Plan.

4.5.10 Monitoring and Evaluation

Establishes a framework for monitoring progress and evaluating the effectiveness of the action plan.

- Surveys will be used to collect data from stakeholders to guide their awareness, acceptance, and participation in RuralBioUp and Hub initiatives, including questions about the perceived benefits and challenges. Analysing the collected data, the Lombardy Hub will be able to identify trends, patterns, or areas that need improvement. This analysis will inform decision-making and future planning to adjust the action plan and the Hub strategy.
- Another important point will be to maintain open communication channels with all stakeholders. Share progress updates, challenges, and adjustments to keep everyone informed and engaged. The communication may be of different types and through

different channels: periodic meetings, email, reports, etc. The Lombardy Hub will use communication as a learning opportunity: analyzing how stakeholders respond to different types of communication, we will adjust our approach accordingly. Continuous improvement in communication strategies is key.

- The possibility of using specific tools for monitoring activities will be evaluated.

Risk Assessment and Mitigation

Identifies potential risks or obstacles and outlines measures to minimise or address them.

TBD

Communication Plan

Specifies how the action plan will be communicated to stakeholders and the community.

TBD

4.6 A RuralBioUp hub Action Plan – BIOEAST HUB CZ Regional HUB Charles Spa

4.6.1 Introduction

The Charles Spa Region shares a significant portion of its frontier with Germany. The Krušné hory Range extends throughout the region, marking the national boundary, with its pinnacle being Klínovec at 1,244 meters. The region's nadir is found by the Ohře Stream near its edge. The region's weather conditions and soil makeup aren't particularly suited for farming. However, its primary treasures are its natural assets, especially its mineral fountains and therapeutic waters.

This region encompasses an expanse of 3,310.1 km^2, making up roughly 4.2% of the Czech Republic's total territory. In terms of municipality count, the Karlovy Vary Region ranks as the smallest in the nation, with an average municipality size of 24.7 km^2. The region is home to 133 autonomous municipalities of diverse dimensions and the Hradiště Military Zone. The region has seen a marked decrease in its populace since 2010, which is also aging more rapidly (the region's median age is 43.5, compared to the national median of 42.7). This demographic trend is due to a diminished birth rate and the migration of the younger generation to more prosperous regions.

For a long duration, the region's economic foundation has been rooted in extraction and power generation. There are notable brown coal extraction operations in the region, but these reserves are dwindling. As a result, the extraction sector is gradually winding down (anticipated to halt operations in the near future) and is scouting for alternative ventures, such as the projects by Sokolovská uhelná, a.s. to repurpose landscapes post-extraction. The region's mechanical enterprises are intertwined with its traditional sectors, and the chemical sector also holds importance. Brown coal extraction and its associated sectors remain at the heart of the region's economic structure.

BIOEAST HUB CZ is a working tool of the BIOEAST initiative of Central and Eastern European countries, it is also the first national bioeconomy BIOEAST HUB in the BIOEAST region established in line with the BIOEAST Governance and Roadmap and with the support of BIOEAST

NCP and the Ministry of Agriculture CZ to gather stakeholders and support their engagement in bioeconomy.

In line with the DoA the goal of the RuralBioUp project is to establish the RuralBioUp BIOEAST HUB CZ Charles Spa. The BIOEAST HUB CZ team did the following activities to prepare the RuralBioUp BIOEAST HUB CZ Charles Spa establishment:

- Desk research of the public strategies, statistical data analysis focused on the regional priorities related to circular bioeconomy transition, identifying key stakeholders;
- Providing a data base from public resources of entrepreneurs and NGOs focuses on areas related to circular bioeconomy;
- Interviews with key stakeholders – representative of the regional development agency (KARP), members of the regional research and innovation advisory board, entrepreneurs and NGOs.

4.6.2 Target Audience and Situation Analysis

Several governmental strategies and policy tools are pertinent to the shift towards ecological sustainability, a regenerative economic model, and an economy free from fossil fuel reliance.

Public Strategies and Policy Instruments

A paramount document guiding the regional metamorphosis towards the three tenets of sustainable development from a carbon-based economy is the Just Transition Program. This plan outlines infrastructural endeavours, both immediate and extended, capital injections into the region, and the enhancement of human capabilities. The foremost policy mechanism for this metamorphosis is the Just Transition Funding Action Plan, which bolsters the regenerative economic model by incorporating associated technologies, methodologies, and systems. It aids in the pivot of existing enterprises towards eco-friendly operations, fosters the inception of new ventures, and champions advancements, digital transformation, academia, and exploration.

Development Programme of the Region 2021-2027 integrates the tenets of a regenerative economic model and augments waste handling practices. It encompasses various initiatives like ensuring adequate waste processing and salvage infrastructure and techniques for biomass utilization. The Territorial Energy Concept of the Karlovy Vary Region, Update 2017 - 2042[12], delineates the goals and tenets of power administration within the region's confines and the prudent utilization of innate energy assets. The core emphasis of the Charles Spa Regional Novelty Blueprint is to advocate for ingenuity and collaboration within the fourfold helix model. The SWOT scrutiny highlights the prospects in raw material reuse, organic produce, sustainable energy sources, and novel materials as avenues for entrepreneurial novelty and practical studies. This blueprint also pinpoints the strengths and opportunities for pioneering business ventures, studies, and advancements in sectors beyond the conventional or at the nexus of multiple sectors with expansion potential (like material reuse, sustainable energy, organic produce, and so on).

[12] http://www.kr-karlovarsky.cz/samosprava/dokumenty/Documents/koncepce/OZZ_uzemne_energeticka_koncepce.pdf

There were 707 farmers in 2020, 302 holdings dispose of an area of agricultural land up to 10 ha in size. In 2020, 1 016 342 m^3 of wood was harvested, this wood was not affected by bark (unlike lots of forest in the Czech Republic).

	2019	2020	2021
Agricultural producers	739	707	678
with agricultural land up to 10 ha	313	302	283
Utilised agricultural area (hectares)	97 255	96 599	97 541
Arable land	34 864	35 124	35 463
Fallow land	430	295	386
Permanent grassland	62 087	60 827	61 643
Output of the agricultural 'industry' (current prices)			
Total (CZK million)	2 064	2 234 [3)]	2 417
Crop output	1 122	1 290	1 562
Animal output	877	875	782
Agricultural services output	19	20	22
per hectare of agricultural land (CZK)	21 293	23 012 [3)]	24 651
Crop production			
Harvest (tonnes)			
Cereals	103 204	108 250	106 148
Potatoes	2 577	2 104	2 717
Rape	16 910	19 360	14 486
Animal production			
Livestock density			
Cattle[1)]	45,0	44,5	44,2
Pigs[2)]	45,6	46,8	46,9

[1)]head per 100 ha of the utilised agricultural area; as at 1 April

[2)]head per 100 ha of the arable land; as at 1 April

[3)]half-finalised results

Table 30 Agriculture production 2019 – 2021 (Cezch Statistical Authority)

The most viable methods for biomass processing are composting facilities and biogas stations. These bioeconomy methods hold the promise of linking business owners in supply chains, presenting vast opportunities for ingenuity, technological integration, and the development of novel goods and services.

Within the Karlovy Vary Region, presently, there are 11 composting facilities actively functioning with a combined capacity of 51,100 tons annually. Six of these facilities operate under the regulations of the Waste Management Law, while the remaining five, which are predominantly smaller community-based composting sites, primarily handle biodegradable residues from urban green upkeep (these are exempt from the Waste Management Law regulations).

At an initial glance, the composting capacity within the region might appear adequate (see Figure 36). However, a more detailed examination of the entire area reveals certain zones lacking composting facilities. From a logistical perspective and considering transportation

expenses, it's not cost-effective to haul waste beyond a 30 km radius. The composting facilities are enumerated below, with their respective capacities also detailed.

Composting plants - larger facilities (5)

- A. S. A., spol. s r.o., Březová (at the Tisová landfill); capacity = 10 000 t/year
- AVE CZ waste management s.r.o., Hradiště (at the landfill); capacity = 26 000 t/year
- REGENT PLUS Žlutice spol. s r.o., Žlutice; capacity = 4 800 t/year
- Landfill Chocovice s.r.o., Třebeň u Františkových Lázní; capacity = 5 000 t/year
- Spa Parks Administration, contributory organisation, Karlovy Vary; capacity = 3 500 t/year

Small and community composting (6)

- Technical Services of the City of Kraslice o.p.s. - Kraslice (community composting plant on the body of the landfill), (capacity not specified)
- Městské lesy Kraslice, spol. s r.o. - Kraslice - small composting plant under the Waste Act with a capacity of 150 t/year
- Bublava Municipality - Bublava - community composting plant behind the cemetery on plot no. 1225/2 in k.u. Bublava, (capacity not specified)
- Municipality of Stříbrná - Stříbrná - community composting plant at the local cemetery, plot No 1419/2 in the cadastral area of Bub Bublava Stříbrná, (capacity not specified)
- Ašské služby s.r.o. - Aš - community composting plant with a capacity of 700 t/year
- Municipality Krásná - Krásná u Aše - community composting plant with a capacity of 500 t/year

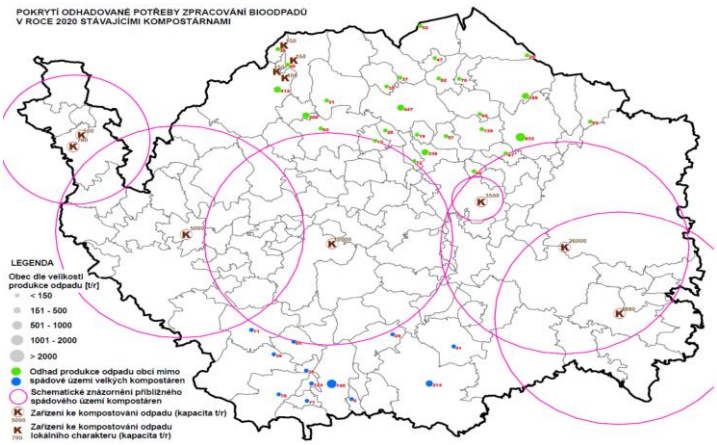


Figure 36 Network of composting unit

There are 14 biogas plants, and 103 wastewater treatment plants are in operation with a total capacity of 126 338 m^3/day. Their distribution is shown in Figure 37 below.

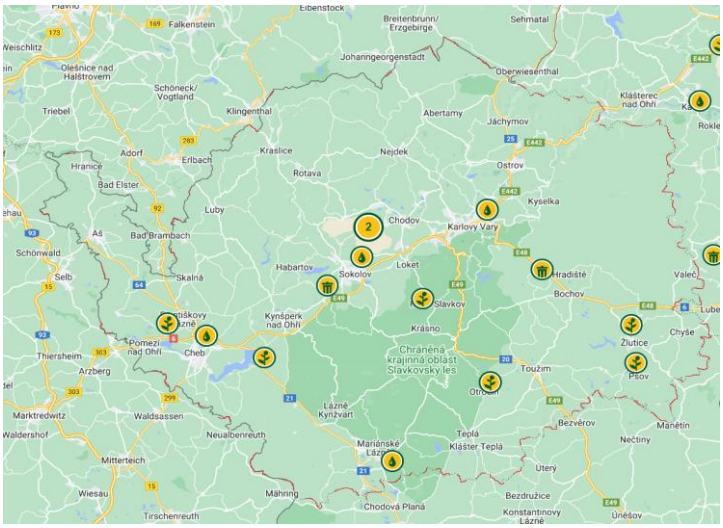


Figure 37 Network of biogas plants and wastewater treatment plants

Transformation towards circular bioeconomy enhances sustainable electricity production and reduces the dependence on fossil-based resources.

Conclusions from State of the Art in the Region

The desk research survey indicated a big gap concerning eco-innovation systems. Charles Spa Region suffers from the non-existence of research organizations focused on applied or basic research. Likewise, there is not any regional local university, university education programmes are being offered by local departments established by Pilsner or Prague universities, mainly private and focused on spa and tourism. **This is the biggest barrier in the development of bioeconomy, as both innovations, technologies, and new approach to value chains** are a must for bioeconomy enhancement. Therefore, there is a lot to be done in supporting the education, awareness raising and networking to establish the connections with the research organizations. ART and BIOEAST HUB CZ provided an extensive stakeholder mapping that can be fully utilized for the networking.

Conclusions from Stakeholder Mapping

Conclusion from stakeholder mapping – see Table 31.

STAKEHOLDER GROUP	Indicate ALL INSTITUTIONS you have mapped so far (please also indicate if they are in the hub CORE TEAM[1] or have some other specific role in the hub)	Ideas to DESIGN OUTREACH ACTIVITIES to reach/inform/involve them (tools, formats, etc. - e.g. information leaflet...)	Do you have any REQUESTS to RuralBioUp to better reach out to stakeholders (e.g. specific information, dissemination material, etc.)?
policy/administ-ration	BIOEAST HUB CZ: Informal interim. group - Ministry of Agriculture, Ministry of Industry and Trade, Ministry of Education, Youth and Physical Education, Technology Agency of the Czech Republic, RuralBioUp BIOEAST HUB CZ Charles Spa: ● Regional Development Agency (KARP) ● Regional Council for R&D	BIOEAST HUB CZ: Good practice of ● Regular on-line meeting ● Providing support in concept papers Cp development (f.e. Cp 4 nat BE str, Cp nation agriculture research, RIS 3 strategy, JTF instruments for all 3 regions) ● Managing stakeholder consultations on strategies provided by policy makers (f.e. National Circular Economy Strategy) ● (Co)organization of internal national events f.e. under the Czech EU Presidency BIOEAST Support for the Danube Lighthouse Implementation, BIOEAST Bioeconomy Education perspective) RuralBioUp BIOEAST HUB CZ Charles Spa: ● Cooperation on content development for events organized by regional policy makers, I.e. awareness raising for bio economy, showcasing good practices from other regions to inspire, encourage, engage and involve local businesses into bioeconomy ● Providing comparative analysis with other regions ● Planning study visits and training	RuralBioUp Project has a great potential to exchange information, learn from each other, build new connections.

private sector/business	BIOEAST HUB CZ: ● A few SMEs are members and has recently become members ● AgriKomp Bohemia ● ProPelety ● VepaSpol RuralBioUp BIOEAST HUB CZ Charles Spa: ● The initial database is being provided ● Recommendation from the members of BIOEAST HUB CZ	BIOEAST HUB CZ: Good practice of ● Regular on-line meeting ● Information about brokerage events, opportunities in national and international programme; BIOEAST HUB web pages post all available NL (ERDF, Interreg, CBE – JU) ● Support tools for project development and networking with R&D Institutions and methodologies RuralBioUp BIOEAST HUB CZ Charles Spa: ● Awareness raising events ● Networking ● Promotion for regional SMEs (in preparation)	RuralBioUp Project has a great potential to exchange information, learn from each other, build new connections
research and innovation	BIOEAST HUB CZ: ● Technical University Ostrava, MENDELu Agro Faculty ● Research organizations (ZVT, Agritech, Comtes FHT to name but a few examples ● Association of Research organizations ● Czech Agriculture Academy of Science ● Czech Technology Platform Plants for the Future RuralBioUp BIOEAST HUB CZ Charles Spa: ● The biggest challenge of this region is the missing R&D infrastructure (there are no research organizations neither universities) ● The goal of this regional department is to provide connections between local SMEs and research institutes from the neighbouring	BIOEAST HUB CZ: Good practice of ● Regular on-line meeting ● Supplying information about new projects possibilities (inter)national programs ● Promoting and active participation in the info days (f.e. CBE-JU, HE) ● Development of the first e-map that connects R&D organizations and businesses ● Development of methodologies how to effectively manage R&D focused on SMEs and how to implement BE innovations RuralBioUp BIOEAST HUB CZ Charles Spa: ● Promoting and active participation in the regional info days (f.e. JTF)	RuralBioUp Project has a great potential to exchange information, learn from each other, build new connections.

	regions, primarily Pilsner Region (good practice of AVO)	● Awareness raising about the available tools and good practices	
education community	BIOEAST HUB CZ: ● BIOEAST HUB CZ is the coordinator of the macro-regional BIOEAST TWB BE Edu ● BIOEAST HUB CZ established BIOEAST uni net RuralBioUp BIOEAST HUB CZ Charles Spa: ● Since there's no universities the focus is on secondary school	BIOEAST HUB CZ: Good practice of ● Discussion in the wider (i.e. macro-regional) perspective ● Macro-regional network enables sharing experience among different projects focused on education (BIObec, BIOGOVnet, GenBe, BIOEco-Up) ● Regular on-line meeting RuralBioUp BIOEAST HUB CZ Charles Spa: ● BIOEAST HUB team developed on-line mini site and also tutorials for Secondary School teachers focused on bioenergy, composting and biogas including interactive videos, these will be shared in the region	RuralBioUp Project has a great potential to exchange information, learn from each other, build new connections.
civil society (NGOs, associations, interest representation, etc.)	BIOEAST HUB CZ: ● Czech Technology Platform Plants for the Future ● ZERA Regional Development Agency ● Cluster Mechatronica RuralBioUp BIOEAST HUB CZ Charles Spa: ● We are building the connection with a special focus to local action groups	BIOEAST HUB CZ: ● Facilitating the co-organisation of common events and participation on national events (Nabočany - Our Fields, Southern Bohemia Země Živitelka, Tech Agro Fair in Brno) ● Common projects focused on innovation and technology transfer, composting campaign, new breeding techniques, international cooperation to name but a few examples ● Development of strategic documents, f.e. Technology foresight of applied research, Road	RuralBioUp Project has a great potential to exchange information, learn from each other, build new connections.

		Map of applied research, National Concept paper for bioeconomy strategy. RuralBioUp BIOEAST HUB CZ Charles Spa: ● Building bridges between regional actors and organizations from other regions in relevant areas (composting, innovation, and technology transfer) ● Support for SMEs how to develop R&D activities in bioeconomy	

Table 31 Conclusion from stakeholder mapping

Overall Summary

- **Education and R&D:** very low R&D infrastructure and expenditure (no mention to biotechnology), there is no university located in the Charles Spa Region only departments of the Western Bohemia University (located in Pilsner Region) and department of a private University of Management and Public Governance (locate in Prague) no relevant education for circular bioeconomy, lack of entrepreneurial mentality
- **Funding**: low investment in innovation and new technologies; Innovation vouchers, more funding methods are currently under negotiation and are expected to facilitate the transition
- **Networks:** there is not any cluster or technology platform working in the region
- **Potential for value chains:**
  - limited land for agriculture doesn't allow for extensive energy use
  - enhancement the disposable infrastructure of biomass utilization

4.6.3 Added Value for Stakeholders

The above outlined gap analysis and identification of problems of the Charles Spa Region is the basis of the value added proposition for stakeholders to illustrate how can RuralBioUp BIOEAST HUB CZ Charles Spa support regional growth. RuralBioUp BIOEAST HUB CZ Charles Spa can network stakeholders, enable sharing good practice, providing the connection to research organizations and provide training focused on bioeconomy and innovation management.

Added value proposition and tailored made for key stakeholder groups:

Public administration

- Cooperation on content development for events organized by regional policy makers, ie. awareness raising for bio economy, showcasing good practices from other regions to inspire, encourage, engage and involve local businesses into bioeconomy
- Providing comparative analysis with other regions
- Organizing study visits and training

Private sector/business

- Awareness raising events
- Networking and enhancement
- Promotion for regional SMEs (in preparation)

Research and innovation

- Promoting and active participation in the regional info days (f.e. Just Transition Fund)
- Awareness raising about the available tools and good practices

Education community

- BIOEAST HUB team developed on-line mini site and also tutorials for Secondary School teachers focused on bioenergy, composting and biogas including interactive videos, these will be shared in the region
- Civil society (NGOs, associations, interest representation, etc.)
- Building bridges between regional actors and organizations from other regions in relevant areas (composting, innovation, and technology transfer)
- Support for SMEs how to develop R&D activities in bioeconomy

4.6.4 Proposition for Stakeholders

As a preparatory work before the KoM based on the above mentioned analysis the following objective and tasks of the RuralBioUp BIOEAST HUB CZ Charles Spa was prepared to be presented and discussed with stakeholders, so they can better understand the direction in which the goals need to be thought about.

Objectives

- **O1. Act as a regional network of stakeholders** interested in exploring and implementing circular bioeconomy
  - Provide tailored training focused on circular bioeconomy (min 444)
  - Provide assistance for stakeholders (explanation, briefing (111))
  - Organise networking events (2) and bringing new stakeholders (50)
- **O2. Bridge Charles Spa Region with other EU regions** and shared good practice how to implement bioeconomy
  - Organize study visits
  - Sharing knowledge with followers (3 – 4 outside RuralBioUp project)
- **O3. Enhance innovation and technology transfer in Charles Spa Region**
  - Support intra value chains collaboration (17/6 farmers and foresters), new companies / start-ups (1/2)
  - Adopt small bio-based solution (11) and market uptake of 5-6 new bio-based products /services
- **O4. Support the enhancement of value chains** (6 value chains)
  - Bring public / private investments (12 mil EUR)

Tasks

1. Organizing networking events, sharing good practice, and learning from each other (O1., O4.)
2. Providing the connection to research organizations – introducing e-tool for searching relevant R&D infrastructure (O2.)
3. Organize matchmaking events (O1., O2., O4.)

4. Provide training focused on bioeconomy and innovation management (02., 03., O4.)
5. Sharing good practice from BIOEAST HUB CZ members from other regions of the Czech Republic (01., 03.)

4.6.5 Implementation Part

The discussion with stakeholders of the RuralBioUp BIOEAST HUB CZ Charles Spa was very inspiring and showed the need for awareness raising, education activities and workshops dedicated to bioeconomy.

Stakeholders' Reflection of Bioeconomy Deployment

However, bioeconomy is embedded in the strategic documents of the Just Transition Funding (JTF) Instrument, public administration does not comprehend the potential of bioeconomy in full. This is very apparent in the comparison to other JTF regions - Moravian Silesian and Ústí Region. Both these regions have prepared several strategic projects to support the transformation path; there was only one project submitted in the Charles Spa Region, the revitalisation of pond Medard. This project was submitted by key regional Industrial Player - Sokolská Uhelná, a.s. This company is in favour for the transition and understand bioeconomy as a great opportunity, the following reasons were articulated by the company representatives:

1. **Diversification of revenue streams:** By exploring bio-based products and processes, Sokolská Uhelná, a.s. can diversify its product portfolio, reducing dependency on coal as the primary source of revenue, Sokolská Uhelná, a.s. has launched an agriculture production and invested in a new technology processing biogas and are looking for new possibilities to enhance the efficiency.
2. **Sustainability and environmental benefits:** Transitioning to bio-based processes can reduce the environmental footprint of the company. Sokolská Uhelná, a.s. wants to decrease greenhouse gas emissions, reduced water usage, and overall less reduction.
3. **Regulatory compliance**: As both the EU and national regulations become stricter regarding carbon emissions and environmental sustainability, adopting bioeconomy strategies can help Sokolská Uhelná, a.s. as a coal mining companies meet these regulatory requirements. This goes hand in hand with reputation and branding: embracing bioeconomy and transition to sustainable development can enhance the reputation of Sokolská Uhelná, a.s. as a forward-thinking and environmentally responsible entity. Sokolská Uhelná, a.s. belives that this can lead to increased trust and support from stakeholders, including investors, customers, and the local community.
4. **Job creation**: Sokolská Uihelná, a.s. considers the bioeconomy sector as a prospective one to create new job opportunities in research, development, and production of bio-based products that can help in retaining employees who might be affected by the decline of the coal industry. Therefore, they submitted the project of Pond Medard revitalisation, Sokolská Uhelná, a.s. wants to build a creative and inspiring place where people can work, live, chill out to stop brain drain from the Charles Spa Region.
5. **Innovation and R&D Opportunities:** The bioeconomy sector is ripe for innovation. Sokolská Uhelná, a.s. is investigating whether investing in research and development to create novel bio-based products and solutions may lead to open new business

opportunities, it may support collaboration with universities, research institutions, and other industries, leading to knowledge exchange and shared resources.

As for the Charles Spa Region stakeholders considered that implementing bioeconomy might bring these advantages:

1. **Economic stimulus:** Bioeconomy offers an opportunity for a region with a traditional focus on mining as it enables to get involved in a wide range of industries, from agriculture and forestry to biotechnology and green chemistry. This diversification can reduce the region's dependency on a single industry, ensuring more stable economic growth. Naturally, this diversification can create new job opportunities in research, development, and production of bio-based products. For the Charles Spa Region, it is of vital importance to demonstrate career opportunities for young families and students and stop the migration to Germany, Prague and more developed regions of the Czech Republic.
2. **Innovation and R&D opportunities:** The Charles Spa Region suffers from the missing R&D infrastructure and very poor eco-innovations system. The bioeconomy sector is ripe for innovations to utilize the locally produced biomass. There is a Strong need for networking and clustering events, where regional stakeholders can meet with R&D organisations to open new possibilities for innovations.
3. The regional administration was interested in the new concept **The Regional Innovation Valleys for Bioeconomy and Food Systems (RIV4BFS)** that launched on the High-Level Conference in Plovdiv, Bulgaria on 13 October 2023 that was co-organized with the Agricultural University of Plovdiv – member of the BIOEAST Uni Net and with the BIOEAST initiative. RIV4BFS is a new comprehensive initiative aiming to transform the bioeconomy and food systems landscape by integrating sustainability, innovation, and regional collaboration depending on local priorities. RIV4BFS aims to builds full value networks ensuring no resources are wasted, focusing on multiple products and services coexisting in an industrial ecosystem symbiosis. RIV4BFS rely on regional sustainable resources, strengthening resilience and strategic autonomy, and avoiding negative environmental or social impacts. Regions can invest in research and development to create novel bio-based products and solutions, leading to potential patents, technological advancements, and academic excellence.
4. The label of **Regional Innovation Valley** can support attracting investments as it is demonstrating a commitment to sustainability and bioeconomy; Charles Spa Region can attract more investments from private sectors, including international organizations that prioritize sustainable development. As bioeconomy can promote traditional practices, local knowledge, and indigenous technologies, leading to the preservation of cultural heritage and increased social cohesion, that are becoming fashionable, this can be a good stimulus for start-up and spin offs likewise support new value chains and added value production for local businesses.
5. **Environmental benefits:** Shifting to bioeconomy can lead to a reduction in greenhouse gas emissions, decreased pollution, and more sustainable land and water use. This can improve the overall environmental health of the region.

It was concluded that for the Charles Spa Region as a Just Transition Funding one, shifting from fossil fuels to bioeconomy can provide a pathway to sustainable economic growth, environmental preservation, and social development. It aligns with global trends towards

sustainability and offers a proactive approach to address the challenges posed by climate change and resource depletion.

Value Chains

The following opportunities for enhancing value chains in the Charles Spa Region were discussed:

1. **Supply chain provides a direct link between wheat producers with flavour industries**

This supply chain can reduce intermediaries, and ensure that the flavour industry gets the freshest and highest quality wheat for their products. It was considered that there's an opportunity to add value to raw wheat by transforming it into high-quality flavour products (f.e. new fashionable baker shows that are becoming very popular in the cities). The flavour industry can therefore specify the type, quality, or variety of wheat they need, allowing farmers to tailor their production to meet these specific requirements (wholegrain, gluten free etc.) Direct collaboration can lead to cost savings for the flavour industry as they can negotiate bulk purchase agreements and reduce costs associated with middlemen, moreover direct links ensure better traceability of the raw materials, allowing the flavour industry to guarantee the source and quality of their ingredients, which can be a significant selling point for consumers. Direct partnerships can promote sustainable agricultural practices. The flavour industry can invest in sustainable farming methods, ensuring long-term availability of high-quality wheat. A direct link can lead to better demand forecasting, allowing farmers to produce the right amount of wheat, reducing overproduction and wastage.

Providing a bridge between primary wheat producers and the flavour industry can lead to mutual benefits in terms of economic gains, sustainability, innovation, and consumer appeal. It fosters collaboration, transparency, and shared growth. Collaboration can lead to joint research and development efforts to produce unique flavours or improve existing ones. The primary producer can provide insights into wheat varieties and growing conditions that might influence flavour profiles. Direct access to the flavour industry can lead to better pricing for wheat farmers, ensuring a fair price for their produce and improving their economic stability.

2. **Value chain based on hemp** that is offering environmental, economic, and health benefits. Its versatility and sustainability make it a promising crop for the future.

Hemp cultivation is environmentally friendly. It requires less water, grows quickly, and can thrive without pesticides. Its deep roots prevent soil erosion and can help in soil remediation. Hemp can be integrated into crop rotation systems, improving soil health and reducing the need for chemical fertilizers. Hemp's adaptability means it can be grown in various climates and regions including the highlands of the Charles Spa Region. Hemp plants absorb and store carbon dioxide, which makes hemp cultivation beneficial for combating climate change. Hemp is a hardy plant that requires minimal inputs in terms of pesticides and herbicides, leading to reduced production costs.

Hemp can be used to produce a variety of products, including textiles, paper, building materials, food, and health products such as CBD oil. This means multiple industries can benefit, leading to job creation and new business opportunities. Moreover, many hemp-based products are biodegradable, offering an eco-friendly alternative to synthetic products, that can support the transformation from the fossil based to bio based economy in the Charles Spa Region.

There are several technologies required for hemp plant utilization spans from cultivation and harvesting equipment to advanced extraction and processing machinery, tailored to the specific hemp-derived product being produced, in particular: a) processing Technology such as machines that separate the outer bast fiber from the inner woody core (hurd) of the hemp stalk, extraction technology for extracting hemp seed oil., equipment to process hemp fibers into paper or machinery to weave or knit hemp fibers into textiles.

3. **Value chain of biofertilizer production** based on composting that offers a holistic approach to agriculture, waste management, and sustainability, providing both environmental and economic benefits.

Composting is a natural process that doesn't rely on synthetic chemicals, making it a sustainable method for fertilizer production. Biofertilizers enhance soil structure, improve its water retention capacity, and increase its microbial activity, leading to healthier and more fertile soil[13]. Composting utilizes organic waste, turning what might otherwise be landfill material into valuable fertilizer, thereby reducing the overall waste footprint. Using waste materials as a primary input can reduce production costs, moreover biofertilizers can lead to increased crop yields due to the enhanced soil health and nutrient availability. Additionally, composting can decrease the need for synthetic fertilizers, reducing costs for farmers.

Composting reduces methane emissions from landfills and lowers the carbon footprint. Biofertilizers also reduce the runoff of synthetic chemicals into waterways, which can harm aquatic life and water quality. Composting and biofertilizer production can be done locally, reducing transportation costs and emissions and supporting local economies.

The value chain promotes a circular bioeconomy model, where waste is not just discarded but is transformed into valuable products, the composting process and subsequent biofertilizer production can create jobs in collection, processing, and distribution. There are a few composting units in the Charles Spa Region that can be fully utilised.

In a nutshell the tree above mentioned value chains highlight the potential of direct collaborations, sustainable agricultural practices, and the transformation of waste into valuable products for both environmental and economic benefits

Wheat-to-Flavour Industry Value Chain:

- Direct links between wheat producers and the flavour industry can streamline the supply chain, ensuring fresher, high-quality wheat for flavour products.

[13] Compost-based biofertilizers offer a wide range of essential nutrients for plants, not just the primary N-P-K (Nitrogen, Phosphorus, Potassium) found in many synthetic fertilizers. Using biofertilizers can reduce dependency on chemical fertilizers, leading to a more organic and natural farming approach.

- This direct collaboration can lead to cost savings, better traceability, sustainability, and improved demand forecasting.
- Mutual benefits include economic gains, sustainability, innovation, and increased consumer appeal. Direct partnerships can also foster joint R&D efforts and ensure fair pricing for farmers.

Hemp Production Value Chain:

- Hemp offers environmental, economic, and health benefits, making it a versatile and sustainable crop.
- Environmentally, hemp cultivation conserves water, grows rapidly, prevents soil erosion, and combats climate change by absorbing CO2.
- Hemp's diverse applications span textiles, paper, building materials, food, and health products, promoting job creation and eco-friendly alternatives.
- Key technologies for hemp utilization include decortication, retting, cottonization, various extraction methods, and equipment for refining, paper production, textile production, and construction material production.

Biofertilizer Production Value Chain:

- Composting-based biofertilizer production offers an integrated approach to agriculture and waste management, emphasizing environmental and economic benefits.
- Composting enhances soil health, reduces waste, and offers a sustainable alternative to synthetic fertilizers.
- The process supports local economies, reduces transportation costs, and promotes a circular bioeconomy model, transforming waste into valuable products and creating job opportunities.

The discussion with stakeholders resulted to the following objective and actions – see next text.

Objectives of the RuralBioUp BIOEAST HUB CZ Charles Spa

1. **Act as a regional network of stakeholders** interested in exploring and implementing circular bioeconomy
2. **Bridge Charles Spa Region with other EU regions** and shared good practice
3. **Enhance innovation and technology transfer in Charles Spa Region**
4. **Support the enhancement of value chains**
5. **Support bioeconomy education in the region** shared good practice of the secondary schools involved in the BIOEAST HUB CZ[14]

Steps to Achieve the Above Indicated Objectives

<u>O1. RuralBioUp HUB regional network of stakeholders</u>

- Organize conferences, workshops or seminars focused on circular bioeconomy
    - focused on new agriculture practice, agriculture Innovations and new agro technology - in October and November 2023

[14] There is sadly no university in the Charles Spa Region (as describe before).

    - exchange of a good practice - spring 2024
- Organize networking events and exchange good practice
    - National bioeconomy congress - December 2023
    - National technology fair focused on new technology and equipment TECHAGRO Brno in spring 2024

O2. RuralBioUp HUB building bridges with other EU region

- Organize study visits in the RuralBioUp project
- Sharing knowledge with followers Zlínský Region, Southern Moravia and Liberec Region

03. Enhance innovation and good practice

- Conference organized by the Association of Research Organisation focused on applied research and innovation - spring 2024

04. Support of new value chains

- Networking event on the national level - National bioeconomy congress in December 2023
- National AgroFair the biggest of its kind - summer 2024
- training materials and webinars dedicated to hemp, composting and other biomaterials - spring 2024
- preparation of info sheets with bioeconomy topics in national language

05. Bioeconomy education

- Link building between secondary schools that dispose of bioeconomy programmes with regional secondary schools - National bioeconomy congress in December 2023
- networking activities with universities that dispose of the bioeconomy related programmes - members of the BIOEAST Uni Net (the Bioeconomy Changemaker Festival 2024)

Communication with Stakeholders

Effective follow-up communication is crucial for building strong relationships and ensuring that stakeholders remain engaged, informed and involved in the RuralBioUp activities.

Stakeholders were asked to evaluate the Kick of Meeting that was analysed to gain insights into the effectiveness of the kick-off meeting and make adjustments as needed to improve future meetings. In particular stakeholders were asked to judge:

- Clarity of understanding of bioeconomy and RuralBioUp, clarity of communication (effectiveness of communication during the meeting, including the use of visual aids, presentations, and language)
- Organization of the Kick of Meeting precisely if they were encouraged to actively participate during the meeting
- Topics that were not covered or should be covered in more detail

Stakeholders expressed that the communication was comprehensive, bioeconomy concept, potential and opportunities for the Charles Spa Region was clearly communicated, using of practical examples were highly appraised. They evaluated positively time for the discussion. As during the Kick of Meeting a few “aha” moments happened (help based material for aquaponie, technology for biogas enrichment), they were able to witness advantage of RuralBioUp HUB. Stakeholders showed interest in practical examples of agriculture innovations, technological

equipment for new agro-technology practice, bioeconomy education, these topics was reflected in the action plan. As the concept of value chains is rather a novelty, stakeholders require national events that can demonstrate their advantages.

Hereby the following steps were planned:

- Progress updates: RuralBioUp will share information on the status of the above mentioned planned activities on the web pages, social medial; the delivery of the NL is discussed
- Feedback incorporation: stakeholders provided feedback to the Kick of Meeting, that was discussed in the internal team and integrated in the action plan
- Action plan enhance networking and collaboration, a lot of networking events that can advance upon the discussion and build trust and credibility with stakeholders

4.7 A RuralBioUp hub Action Plan – Latvia Regional HUB

4.7.1 Intro

HUB region In the RuralBioUp project is all Latvia territory. Latvia is a country situated between Estonia and Lithuania in Europe. Latvian population Is approx. 1.9 million people and total area 64 589 km^2. Latvia is a member of the European Union, the Organization for Economic Cooperation and Development (OECD), the World Trade Organization (WTO), and the United Nations.

In 2022 Agriculture contribution in economic growth In GDP for crop, animal production and hunting were 3%, for forestry and logging - 2.6%, food production - 2%, drink production 0.3% and fishing - 0.2%[15].

Forests cover half of Latvia's territory - about half of it owned by private forest owners, the other half by the state and some by municipalities. The economic rationale for forestry as a land use in Latvia is timber extraction, which ensures the economic stability of our society through jobs, tax contributions to the national budget, GDP contribution, export balance and the extraction of a renewable resource. At the same time, forests provide many other essential functions - balancing water cycles and preventing soil erosion risks, providing biodiversity, producing O2 and sequestering CO2 to mitigate climate change risks, and forest areas are mostly available for public recreation, including the extraction of non-timber forest values[16]. Wood processing is the largest manufacturing industry in Latvia. It accounts for more than 30% of total industrial output. Wood processing is also mainly export-oriented, with more than two

two-thirds of the sector's production. Traditionally, the sector's export markets are EU countries[17].

[15] https://www.zm.gov.lv/lv/media/12006/download?attachment
[16] https://mezaipasnieki.lv/lv/nozare
[17] https://www.em.gov.lv/lv/media/15783/download?attachment

Food and drink manufacturing is the second largest manufacturing industry in Latvia, both in terms of output and employment by the number of jobs. Although most of its production is sold on the domestic market (58%), in recent years export sales has been gradually increasing[3].

The main export industries in Latvia are agricultural and food products, and wood and its products. In 2022 Agricultural and food products accounted for 19% and wood and its products 18% from all goods exports[3].

4.7.2 Target Audience and Situation Analysis

Various governmental strategies and policy instruments are relevant to the transition towards ecological sustainability, bioeconomy development and transition from fossil fuels to renewable.

Public strategies and policy instruments

Latvia's Long-Term Energy Strategy 2030[18]

The Strategy was designed to offer an energy policy scenario that looks beyond the development of the energy sector and places it in the context of climate policy, the EU's binding framework for reducing GHG emissions. One of the objectives of the strategy is to achieve a 50% share of RES in gross final energy consumption in 2030, which will be done by increasing the use of wood in energy production.

The Latvian Bioeconomy Strategy 2030[19]

Adopted by the Cabinet of Ministers in 2017. Its vision is that Latvia's bioeconomy sectors (including agriculture and forestry) are leaders in preserving, enhancing and effectively and sustainably using the value of natural capital in the Baltic States.

The main objectives of the strategy are to promote and maintain employment, increase value added and exports in the bioeconomy sectors by 2030. Agriculture and forestry, which are included in the primary production of bioresources, are identified as one of the priority sectors to be developed. The Strategy envisages increasing land use efficiency in agriculture by bringing into production around 400 000 ha of unused land, as well as converting overgrown land into forests, which are not intended to be used for agricultural production in the future.

Latvia's strategy for achieving climate neutrality by 2050[20]

Strategy was announced in 2018. Strategy aims to reduce GHG emissions from the Latvian economy by 80% compared to 1990 and increase carbon sequestration, fully covering Latvia's anthropogenic GHG emissions and achieving carbon neutrality by 2050. One of the tasks for successful implementation of the strategy is sustainable land management and gradual

[18]https://likumi.lv/ta/id/342264-latvijas-energetikas-ilgtermina-strategija-2030-konkuretspejiga-energetika-sabiedribai
[19]https://www.lbtu.lv/sites/default/files/2018-07/Latvian-Bioeconomy-Strategy-Summary-WEB_0.pdf
[20] https://ec.europa.eu/clima/sites/lts/lts_lv_lv.pdf

transition from fossil energy to renewable resources using woody biomass for energy production.

Latvia's National Energy and Climate Plan 2021-2030[21]

Plan was adopted in 2020. The Plan is designed as a long-term energy and climate policy planning document, setting out the guiding principles, objectives and courses of action for Latvia's national energy and climate policy until 2030. One of the objectives of the long-term vision of the Plan is to reduce fossil and unsustainable resources and replace them with renewable resources, including biomass. One of the action lines to achieve the Plan's objectives for biomass use is - sustainable use of resources and reduction of GHG emissions and increase of CO2 sequestration in the land use, land use change and forestry sectors.

The National Development Plan 2021-2027[22]

Plan was approved in 2020. The plan states that increasing energy security and reducing the country's dependence on energy imports can be achieved by increasing the use of domestic and renewable resources in energy production, which includes increasing the use of biomass in energy production.

Biomass production and utilization

At the end of 2022 in Latvia there were 61.8 thousand agricultural holdings, which is 15.3 % fewer than in 2020. Average size of a holding constituted 44.7 ha, which is 6.4 ha or 13.5 % more than in 2020. Agricultural area on average per holding has increased from 26.9 ha in 2020 to 31.1 ha in 2022 or by 15.6 %. Compared to 2021, in 2022 the total utilised agricultural area in the country grew by only 0.3 thousand ha and constituted 1970.4 thousand ha[23].

	2018	2019	2020	2021	2022
Utilized agriculture area (thsd. ha)	1,937	1,959	1,969	1,97	1,970
... arable land	1,294	1,318	1,333	1,362	1,356
... cereals	690	742	753	776	780
... industrial crops	129	145	151	152	168
…potatoes	22	22	18	16	14
...fallows	85	55	55.8	59	53
…meadows and pastures	634	631	626.3	598	603
Agricultural crop production (t)					
…cereals	2,057,366	3,163,212	3,497,087	2,994,631	3,243,645
…potatoes	426,899	501,847	377,454	248,977	246,659
…open field vegetables	127,586	161,707	147,055	113,397	115,477
Number of livestock and poultry at the end of year (thousand heads)					
…cattle	395.3	395.3	399.0	393.5	391.4
…pigs	304.9	314.2	306.8	327.0	307.9
…poultry	5,403.1	5,690.4	5,837.9	5,857.7	5,744.3
Meat production (thsd t)	91.3	94.0	91.9	93.4	94.2
…beef and veal	17.5	16.2	16.0	17.0	15.9
…pork	38.9	40.7	37.3	37.8	38.7

[21] https://www.em.gov.lv/lv/nacionalais-energetikas-un-klimata-plans
[22]https://www.mk.gov.lv/lv/latvijas-nacionalais-attistibas-plans?utm_source=https%3A%2F%2Fwww.google.com%2F
[23]https://admin.stat.gov.lv/system/files/publication/2023-06/Nr_17_Latvijas_Lauksaimnieciba_2023_%2823_00%29_LV_EN.pdf

…poultry	33.9	36.0	37.5	37.6	38.4

Table 32 Agriculture production 2018 – 2022 (Central Statistical Bureau of Latvia)

Latvia's forests cover 3.3 million hectares and 53% of the country of its territory. Moreover, forest cover continues to grow. Forest expansion is taking place both naturally and through afforestation of arid and unused agriculture lands land. Latvia's forest cover is increasing because the country is carrying out targeted forestry activities. In the last decade, on average, Latvia's forests have been harvested annually 11 million cubic meters of timber. This is less than the natural growth, so Latvian forestry can be described as sustainable.

	2018	2019	2020	2021	2022
Forest area, thousand ha	3,281	3,285	3,292	3,296	3,299
Standing timber, million m^3	677	679	681	682	-
Harvested timber, million m^3	12,9	13,3	13,2	13,1	13,1
Forest product production					
…industrial roundwood, thousand m3	11,992	12,267	12,726	13,003	12,491
…fuelwood, thousand m3	2,400	2,555	2,620	2,940	2,936
…charcoal, thousand tonnes	9.0	8.0	8.0	8.0	7.0
….wood chips, particles and residues, thousand m3	5,463	4,602	3,937	4,310	5,615
…wood pellets and other agglomerates, thousand tonnes	1,771	2,257	2,318	2,189	2,160

Table 33 Forests and forest products 2018 – 2022 (Central Statistical Bureau of Latvia)

In Latvia, agriculture and forestry are main biomass producers.

In Latvia biomass is used in different ways:

- bioenergy (divided into: "bioheat", which is heat energy and "bioelectricity" - electricity obtained from biomass);
- biofuels: all fuels produced from biomass, including solid fuels (chips, chips, wood, pellets), liquids (bioethanol, biodiesel, bio-oils) and gases (biogas, hydrogen and other gases).
- other uses: biomass is also used to produce fibers and other substances.

There are favorable conditions for the development potential of the bioeconomy in Latvia. The country has a high specific potential of agricultural land per capita (Latvia – 2nd place in the European Union, EU) and a high rate of specific forest area per capita (Latvia – 4th place in the EU). However, the value of production from agriculture and forest resources per unit of land is one of the lowest in the EU[24].

In Bioeconomy development all stakeholders, as farmers, fishermen's, foresters, waste managers, producers of innovative products, scientists, politicians and non-governmental organizations should be connected and should work together.

[24] https://enciklopedija.lv/skirklis/89571-bioekonomika-Latvij%C4%81

Conclusions from state of the art in the Latvia region

The desk research survey indicated big opportunities for biomass utilization in Latvia in the future. Available biomass streams are from agriculture and forestry, where biomass could be used in bioenergy, biofuel or other product production. Statistics shows, that forest and agriculture products are in stable production and it is unlikely, it will decrease I the near future. There are several strategies and political documents, that confirms, that the bioeconomy will be developed on a national scale and will ne supported from the state. Above mentioned conditions are very applicable for small sale innovations and small-scale bio based solution development in rural areas, what will be supported by RuralBioUp project through Latvian HUB activities.

Conclusions from stakeholder mapping

Stakeholder mapping was done in the first phase of the project. Stakeholder mapping was done through project contact point - The Latvian Agricultural Organization Cooperation Council (LOSP) who is an association that unites 52 non-governmental agricultural organizations of national producers and processors, covering the entire territory of Latvia and all production sectors. The first phase involved personnel and face to face meetings with potential stakeholders and several meeting with Contact point. NGO's and agricultural organizations as initial stakeholders will bring down the information about the project to the members of these organizations, such as, farmers, foresters and entrepreneurs.

Overall Summary

- In the region are enough biomass and resources from agriculture and forestry that could be used in small-scale biobased solutions in rural areas by creating new products or solutions
- Region strategies and policy documents support bioeconomy development in the region and see it as future economy for regional growth and transition to low carbon economy
- The region has infrastructure for small-scale biobased solution development through universities, research institutes and regional platforms, but more active stakeholder engagement is necessary to develop more innovative solutions
- Funding is available for small-scale biobased solution development, but information is not collected in one place and it is hard to navigate in all funding possibilities. That will be eliminated within framework of this project, by offering consultations to project stakeholders and collecting all information in one easy-to-view document.
- Most off the networks are within specific stakeholder groups, what leads to slower information exchange between different stakeholder groups. This will be improved by with Latvia HUB, where different stakeholder will be informed on regular bases about news in bioeconomy and funding opportunities.

4.6.3 Added value for stakeholders

RuralBIOUp HUB Latvia facilitates the networking of stakeholders, fosters the exchange of best practices, establishes connections with research organizations, and delivers training with a specific focus on bioeconomy and innovation management.

Added value proposition and tailored made for key stakeholder groups:

Public administration

- cooperation on content development for events organized by regional policy makers, I.e. awareness raising for bio economy, showcasing good practices from other regions to inspire, encourage, engage and involve local businesses into bioeconomy
- providing comparative analysis with other regions
- organizing study visits and training

Private sector/business

- awareness raising events
- networking and enhancement
- promotion for regional SMEs (in preparation)
- study visits and trainings

Research and innovation

- Promoting and active participation in the regional info days and local bioeconomy events
- Awareness raising about the available tools, good practices, funding and cooperation possibilities with the industry

Education community

- Sharing training materials with education communities
- Visits to schools or public events for children to give lectures and presentation about bioeconomy and small scale biobased solutions.
- Civil society (NGOs, associations, interest representation, etc.)
- Building bridges between regional actors and organizations from other regions in relevant areas (composting, innovation, and technology transfer)
- Support for SMEs how to develop R&D activities in bioeconomy

4.7.4 Proposition for stakeholders

Objectives

- **Act as a regional network and consultancy platforms for stakeholders:**
    - Organize networking events, invite new stakeholders, give updated information to involved stakeholders
    - Help stakeholders to find new funding opportunities,
    - Organize trainings focused on bioeconomy and small-scale biobased solution development in region
- **Bridge Latvia Region with other EU regions** and share good practice how to implement bioeconomy:

- Organize study visits to other countries and regions
- Share knowledge with project followers

- **Enhance innovation and technology transfer in Latvia region from other regions**
  - Support stakeholder collaboration in new value chain development or existing value chain improvement according to experience from other regions
  - Add new stakeholders to already existing value chains and try to organize, where it is possible, existing value chain transfer from other regions
  - Support new company/start up occurrence in the region
- **Support the enhancement of value chains**:
  - Help to create new value chains and organize stakeholder enrolment in these value chains in the region
  - Help to transfer value chains into products, solutions or project proposals

Tasks

1. Organize networking events,
2. Share good practice with project stakeholders and organize learning from each other (O
3. Provide stakeholder connection to research organizations, universities, funds, clusters, associations and funding entities
4. Organize matchmaking events, study visits, good practice demonstrations
5. Provide training focused on bioeconomy and innovation management
6. Organize good practice demonstration within Latvia and from other RuralBioUp project regions as well organize good practice demonstration to RuralBioUp regions.

4.7.5 Implementation part

Stakeholders' reflection of bioeconomy deployment

After speaking with stakeholders, they agree with statements, that are written in Latvia Bioeconomy Strategy 2030, Latvian Sustainable Development Strategy 2030, Strategy of Latvia for the Achievement of Climate Neutrality by 2050 and Action Plan for the Transition to a Circular Economy 2020–2027.

Actions for Bioeconomy deployment in region mentioned in Latvia Bioeconomy Strategy 2030, what was also discussed with stakeholders and they agreed, that they are vital and important.

- Create attractive Entrepreneurial Environment in the region. This will promote and preserve employment in bioeconomy sector, what will make the sector more attractive to new ideas and funding.
- Create and support result-oriented efficient and sustainable resource management. This will lead to increased added value of bioeconomy products, where several new value chains will be created and resources will be used in more effective manner.
- Support and fund knowledge exchange and innovation. This will lead to new companies, initiatives and projects.
- Promote manufacturing in bioeconomy sector. This will lead to new products and new value chains and product streams.

- Create and support responsible and sustainable bioeconomy sector development. More sustainability will lead to better products and services what will be more accepted form new customers.

Value Chains

During face to face meetings and in the Kick-off meeting the following opportunities for enhancing value chains in the Latvian region were discussed:

1. **Value chain of waste and by-product usage as fertilizers in agriculture and agroforestry.**

This supply chain will use waste products as wood ash from boiler houses, low quality peat from peat producers and biochar residuals from biochar producers. All these products will be pelleted together in different proportions and used as fertilizers in agricultural fields or forest plantations, where fertilization will be done to each planted tree individually

2. **Value chain of agroforestry system where crops, animals and trees could be grown together on one land property.**

This supply chain will incorporate different land management systems into one, where crops, animals and trees will be grown together and benefits will be summed up. In the agroforestry system crops will produce food and biomass while trees will produce biomass and animals could use tree shadows as shelters from sun and wind. In the agroforestry system also bio services, for example, behives could be incorporated, to keep agroforestry system more sustainable with higher economically value.

Objectives of the RuralBIOup HUB Latvia

The discussion with stakeholders resulted to the following objective and actions

1. Act as a regional network of stakeholders interested in exploring and implementing circular bioeconomy in the regions
2. Bridge Latvia Region with other EU regions and share good practice within regions
3. Organize networking event and study visits inside region and to other countries
4. Support the enhancement of value chains

Steps to achieve the above indicated objectives

<u>Act as a regional network of stakeholders</u>

- Organize conferences, workshops or seminars focused on circular bioeconomy
    - Workshop focused on funding and project proposal writing – spring 2024
    - Workshops and seminars about bioeconomy topics – spring 2024 to autumn 2025

Building bridges with other EU region

- Organize study visit to the RuralBIOUp project partners and to other countries - spring 2024 to autumn 2025
- Organize conference attendances which are in other countries - spring 2024 to autumn 2025

Organize networking event and study visits inside region and to other countries

- Networking events inside the HUB - spring 2024 to autumn 2025
- Networking events with other HUBS or clusters - spring 2024 to autumn 2025
- Organize study visit to other HUBS and countries - spring 2024 to autumn 2025

Support the enhancement of value chains

- training materials and seminars/webinars dedicated to value chains - spring 2024 to autumn 2025
- Presentations about good practice examples where science meet stakeholders – December 2023.

4.7.7 Communication with Stakeholders

Hereby the following steps are planned:

- INFORMATION SHARING: Latvia HUB Up will share information on the status of the above-mentioned planned activities on the web pages, social medial; through emails or personnel communication
- FEEDBACK: during every event and after every event feedback from stakeholders will be collected and referring on it, action plan and other planning documents will be regularly updated
- COMMUNICATION: Personnel communication and networking events will be planned in advance with close communication with stakeholders.

4.7.8 Long-Term Sustainability Strategies

Ensuring the continuous progress of ongoing initiatives is crucial, including the exploration of inventive solutions applicable to the chosen value chain and providing support to enable regions to harness the knowledge gained.

Discussion of the long-term strategies is planned in the third stage of the project (M30).

4.8 A RuralBioUp hub Action Plan – Centru Regional HUB

4.8.1 Introduction

The Action Plan is not envisaged as a static document, on the contrary it is a managerial tool and therefore an open document that serves multiple purposes: to compare partial results and discussion modifications to reach KPIs. Being a living document, it will be completed along the

way, with the participation in the actions organized within the RuralBioUp project, with appropriate details.

4.8.2 Target Audience and Situation Analysis

Public strategies and policy instruments

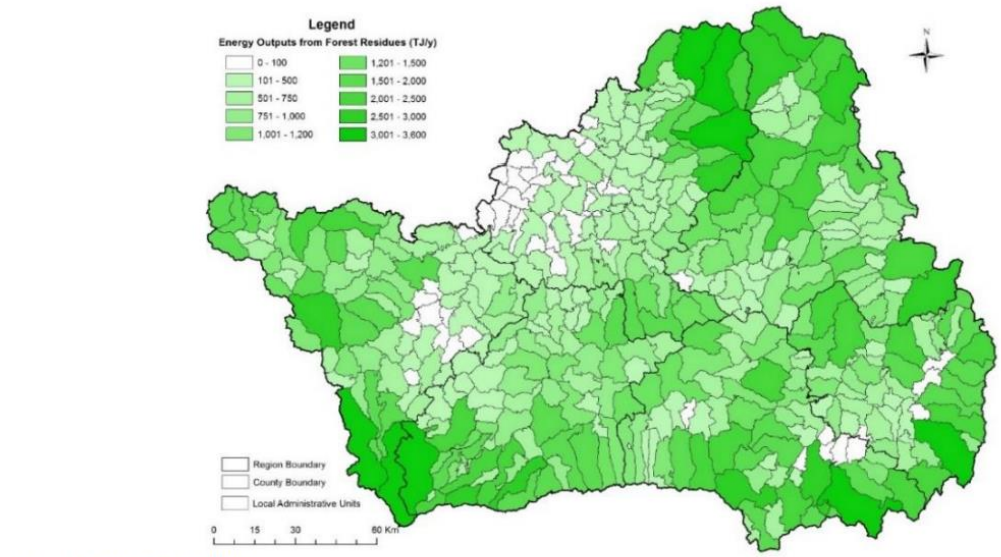
Romania does not have a bioeconomy strategy or a specific regional bio-based industry strategy. Analysis of industrial policies in the country's National Strategy for competitiveness 2014-2020 touches on bioeconomy principles, as do the national proposal for an energy strategy 2016-2030, the 2010 Master Plan for Biomass, and a proposed biomass law currently being discussed in Romania's parliament. Legislators are also preparing a new heating law, which could require up to half of the energy produced (heat) for the domestic / district heating to be obtained from bioenergy sources. The bioeconomy and energy, environment and climate change are among the priorities of Romania's Smart Specialisation Strategy for 2014-2020. Other national policies and strategies relevant for the bioeconomy are:

- National Strategy for Sustainable Development 2030
- National Strategy for Regional Development 2014-2020
- Romania's rural development strategy 2014-2020
- National Rural Development Program 2014-2020
- Romania's Industrial Policy Document (version 2018) involving industrial value chains, innovative clusters, stimulating innovation by investing in new products, services and production facilities in enterprises, energy, resources and energy efficiency to boost competitiveness
- National Waste Management Plan
- National Strategy for Research, Development and Innovation 2014-2020
- The new Regional Innovation Strategies for Smart Specialization –RIS3 · Roadmap for developing a strategy on the circular economy in Romania
- An EU Industrial Policy Strategy: a Vision for 2030 - Council conclusions (adopted on 27/05/2019) · Cluster programmes in Europe and beyond
- Romania's National Rural Development plan 2014-2020 includes funds for investments in farms that can produce and use renewable energy for own consumption or for other economic operators. With so much national and EU level policy focused on bioeconomy-related issues, public subsidies favour this area: projects that apply for public subsidies therefore are more likely to receive them if they include at least partially the topic of bioeconomy, bioenergy production, and utilisation of local bioresources. Regarding the Centru Region there are also some strategic documents which refer to bioeconomy / biomass utilization, such as Smart Specialization Strategy in Centru Region and Regional Development in Centru Region (drafted by Regional Development Agency Centru).

Biomass production and utilization

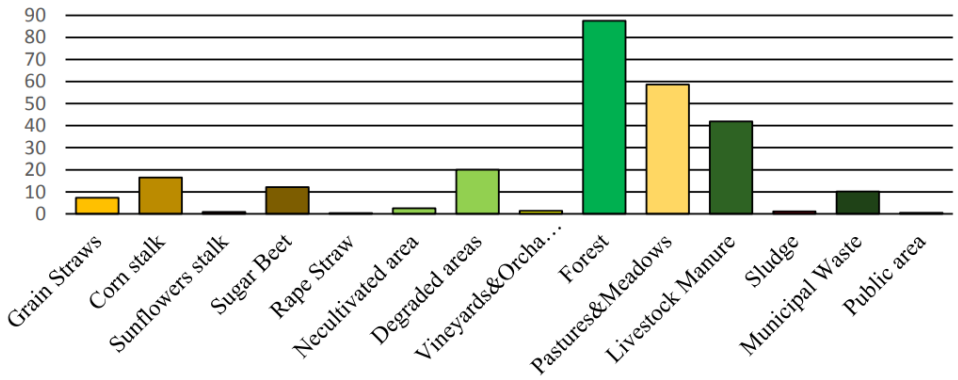
According to local stakeholders, productivity as well as revenue generating potential of the biomass sector could increase if existing bioenergy and waste policies in the region were better

implemented and integrated. Figure 38 illustrates the theoretical energy yields from forest and wood industrial residues for the Centru Region. Figure 39 shows the sources and the potential for integrated biomass energy for the Centru Region. Figure 40 presents the map of energy output from wooden biomass residues, technical biomass to energy potential in the CR. The biggest Romanian biomass CHP Plants are located in Covasna, e.g. 60 MW in Reci where 15 MW electricity and 45 MW thermal energy capacity is installed. Several timber producers have their own wood dryers and use the leftovers from their yard to produce energy.



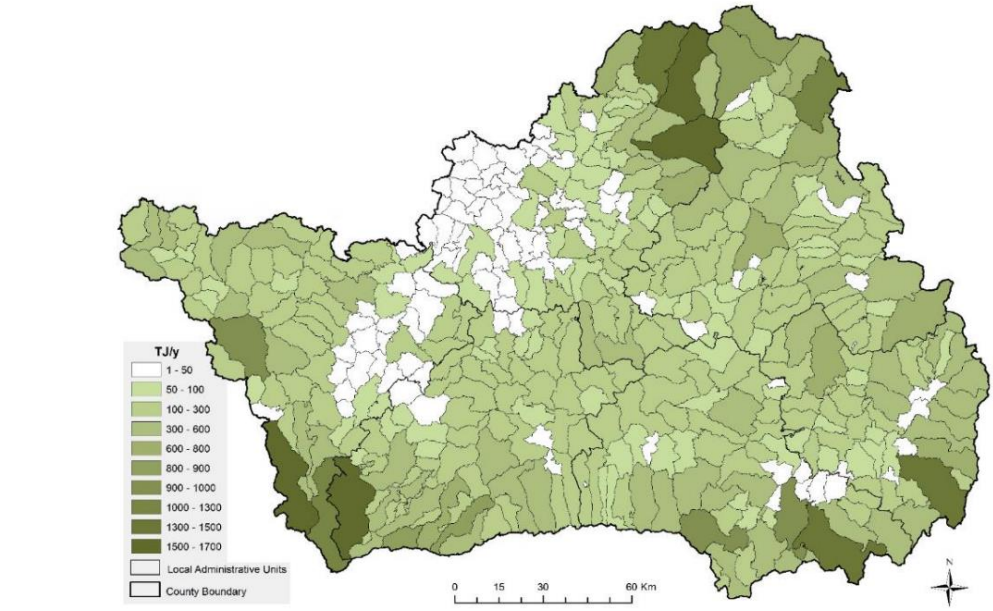
Source: Sebestyén 2019

Figure 38 Theoretical energy yields from Forest and Wood Industrial Residues in Centru Region (TJ/y)



Source: Sebestyén 2019

Figura 39 Integrated biomass energy potential from Centru Region



Source: Sebestyén 2019

Figure 40 Map of energy output from wooden biomass residuals, technical biomass to energy potential in Centru Region

Conclusions from state of the art in the region

The problems of the rural areas in Centru Region are due to lack of investment in basic infrastructure, absence of subsidies, underperforming agriculture, emigration, lack of human capital, insufficient supportive and advisory structures, and a missing overall development vision (Jordan 2016). However, there are good practice examples for the ability to identify opportunities for their development and in promoting a necessary social change. For instance in rural municipalities, represented to a certain extent different approaches, but demonstrated the possibilities that know-how transfer, innovative entrepreneurship, and personal relationships based on trust or friendship had for the development of rural communities exploiting the local human and natural potential (Havadi 2016). While emigration abroad was the main migration trend among young Romanians in the past, recent trends are toward internal migration of young people from rural to urban areas. Most young Romanian people who go to university after they finish high-school settle down in the city where they studied.

Law 199/2000 promotes RES (renewable energy sources) while Law 220/2008 (revised and modified in 2016) introduces a support scheme for renewable energy production in the form of green certificates. No legal restrictions exist regarding the wood waste to energy process. The legislation regarding energy willow plantation has been updated in 2018 to restrict SRCs and maintain arable lands in good conditions.

Given the region's focus on forestry and biomass in the bioeconomy, relevant technologies apply to these areas. Modern boiler technologies at the industrial and household level are being used in Centru Region's many local biomass heating applications, from bakery ovens to office buildings. Machinery for gathering biomass residues, both in urban areas (yard waste) and

forests (branches, waste wood) is expensive and requires maintenance - but makes the residue gathering process much more efficientthan relying on human labour.

The technology transfer in different sectors is provided by the clusters. There are clusters in different sectors such as Green Energy Innovative Biomass Cluster in the field of renewable energy and environmental technologies; the Pro Wood Regional Cluster in field of forest based industry; the AgroFood Regional Cluster in agriculture and food industry; the Transylvania Textile & Fashion Cluster in the field of clothing and fashion; and the Transylvanian Mechanical Engineering Cluster.

The bioeconomy in Centru Region can be developed and expanded due to the large availability of bioresources. Opportunities identified point to the development of a detailed inventory of traditional foods, traditional recipes, agricultural products, bioresources from forest such as mushrooms, berries, mineral waters, etc. and to take into consideration the agricultural by-products for bioenergy production such as biogas and thermal energy production. In order to achieve a well-developed bioeconomy in Centru Region innovation, close collaboration with R&D institutions is essential in the future. This is mainly the mission of the clusters which were established in previous decade.

Conclusions from stakeholder mapping

Collaborative relationships between regional economic actors are intense and have a history; therefore, a number of representatives of the stakeholder categories were informed about the development of the RuralBioUp project, as follows:

Regional Policymakers T1

Regional Development Agency CENTRU
Counties Councils in CENTRU Region
National Mountain Development Agency - from CENTRU Counties

Primary producers - T2

Clusters' producers

Citizens including associations - T3

Foundations in CENTRU Region

KO-FA Association, SMEs' Association in Covasna County ASIMCOV, Breţcu Private Forest Bypass (Ocolul Silvic Privat Breţcu)

Multipliers - T5

CLUSTERO – Romanian Clusters Association

BISNet Transylvania, Services in support of business digitalization, innovation and resilience (Servicii in sprijinul digitalizarii afacerilor, inovatiei si rezilientei), EEN North-West Region and Centru Region

Industries - T6

ASIMCOV

Bio-based industries - T7

Clusters' MEMBERS, from PRO WOOD Cluster, REGIOFA Cluster, TRANSILVANIA FURNITURE CLUSTER Initiative, ARBOR Association Cluster Initiative, Agrofood Cluster, Green Energy Cluster, Transylvania Textile & Fashion Cluster

Researchers / Uni - T8

Institute for Agricultural Economics (IEA), University Brasov - Forestry Faculty, INL - Institutul Naţional de Mobilă (Braşov), Universitatea Lucian Blaga Sibiu, Universitatea Petru Maior Târgu Mures, Universitatea 1 decembrie 1918 Alba Iulia

National /EU policy makers -T9

Ministry of Agriculture and Rural Development, Ministry for Environment, National Mountain Development Agency, Camera de Comert si Industrie Brasov, Agentia de Dezvoltare Durabila Brasov, Centrului de Afaceri, Transfer Tehnologic Si Incubator de afaceri Brasov

Apart from them, the kick-off meeting was also attended by representatives of other institutions from the Centru region, who expressed their interest in RuralBioUp. Along the way, we will signal the expanded component of the HUB CENTRU, apart from a core of specialists, who collaborated with IPE (RF) and in other similar European projects.

4.8.3 Added value for stakeholders

The collaboration between regional actors will benefit from increased opportunities offered by the activities carried out within the RuralBioUp project.

4.8.4 Proposition for stakeholders

The objectives and tasks derived from them can be identified in the following paragraph. As the Action Plan is implemented, they will become more detailed, depending on the specifics of the respective measures.

4.8.5 Implementation part

Stakeholders' reflection of bioeconomy deployment

The economic actors in the CENTRU Region are familiar with the concept of bioeconomy, they traditionally carry out activities that fall within this field.

On the occasion of the kick-off meeting, the relevant actors in the region, knowing the regional potential, expressed their opinions regarding the value chains, which could be improved (see details below).

Value Chains

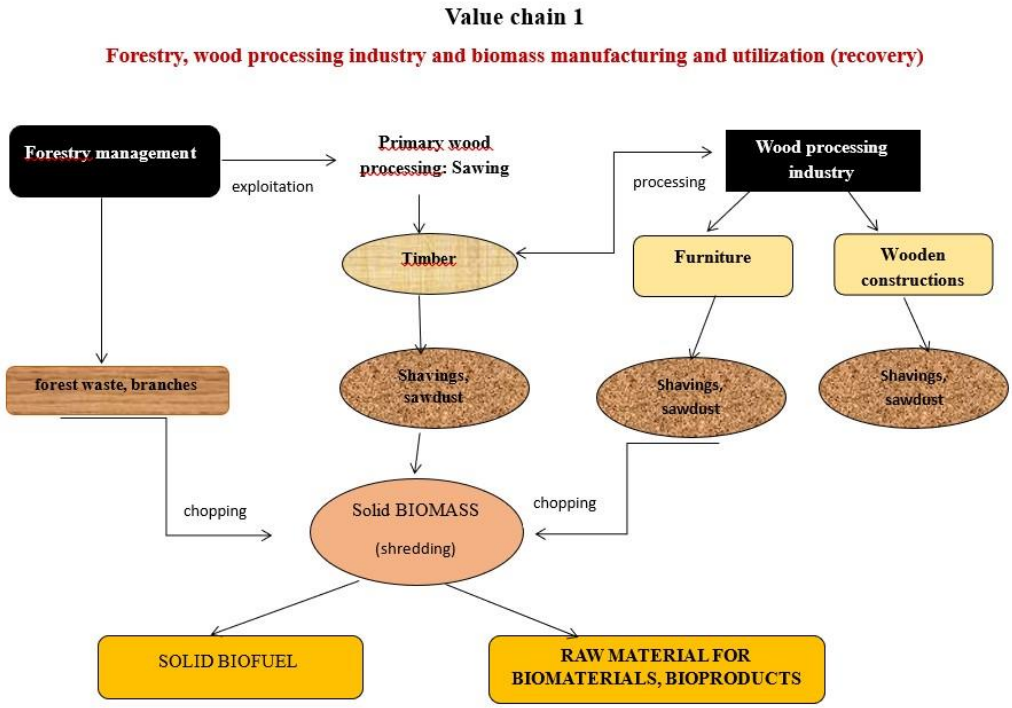


Figure 41 Value chain 1 in Centru region

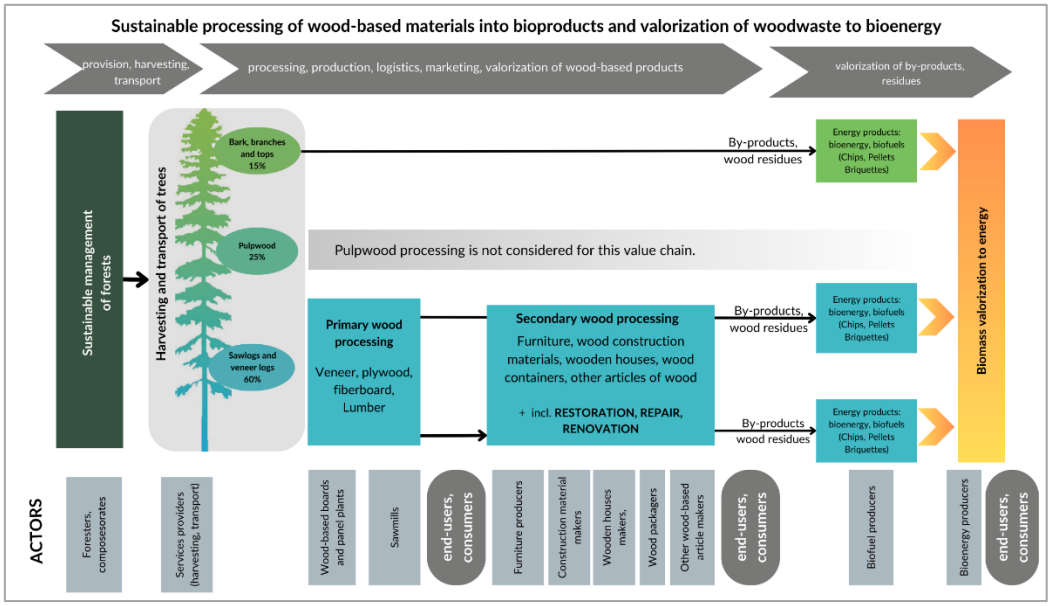


Figure 42 Sustainable processing of wood-based materials into bioproducts and valorization of wood waste to bioenergy

Value chain 2

Valorization of biomass from agricultural (vegetable) waste, agroforestry and the greening of green areas in the countryside

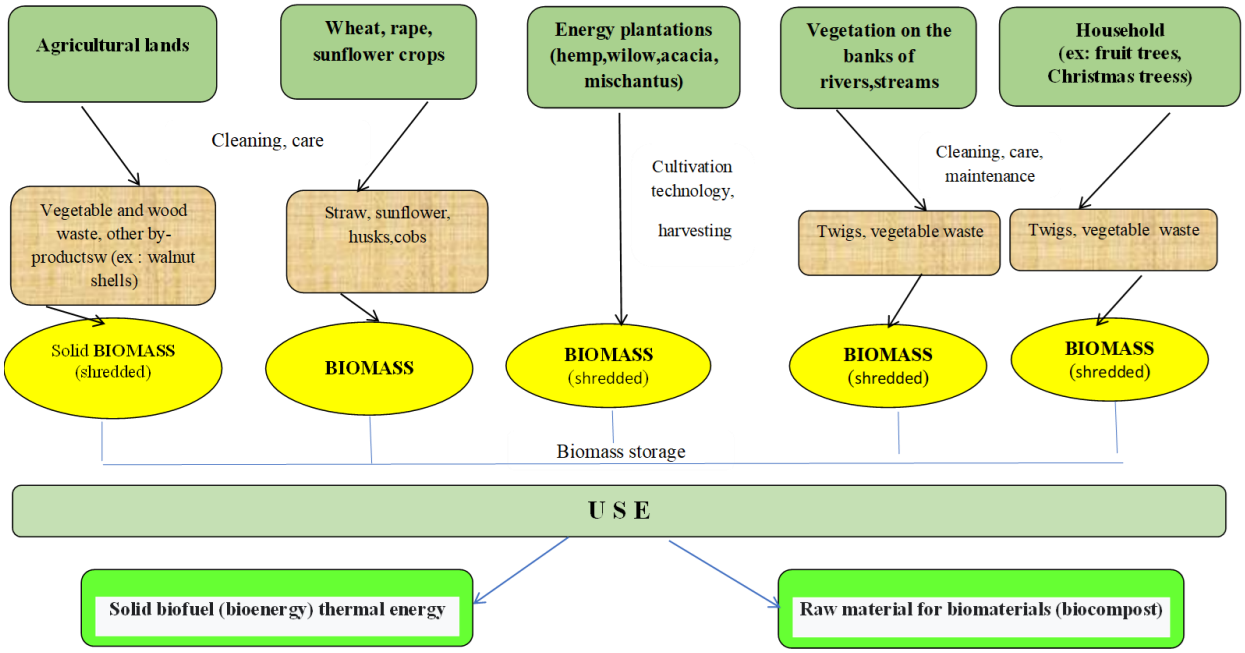


Figure 43 Value chain 2 in Centru region

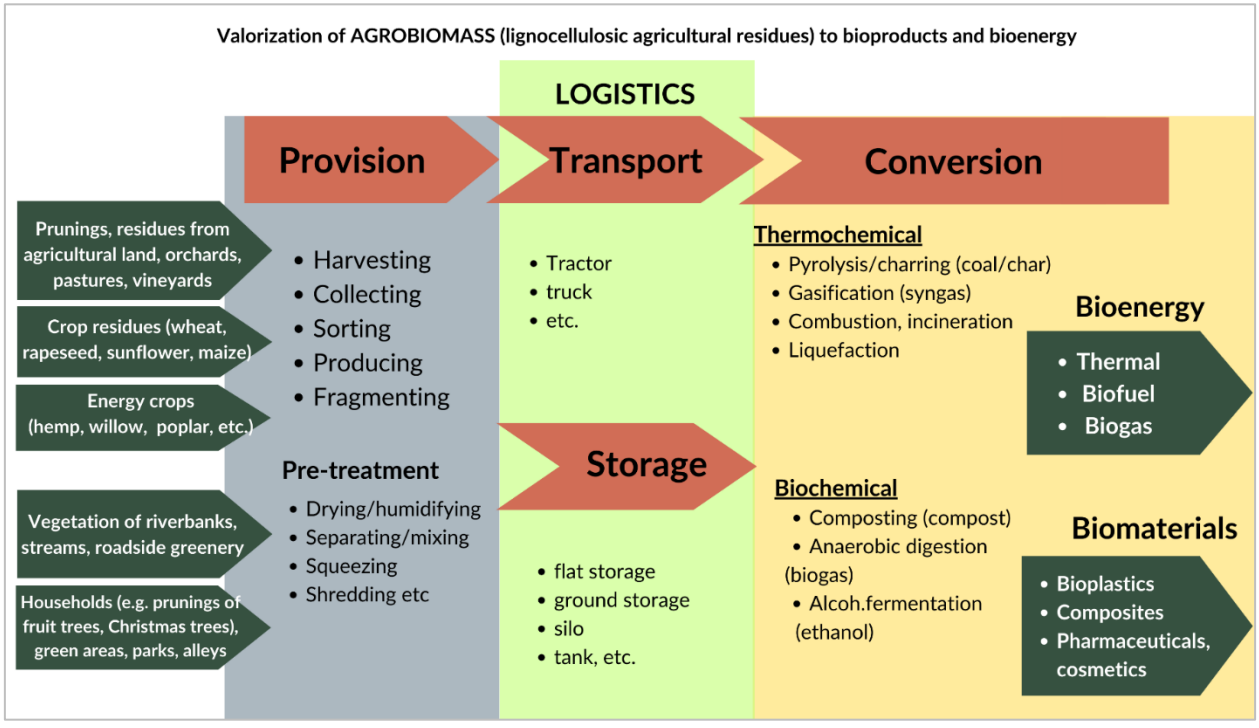


Figure 44 Valorization of agrobiomass to bioproducts and bioenergy

Objectives of the RuralBioUp HUB CENTRU Region

Objectives of the RuralBioUp HUB CENTRU Region for Value chain 1

General objective:

Achieving a sustainable transition towards the use of natural wood materials/products, sustainable management of biological resources, wood resources and the use of renewable energy.

Specific objectives:

- Development of local strategies for sustainable management of forest resources
- The development of sustainable business models, the development of entrepreneurship in the field of wood processing
- Cooperation between actors along the value chain
- Emphasis on safeguarding values, rural wooden constructions: sustainable constructions, circularity and biomaterials
- Safeguarding the heritage built from wooden materials (houses, traditional wooden houses)
- Renovation, reconstruction, rehabilitation, repair
- Promotion of wooden handicrafts, traditional crafts (wooden products, wood residues, etc.)
- Development of research, education and professional training in the field
- Stimulating the development of demand and supply of woody biomass for energy
- Expansion of economic activity and cooperation in the field of wood biomass use
- Developing access to financing for wood biomass use projects
- Improving policies and legislation in the field of biomass.

Objectives of the RuralBioUp HUB CENTRU Region for Value chain 2

General objective:

Achieving a sustainable transition to the use of renewable energy and the sustainable management of agricultural, plant and wood resources.

Specific objectives:

Specific objectives	Detailed specific objectives	Indicator	Period of time	Expected results
Development of local green waste				

management strategies				
Development of technical capacities for harvesting, storage and logistic utilization of agrobiomass for energy purposes				
Encouraging households to collect and manage green waste sustainably.	Launching an awareness and education campaign on household green waste collection and management	I.1. Percentage of households participating in green waste collection. I.2. The total amount of green waste collected (kg/month). I.3. Reducing the amount of waste stored in landfills (kg/month).		R.1. Increasing the rate of green waste collection in households. R.2. Reducing the amount of green waste that ends up in landfills. R.3. Improving the quality of the soil and the environment through proper management of green waste.
	Provision of special containers for green waste in every household.			
	Collaboration with local authorities for the development of an adequate infrastructure for the collection and processing of green waste.			
Establishment of energy plantations (energy willow, poplar, etc. - suitable for the region)				
	- a biomass center where the green residues harvested/collected from public institutions, companies and individuals can be transported and the biomass could be stored and later exploited. - farmers, households, public authorities to deposit the residues resulting from cleaning green spaces,			

	cleaning gardens, green spaces, etc. - households transport and store garden waste, cuttings (lignocellulosic) at the logistics center, free of charge. - Separate storage for other types of agrobiomass (if applicable): walnut shells, sunflower shells, straw, corn cobs, etc.			
Implementing renewable energy sources in public buildings and encouraging the use of biomass for heating.	Creating local partnerships to ensure sustainable supply of biomass.	I.1. Percentage of public buildings with biomass-based boilers installed. I.2. Reduction of energy consumption in public buildings (kWh/year). I.3. Reduction of greenhouse gas emissions in public buildings (tons of CO2/year).		R.1. Efficient use of renewable energy in public buildings, leading to reduced energy consumption and greenhouse gas emissions. R.2. Reduction of heating costs for public buildings and significant savings in local budgets. R.3. Raising awareness in the community about the advantages of using renewable energy and biomass for heating.
	Construction and installation of biomass-based heating systems in rural areas			
	Training local staff in the use and maintenance of biomass boilers.			
	Monitoring and evaluation of energy efficiency and reduction of greenhouse gas emissions in public buildings.			
The inclusion of measures regarding the efficient management of biomass in the strategy of the LAGs	The development of action sheets regarding the financing of value chain development actions at the local level (collection, storage, biomass production and the creation of the heating system, investments in thermal power plants of small	Sheets of measures in the strategy of the LAGs		R.1. Increased community involvement and support in energy and sustainable development initiatives.

	capacity), the implementation of the concept of 1 village 1 MW from biomass.			

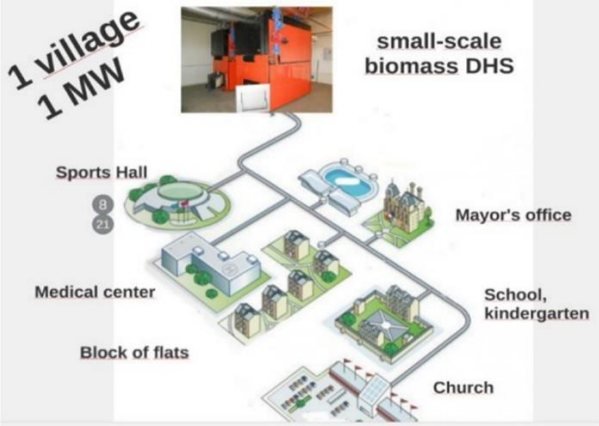


Figure 45 Sustainable communities in CENTRU REGION – ROMANIA, Best practice in bioeconomy (DHS -district heating systems) Source: https://www.biovillmap.ro/en/

Steps to achieve the above indicated objectives – what/when/how/who to do to have SMART goals

SMART goals refer to different training courses, workshops, study visits, webinars, networking events and other collaboration forms. The details will be mentioned depending on their specificities.

Communication with Stakeholders about HUB Action Plan for long time period (plans for future)

Details regarding the forms of communication and the calendar of events are to be established following consultations with the Hub Contact Point and the other stakeholders.

4.9 A RuralBioUp hub Action Plan – Marche Regional HUB

4.9.1 Introduction

With this Action Plan (P.A.) we intend to provide the framework of the activities that the facilitators and the Regional contact point of the Marche Hub (ITABIA and AMAP respectively) will organise in order to support the development of three supply chains (one more than those required by the Project) related to the bioeconomy in the rural area.

From this point of view - starting from a careful analysis of the context and from specific questionnaires addressed to the Hub members - four "Goals" have been established and for each of them "tasks" with a relative timeline, resources and stakeholders to be involved. All this is designed to ensure a S.M.A.R.T. approach, i.e. Specific, Measurable, Achievable, Relevant and Time-bound.
In addition, the following principles were considered for the Action Plan:

a. Environmental Sustainability:
   - Decrease carbon emissions by implementing energy-efficient practices in buildings.
   - Increase recycling rates by implementing a comprehensive recycling program in a community.
   - Promote sustainable transportation options by encouraging the use of public transit and cycling infrastructure.

b. Education:
   - Improve literacy rates by implementing reading intervention programs for elementary school students.
   - Increase access to quality education in rural areas by establishing mobile classrooms or digital learning initiatives.
   - Enhance skills development by implementing vocational training programs for unemployed youth.

c. Economic Development:
   - Increase employment opportunities by supporting entrepreneurship through business incubation programs.
   - Enhance tourism and local economies by developing and promoting cultural and heritage attractions.
   - Improve financial literacy and access to financial services in underserved communities.

d. Social Justice:
   - Promote gender equality by implementing policies to reduce the gender pay gap.
   - Strengthen social inclusion by creating programs

4.9.2 Target Audience and Situation Analysis

Identifies the specific group or individuals the action plan is intended to reach and benefit. Analyzes the current state of affairs, including strengths, weaknesses, opportunities, and threats.

Selected stakeholders

In recent decades, the primary sector in the Marche Region has been affected by structural changes that have generated a diversification of interests linked to agriculture and, more generally, to rural areas, favouring innovation and the involvement of stakeholders. Systems for generating and disseminating innovation and knowledge in the agricultural sector are characterised by a wider range of actors in the production and use of knowledge. The establishment of the Operational Groups, linked to the European Innovation Partnership (EIP) in agriculture stimulates knowledge transfer models based on collaborative approaches and the co-production of innovation. In this context, the Marche region feels the need for new professional figures to support these processes through intermediation and facilitation.

In the rural context, the Marche region feels the need for new professional figures to support the development of the Bioeconomy through intermediation and facilitation.

In relation to the above, this Action Plan is addressed to the following actors:

- Enterprises operating within agricultural and agro-industrial economic chains
- Local research bodies involved in product and/or bioproduct development programmes
- Trade associations able to extend stakeholder involvement and dissemination of the outcomes of the RuralBioUp project
- Public Administrations (managers and technical officials) as a direct reference for local development strategies
- Technical consultants, professional figures of great utility as an interface between governance/research and companies
- Financial advisers, with a view to facilitating access to economic resources useful for developing specific initiatives.

In addition, the Action Plan aims to

- set up a technical table on the bio-economy that, also after the end of this project, would provide advice and collaboration to decision-makers in the Marche region. This initiative would be an excellent legacy of RuralBioUp
- promote within Operational Groups already established with the previous programming period, new innovative projects to be carried out thanks to the activities carried out with the Action Plan.

The selection of the Hub Marche stakeholders was based on an analysis of the best supply chain projects approved in the last 4 years by the Marche Region's Agriculture Department. To this end, the Operational Groups (GOs) of the European Partnership for Innovation in Agricultural Productivity and Sustainability (PEI AGRI), financed through the Regional Rural Development Programmes (RDPs) under sub-measures 16.1 and 16.2, were analysed.

The stakeholders collaborating in the GOs basically consist of agricultural, forestry and agrifood companies, research centres, universities, consultancy organisations, etc.

The selection of the members of the Marche Hub was done in cooperation with AMAP - Agri-Food and Fisheries Innovation Agency 'Marche Agricoltura Pesca', an instrumental body of the Marche Region.

The P.A. will also make use of the competences in the agricultural, agri-food and forestry sector in the Marche region provided by the presence of four universities that play an important role in technology transfer, e.g. the Polytechnic University of Marche has a didactic-experimental agricultural enterprise. Other public research centres also operate in the region, such as the Council for Agricultural Research and Analysis of Agricultural Economics (CREA), various institutes of the National Research Council (CNR), the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), etc.

In the field of education, there are five Higher Technical Institutes (ITS) and vocational institutes with an agricultural focus in the region, and four Higher Technical Institutes (ITS-Academy), postgraduate or post-diploma courses, two of which are in the agri-food sector.

Public strategies and policy instruments

Analyzes the current state of affairs, including strengths, weaknesses, opportunities, and threats.

The Complement for Rural Development (CSR) of the Marche Region can be considered the main strategic reference tool for the agricultural, agro-industrial and territorial system in the programming from 2023 to 2027. The document revolves around five key concepts:

- *Quality and market orientation*: qualify supply chains by modernising production systems and promoting diversification.
- *Sustainability*: safeguarding natural resources (water, soil, air), combating and mitigating climate change, promoting organic production, protecting biodiversity, the agrarian landscape, forests and animal welfare also through the sustainable management of production inputs.
- *Innovation and knowledge*: supporting the competitiveness and sustainability of production sectors in the segments concerning the production, first processing and marketing of agricultural and forestry raw materials
- *Young entrepreneurs*: they can face the new challenges of competitiveness, sustainability and resilience of the agricultural sector with more impetus.
- *Simplification*: facilitate access to resources by making calls for proposals clearer and using all possible tools to simplify the procedural stages.

Other reference instruments of the Marche Region to keep in mind are:

POR FESR 2021-27 – The Regional Programme of the European Regional Development Fund (ERDF PR) 2021-2027 - approved on 25 November 2022 - has a budget of approximately EUR 586 million. The aim is the revitalisation of the economic and social fabric by promoting a sustainable approach to investments in the region.

POR FSE+ 2021-27 - The European Social Fund Plus (ESF+) Regional Programme 2021-2027 - approved on 10 October 2022 - has a budget of EUR 296 million. It finances interventions related to employment, social inclusion, education and training.

PAF 2021-27 – The Prioritised Action Frameworks (PAF) was approved by the Marche Regional Council on 15 November 2021. It has EUR 92, 6 million to implement the EU Natura 2000 network and related green infrastructure.

Strategia Smart Specialitation – Approved by the Marche Region on 13 January 2022 aims to strengthen the production system through innovation and diversification of regional supply chains. For the 'Agrifood System', the research and development trajectories concern: precision agriculture and breeding; packaging; food traceability, safety and quality; circular economy and eco-design; organic and natural products; functional foods; and nutraceutics.

Context and SWOT analysis

Until 2019, the regional GDP grew at annual rates of around 2 per cent to reach EUR 42.6 billion, but then fell sharply by 7.5 per cent in 2020 due to the economic crisis triggered by the pandemic. The regional dynamic does not deviate from the national one. Regional GDP per capita fell in 2020 to around EUR 26,000 (-9% compared to 2019), remaining significantly below the national average of almost EUR 28,000. Employment was also affected by this contraction of the economy in 2020, with a drop of 2.5% at regional level, slightly higher than at national level (-2.1%).

Agricultural employment is bucking the trend, rising from 16 thousand in 2017 to over 20 thousand in 2020. The regional farms surveyed in the latest 2020 Census are about 34 thousand, down by almost 25% compared to the previous survey in 2010 (Italy -30%). The UAA is about 450 thousand hectares, slightly down on 2010 (-3%), slightly higher than the national average change (-2.5%).

The decrease in the number of farms is matched by an increase in the average size from 10.5 hectares in 2010 to 13.5 in 2020. Agriculture in the Marche region shows several critical elements, including the presence of many small farms and the marked specialisation in cereals, which exposes producers to fluctuations in the market prices of raw materials and products. This situation is aggravated by a general weakening of the regional economy following the pandemic crisis and, previously, the earthquake that affected a large portion of the region.

Strengths	
F1.3	Production factors of high quality and healthiness, for the dissemination of low environmental impact production methods
F2.2	Propensity for economic diversification of agricultural and forestry holdings
F2.3	Presence of local and sectorial business systems with marked typicality, quality, sustainability and a good level of technological specialisation
F3.1	High presence of quality production, GI recognitions and organic products
F3.3	Growth of direct processing and use of short marketing channels
Weakness	
D1.1	Lower agricultural income compared to other sectors
D1.2	Smaller farm structures, lower productivity growth and lower farm income than the EU average. Differentiation at territorial and sectoral level and between farms of different sizes
D1.3	Economic weakness of farms in some areas of the territory and some production sectors (e.g. disadvantaged mountain areas)
D1.5	Orographic characteristics of part of the territory (hills, mountains) that reduce agricultural and forestry profitability and lead to the abandonment of advantaged areas
D2.1	Reduced productivity in agriculture and forestry that limits their development
D2.2	Unstable investment trends and insufficient modernisation and innovative investments in agriculture, forestry and processing
D2.3	Operational liquidity problems and low access to credit for investments
D2.4	Lack of knowledge and limited use of financial instruments
D2.5	Low company size and competitiveness for some sectors and enterprises, including the forestry sector
D2.6	Low propensity of some sectors and smaller enterprises to export, with little inclination to aggregate and insufficient diversification of outlet markets

D2.9	Inadequate road infrastructure, particularly secondary roads, with consequent problems of access to agricultural and forestry holdings
D2.10	Poor propensity to introduce innovations, especially for marginal farms, those run by elderly, less professionalised and small entrepreneurs
D3.1	Gap between potential of the territory and actual use of certifications (GI, organic, other volonterie and environmental) in some areas and for some products
D3.2	High fragmentation of supply and lack of vertical and supply chain relations
D3.4	Inadequate agricultural product valorisation and processing capacity in some areas and sectors
D3.5	Individualism, poor dissemination of innovative aggregation tools (supply chain contracts, framework agreements, enterprise networks, etc.) in some territories
D3.7	Unequal distribution of added value along the supply chain and inadequate remuneration for basic products, also in quality certification systems
Opportunities	
O1.1	Segmentation and qualification of supply in response to emerging consumer and community needs
O1.2	Evolving Community policies and actions to support against income fluctuations
O2.2	New possible sales channels and increasing consumer attention for quality and traceable or environmentally certified agricultural and forestry products
O2.3	Technological development towards environmentally friendly agricultural and forestry processes and increased environmental and animal welfare awareness
O3.1	Increased consumer attention towards short marketing channels (including online)
O3.3	Growing consumer awareness of origin, traceability and sustainable production methods
O3.5	Information tools and actions to increase market transparency along the supply chain and reduction of unfair practices
Threats	
M1.1	Increasing climatic and meteorological risks and the emergence of health problems such as plant diseases and epizootics
M1.2	Fluctuating prices of agricultural and forestry products, energy raw materials and other inputs with unstable terms of trade
M1.5	Marginalisation of agriculture in the economy and increased infrastructure/urbanisation, competition in land use
M1.7	Negative effects on the economic system and health emergencies (e.g. corona viruses, health shocks, etc.)
M2.1	Italian context of low economic growth
M2.3	Increase in global competition and protectionist practices
M2.4	Increased market risks, economic shocks and extreme climatic events
M3.1	High international competition for certain productions (especially commodities)
M3.2	Inefficiency of organisational and logistical structures in the territories (e.g. viability, transport, connections, platforms, etc.)

Table 34 SWOT analysis of the Marche agricultural sector (extrapolation from national analysis)

Biomass production and utilization

For any production chain, raw material procurement plans are very important. These are necessary to ensure adequate quantity, quality and cost standards for economic sustainability. This is particularly true in the bio-economy sector where competition with production based on

the use of fossil sources, which are much cheaper than renewable raw materials, requires the utmost care in containing purchasing and transport costs. With this in mind, it is of paramount importance to know the availability of residual biomasses in the local area. For this reason, a very important area of the ***RURAL SPOT*** tool concerns the database on the potential of biomass theoretically available in most European countries. This information is a valuable legacy of the H2020 "Enabling" Project to which ITABIA has provided a valuable contribution for the Italian national context with a regional level detail. The table below shows the data concerning the Marche Region.

SNo	Feedstock	Cultivated Area (Hectare)[25]	Wet_Yield (Tonnes / Hectare)	Arisings (Wet Tonnes)	Traditional End Use
1	Durum wheat (straw)	109.785	2	219.570	Cattle breeding
2	Sunflower	43.654	4	174.616	Burying in land
3	Corn (corn stalk)	5.172	10	49.134	Cattle breeding
4	Vineyard	15.668	3	43.870	Burning out,Energy
5	Barley (straw)	15.780	2	37.872	Cattle breeding
6	Soft wheat (straw)	13.295	2	27.920	Cattle breeding
7	Sorghum	2.018	12	24.216	Cattle breeding
8	Olive (pruning)	9.801	2	21.562	Burning out,Energy
9	Broad bean	5.175	2	11.903	Burying in land
10	Chickpea	3.254	2	7.484	Burying in land
11	Oat (straw)	4.017	2	7.231	
12	Pea	2.954	2	6.794	Burying in land
13	Lentil	903	2	2.077	Burying in land
14	Peaches	774	3	2.012	Burning out
15	Soy	478	4	1.721	Burying in land
16	Potatoes	154	6	939	Burying in land
17	Plum Tree	218	2	436	Burning out
18	Apricot tree	171	2	342	Burning out
19	Apple Tree	193	2	309	Burning out
20	Cherry Tree	80	2	160	Burning out
21	Kiwi	62	2	124	Burning out
22	Pear Tree	58	2	87	Burning out
23	Beans	28	2	64	Burying in land
24	Rape (Brassica napus+ B.rapa subsp. Oleifera)	547	-	-	Burying in land
25	Hemp	45	-	-	Burying in land

Table 35 Biomass availability in the Marche region

[25] Data are referred to the biomass database of Enabling Project (2017 – 2020)

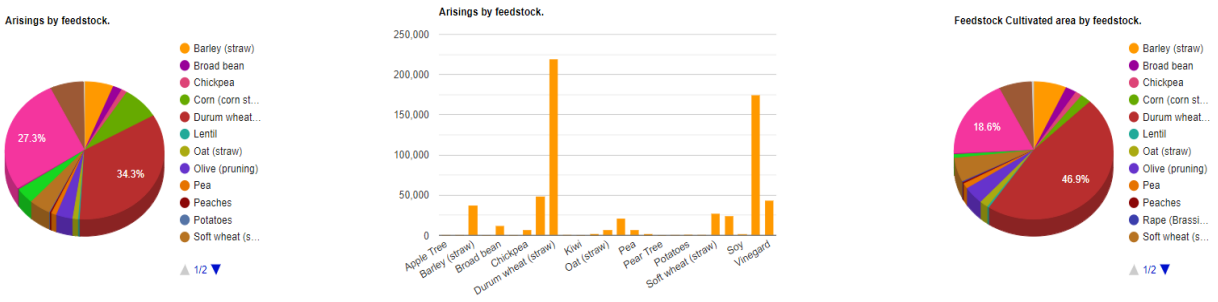


Figure 46 Enabling Biomass Platform, 2020 "Biomass feedstock in the Marche Region" - Errata corrige: vinegar becomes vineyard (in the graph in the center)

As it can be seen from the table and related graphic elaboration, in the Marche Region there are considerable quantities of lignocellulosic biomass - mostly wheat straw and other residues of annual herbaceous crops and to a lesser extent prunings of olive trees and orchards which are used only in part (for straw as bedding on farms) or simply buried or burned directly in the field.

Consequently, the most promising technologies for the use of these biomasses are different depending on their nature, also taking into account the existing situation in terms of number and location of conversion plants.

As regards in particular the production of electricity from renewable sources, in 2021, 66 plants classified as "bioenergy" were operating in the regional territory (Source: GSE - Atlaimpianti, 2023). These are almost exclusively biogas plants (47) of medium-small size (< 1 $MW_{el.}$), bioliquid plants (14 small plants with a power of a few hundred $kW_{el.}$, generally fueled with pure vegetable oils) and minimally (5) very small plants (power around 100 $kW_{el.}$ or less) using woody biomass coming from forestry maintenance operations - which also represents an important potential source of biomass in the Region, as it covers 33% of the entire regional surface area (Source: INFC 2015, 2021) - or other sources.

The contribution of solid biomass to the production of heat is more significant, in particular as direct consumption for domestic heating, which, again in 2021, was equal to 7,877 TJ, corresponding to 2,188 GWh of thermal energy. At the same date, there were no district heating systems powered by biomass or other renewable sources in operation in the regional territory.

The scarcity and small size of the plants currently in operation for the production of energy (electrical and/or thermal) from woody biomass - for which there is, however, a relatively large market on a regional scale - leads us to consider them realistically feasible, in light of the potential availability of biomass from the forestry sector, territorial forest-wood-energy chains based on the creation of "logistic platforms" for the collection, conditioning and transport to an industrial user (conversion plant or for the production of wood chips or pellets, on the regional territory or in neighboring regions) of the biomass resulting from forest management operations, which could also receive and process that resulting from the pruning of olive groves, vineyards and orchards.

Wastes and residues from horticultural or fruit crops can instead be used as a priority to feed biogas plants - which already happens in many cases - in co-digestion with manure and sewage from livestock farms, processing residues from the agri-food industries and crops energy.

A separate discussion must be made however for the residues (straw, stalks, etc.) of cereal and oilseed crops, which in the current state of technology do not easily lend themselves to use as raw materials for the production of electricity and/or heat in plants. conventional combustion mainly due to the high silica content, although there are some examples of power plants (in Italy in Sant'Agata di Puglia) or straw-fueled district heating networks (Poland). Furthermore, these biomasses cannot be used as substrates for the production of biogas or biomethane unless they are subjected to specific pre-treatments (mechanical, thermal or chemical) which increase their "digestibility" by the microorganisms responsible for the anaerobic digestion process, as happens for example in a plant operating in the nearby region of Emilia-Romagna (Azienda Agricola Leona, Codigoro) which produces 3 million cubic meters / year of biomethane using exclusively cereal straw subjected to a "steam explosion" pre-treatment.

This difficulty in using straw for energy purposes is probably one of the reasons why they remain largely unused, but it is also a strong incentive to find alternative solutions - even in the non-energy sector - with a high content of technological innovation, verifying the possibility of replicating on the regional territory the examples of "good practices" identified in other national and international contexts.

Conclusions from state of the art in the region

The regional bioeconomy development strategy identifies "process construction" through the involvement of stakeholders and the creation of synergies.

An effective governance framework requires the development of the necessary policies, incentives, laws and plans through multi-actor and multi-sectoral approaches that take full account of all relevant economic, social and environmental dimensions. The Region identifies a limited number of strategic choices capable of encompassing all dimensions of sustainable development with an interdisciplinary and participatory approach.

Furthermore, the development of the AKIS (Agricultural Knowledge and Innovation System) is important to promote knowledge, innovation and digitalisation in the agricultural sector and rural areas. Achieving the modernization of the sector serves to create jobs and effectively address environmental challenges.

The CSR of the Marche intends to enhance the AKIS with the following interventions:

- SRH01 - Provision of consultancy services,
- SRH02 - Consultant training;
- SRH03 - Training of agricultural entrepreneurs, employees of companies operating in the agriculture, livestock, food industries, and other private and public entities functional to the development of rural areas;
- SRH04 - Information actions;
- SRH06 - Back office services for AKIS.

Furthermore, with reference to the specific theme of support for innovation and its transfer, it has activated:

- SRG01- Support for the PEI AGRI Operational Groups
- SRG08 - Support for pilot and innovation testing actions

The AKIS interventions of the CSR will be strengthened with the actions promoted by other policies, funds and programs, and the synergy with the RuralBioUp Project through this same Action Plan appears to be a coherent opportunity.

Conclusions from stakeholder mapping

At the current stage, the HUB Marche is composed of approximately 70 actors, of which 1 Facilitator (ITABIA - 7 people); 1 Hub Contact Point (AMAP - 3 people); 2 Public Administrations; 53 Companies/Sector Associations (many active in Operational Groups); 3 Research Organisations; 4 Farmer consultants.. Over the years, the Marches Hub will develop great potential for exchanging information, learning from each other, building new connections.

Ideas to DESIGN OUTREACH ACTIVITIES to reach, inform, involve the stakeholder group
Organise periodic meetings (face-to-face or online); facilitate the use of the "Rural Spot" tool (coaching users); support the development of new projects; stimulate the creation of stakeholder networks on specific supply chains (the first steps have already been taken); carry out study visits (the first visit to the agricultural consortium of Jesi was carried out), awareness-raising events (workshops, webinars, brochures, etc.), training-coaching (lectures, meetings, videos, etc.); exchange of good practices (data sheets, videos, etc.); creation of a permanent regional table on the bioeconomy.), training-coaching (lectures, meetings, etc.); exchange of good practices (fact sheets, videos, etc.); creation of a permanent regional table on the bioeconomy.

STAKEHOLDER GROUP	**Indicate ALL INSTITUTIONS you have mapped so far** (please also indicate if they are in the hub CORE TEAM[1] or have some other specific role in the hub)	**Reason for stakeholder selection**
policy/ administration	Regione Marche - Giunta Regionale - Servizio Industria Artigianato Istruzione Formazione e Lavoro	Officials and managers with whom SPRING already works
	Regione Marche /Sviluppo Europa arche s.r.l. (SVEM s.r.l)	Officials and managers with whom SPRING already works
	Regione Marche/AMAP	Hub contact point: officials and managers involved from the outset of the project through previous knowledge of other European projects in which Itabia had collaborated
private sector/ business	Confagricoltura	Itabia has been working for years with the national managers of this trade association
	Coldiretti	Itabia has been working for years with the national managers of this trade association
	CIA	Itabia has been working for years with the national managers of this trade association

	Legacoop	Itabia has been working for years with the national managers of this trade association
	Consorzio Italiano Compostatori	Itabia has been working for years with the national managers of these trade associations
	Consorzio Italiano Biogas e Biometano	Itabia has been working for years with the national managers of this trade association
	SOCIETA' AGRICOLA MONTE MONACO S.r.l.	Itabia has been working for years with the managers of this company
	Azienda Agraria Trionfi Honorati	Itabia has been working for years with the national managers of thi company. The company is, also, the leader of an EIP AGRI Operational Group (GO RECAGRI) selected together with AMAP
	La Campana Soc. Coop. Agricola	the company is a partner in an Operational Group of the EIP AGRI (GO RECAGRI) selected together with AMAP
	Azienda Agricola Bezzi Luisa	the company is a partner in an Operational Group of the EIP AGRI (GO RECAGRI) selected together with AMAP
	Spapperi N.T. s.r.l.	the company is a partner in an Operational Group of the EIP AGRI (GO RECAGRI) selected together with AMAP
	DIENPI SRL	the company is a partner in an Operational Group of the EIP AGRI (GO RECAGRI) selected together with AMAP
	Antica Stamperia Carpegna	the company is a partner in an Operational Group of the EIP AGRI (GO RECAGRI) selected together with AMAP
	ESISTAMPI SRL	the company is a partner in an Operational Group of the EIP AGRI (GO RECAGRI) selected together with AMAP
	COOP Canapa	the company is the leader of an EIP AGRI Operational Group (GO Hemp Revolution) selected together with AMAP
	Societa' Agricola 4c	the company is a partner of an EIP AGRI Operational Group (GO Hemp Revolution) selected together with AMAP
	Societa' Agricola Vallesina S.s.	the company is a partner of an EIP AGRI Operational Group (GO Hemp Revolution) selected together with AMAP
	Societa' Agricola La Visciola S.s.	the company is a partner of an EIP AGRI Operational Group (GO Hemp Revolution) selected together with AMAP
	Societa' Agricola La Montagna Ss	the company is a partner of an EIP AGRI Operational Group (GO Hemp Revolution) selected together with AMAP
	La Biologica Soc. Coop. Agricola	the company is the leader of an EIP AGRI Operational Group (GO BHS) selected together with AMAP
	La Biologica Project S.r.l.	the company is a partner of an Operational Group of the EIP AGRI (GO BHS) selected together with AMAP
	AMAP - Agenzia per l'Innovazione nel Settore Agroalimentare e della Pesca "Marche Agricoltura Pesca"	the company is a partner of an Operational Group of the EIP AGRI (GO BHS) selected together with AMAP

	SAF Marche - Società Agricola Forestale di gestione dei beni agro-silvopastorali delle Marche	the company is the leader of an Operating Group of the EIP AGRI (GO CO2 S.Fo.Ma) selected together with AMAP
	SAF Tronto - Società Agricola Forestale di gestione dei beni agro-silvopastorali del Tronto	the company is partner of an EIP AGRI Operational Group (GO CO2 S.Fo.Ma) selected together with AMAP
	SAF Monti Azzurri - Società Agricola Forestale di gestione dei beni agro-silvopastorali dei Monti Azzurri	the company is partner of an EIP AGRI Operational Group (GO CO2 S.Fo.Ma) selected together with AMAP
	Consorzio Marche Verdi Soc.coop.Agr.For (CMV)	the company is partner of an EIP AGRI Operational Group (GO CO2 S.Fo.Ma) selected together with AMAP
	Pro.Mo.Ter.Soc.Coop (Promoter)	the company is partner of an EIP AGRI Operational Group (GO CO2 S.Fo.Ma) selected together with AMAP
	DREAM Italia scrl	the company is partner of an EIP AGRI Operational Group (GO CO2 S.Fo.Ma) selected together with AMAP
	PEFC Italia	the company is partner of an EIP AGRI Operational Group (GO CO2 S.Fo.Ma) selected together with AMAP
	Molini e Pastifici 1875	the company is the leader of an EIP AGRI Operational Group (GO RICREA) selected together with AMAP
	Azienda agricola La Quarta	the company is partner of an EIP AGRI Operational Group (GO RICREA) selected together with the AMAP
	Umani Ronchi	the company is partner of an EIP AGRI Operational Group (GO RICREA) selected together with the AMAP
	Conca d'Oro Bio Società Semplice Agricola	the company is partner of an EIP AGRI Operational Group (GO RICREA) selected together with the AMAP
	Vie en.ro.se. Ingegneria s.r.l.	the company is partner of an EIP AGRI Operational Group (GO RICREA) selected together with the AMAP
	La Biologica Soc. Coop. Agricola	the company is the leader of an EIP AGRI Operational Group (GO B.A.S. - BioAcornScape) selected together with AMAP
	Società Agricola La Marca Di Scagnetti Francesco E C. Soc. Semplice	the company is partner of an EIP AGRI Operational Group (GO B.A.S. - BioAcornScape) selected together with AMAP
	L.A.B. di Bellisi Luigi	the company is partner of an EIP AGRI Operational Group (GO B.A.S. - BioAcornScape) selected together with AMAP
	ALMA FOOD	the company is partner of an EIP AGRI Operational Group (GO B.A.S. - BioAcornScape) selected together with AMAP
	Consorzio Forestale Alto Cesano	the company is the leader of an EIP AGRI Operational Group (GO 4WOOD) selected together with AMAP
	Fondazione MEDIT SILVA (progettista	the company is a partner of an EIP AGRI (GO 4WOOD) Operational Group selected together with AMAP
	Comunanza Agraria Di Serra Sant'abbondio	the company is a partner of an EIP AGRI (GO 4WOOD) Operational Group selected together with AMAP

	Lu.Ce. Srl	the company is a partner of an EIP AGRI (GO 4WOOD) Operational Group selected together with AMAP
	Impresa Verde Marche	the company is a partner of an EIP AGRI (GO 4WOOD) Operational Group selected together with AMAP
	Gastreghini Srl	the company is the leader of an Operating Group of the EIP AGRI (GO VA.S.O.) selected together with AMAP
	Corradini Sas	the company is partner of an EIP AGRI (GO VA.S.O.) Operational Group selected together with AMAP
	Azienda Agricola Corradini Corrado	the company is partner of an EIP AGRI (GO VA.S.O.) Operational Group selected together with AMAP
	Caseificio Il Faro sas	the company is partner of an EIP AGRI (GO VA.S.O.) Operational Group selected together with AMAP
	Azienda Agricola Grestini Maria Luisa	the company is the leader of an Operating Group of the EIP AGRI (GO BEEFLOWER) selected together with AMAP
	Coltivatori ortofrutticoli Valli delle Marche	the company is the leader of an Operating Group of the EIP AGRI (GO INNOVAFOOD) selected together with AMAP
	Gastreghini Srl	the company is a partner in an EIP AGRI (GO INNOVAFOOD) Operational Group selected together with AMAP
	Organizzazione Regionale Trasformatori Orticoli Verde Soc. Consortile Agricola	the company is a partner in an EIP AGRI (GO INNOVAFOOD) Operational Group selected together with AMAP
	Cooperativa Gino Girolomoni	Itabia has been working for years with the managers of this company
	Diansen (azienda B-Corp)	
Research and innovation	Università Politecnica delle Marche, UNIVPM	Itabia has been working for years with many professors of this University
	Università di Camerino, UNICAM	Itabia has been working for years with the many professors of this University
	Istituto Tecnico Tecnologico G e M Montani di Fermo	Itabia has been working for years with a teacher of this technical institute
Farmer Consultant and Civil Society	EUROPE DIRECT	Itabia has been working for years with this company
	Vittorio Merli:	consultant indicated by AMAP
	Amleto Fioretti:	consultant indicated by AMAP
	Eleonora Pettinari	consultant indicated by AMAP
	Legambiente Marche	Itabia has been working for years with the many professors of this association

Table 36 Marche Hub Stakeholders (December 2023)

Overall Summary

Education and R&D

In the Marche there are four universities that offer degree courses relating to the rural development sector, also carrying out an important function of technological transfer while maintaining the relationship with the regional entrepreneurial and institutional fabric.

Furthermore, the department of Agricultural, Food and Environmental Sciences of the Polytechnic University of Marche has an educational-experimental agricultural company. As regards research, in addition to the Universities, public research centers operate in the regional territory, including the Council for Research in Agriculture and the Analysis of Agricultural Economics - CREA, the institute for research and care on active aging INRCA, as well as some offices of institutes of the National Research Council - CNR and ENEA - the National Agency for new technologies, energy and sustainable economic development.

Funding

In the Marche region, public funding (16.3 million euros) has generated 58 Operational Groups with approximately 390 partners involved. These GOs will help increase knowledge on innovation and agriculture across the region. Other calls related to the development of the circular bioeconomy are present in the region.

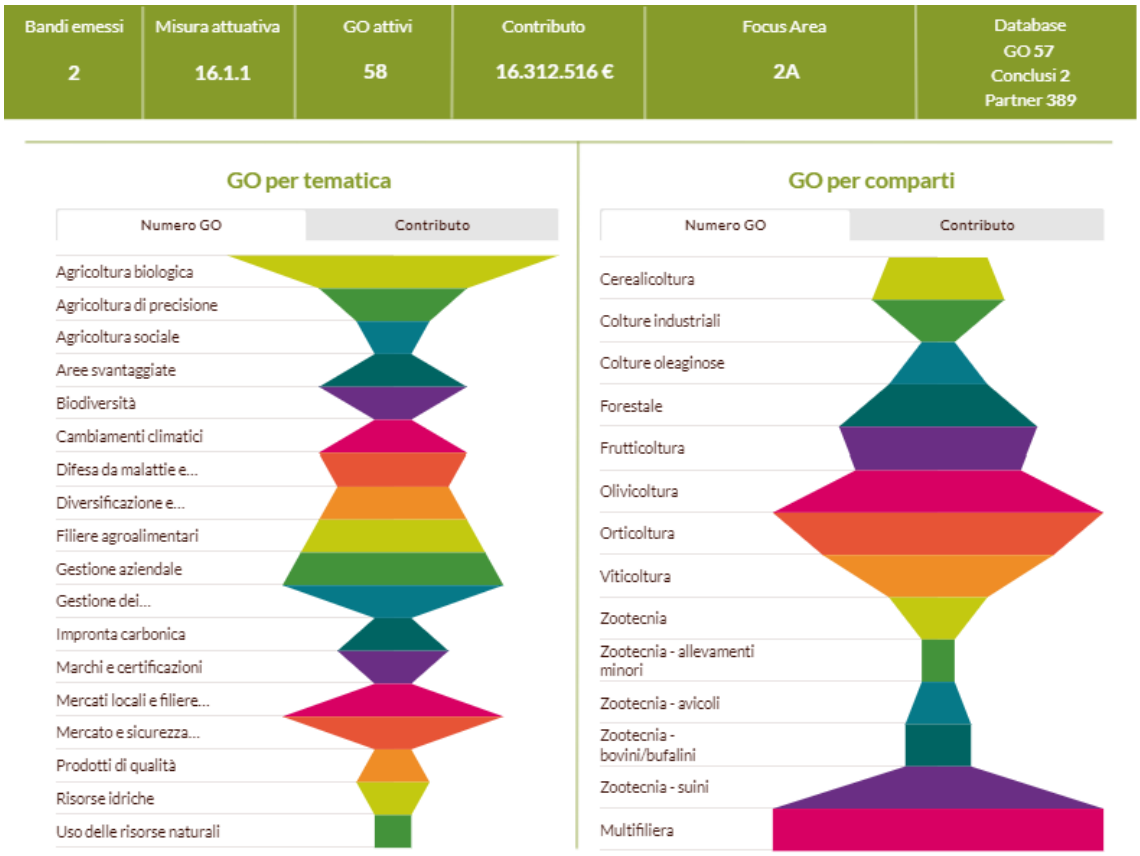


Figure 47 Active Operational Groups[26]

Networks

[26] https://group.intesasanpaolo.com/it/sala-stampa/comunicati-stampa/2023/12/i-distretti-industriali-punti-di-forza-dell-economia-delle-march

The Cluster Marche Foundation represents the technological clusters of the Marche region. It is an alliance of over 180 organizations including businesses, universities, research bodies and trade associations, which works to enhance innovation through the development of collaborative research and technology transfer activities. The Foundation is a multidisciplinary organisation, an open and inclusive network, a community of regional value representative of the thematic areas of reference. It works with a bottom-up approach by gathering the needs of the territory, providing analysis, evaluations and technological scouting, through the activation of extended chains of cooperation between territories, trans-sectoral and international.

There are also numerous industrial districts which confirm the high competitiveness, resilience and ability to create value of the district areas in the region. The strength of the Marche region lies in its manufacturing vocation, in the districts and in the supply chain relationships, where the synergy between large and small companies and the shortening of supply chains generate high quality and great competitive capacity, with an approach attentive to ESG objectives (Environmental, Social and Governance).

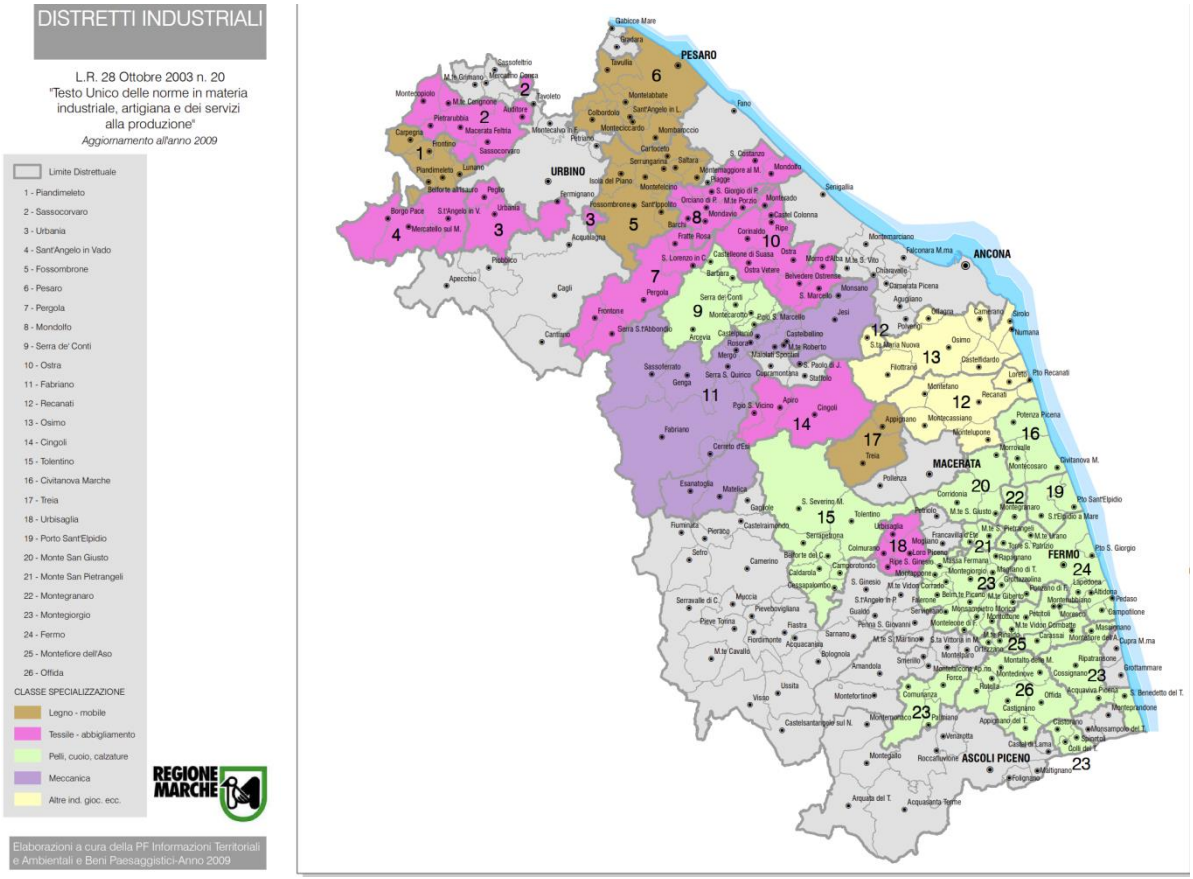


Figure 48 Industrial districts[27]

[27] https://www.regione.marche.it/Portals/0/Paesaggio_Territorio_Urbanistica/Cartografia/AmbitiAmministrativi/07_Distretti_Industriali.pdf?ver=2011-06-30-092256-017)

4.9.3 Added value for stakeholders

The SWOT analysis of the agricultural sector also concerns the bioeconomy supply chains in the Marche and will be an important reference in the construction of this Action Plan.

Added value proposition and tailored made for key stakeholder groups:

For the creation of the Marche Hub we were inspired by the logic of the GOs and we drew a good part of the Hub's stakeholders from the most efficient ones. GOs are in fact temporary partnerships, made up of local stakeholders such as farmers, researchers, consultants, entrepreneurs in the agri-food sector. They therefore represent a target capable of grasping innovation in a short time.
Based on this analogy, the Marche Hub is made up of professional categories differentiated by experience and sphere of interests, from each of which the opportunities indicated in summary below will arise:

Policy/administration

- Cooperation for the planning and implementation of initiatives for the development of the bioeconomy in collaboration with the regional technical managers of the AMAP agency;
- Strengthen collaboration between officials of the various departments of the Marche region on transversal bioeconomy issues;
- Establish a connection between the agriculture departments and research bodies associated with them of the three Italian regions (Marche, Puglia and Lombardy) where the regional RuralBioUp hubs have arisen;
- promote good practices and provide comparative analyzes with other national regions and other project HUBs;
- Organize study and training visits.

Research and innovation

- Support for the diffusion of innovation resulting from research (dissemination);
- Facilitate dialogue between researchers and businesses (needs and solutions)
- Raising awareness of available tools and good practices;
- Participation in training within projects where the research institutions are partners.

Private sector/business

- Knowledge of local issues;
- Knowledge transfer (best practices technical visits);
- Training targets.

Education community

- Knowledge and management of local problems;
- Relaunch the figure of the consultant as a reference and trusted expert for agricultural companies;
- Training targets

Civil society

- Selection of stakeholders interested in topics relating to innovation and corporate multifunctionality;
- Opportunity for comparison and exchange of experiences;
- Possibility of establishing networking for new innovative projects.

4.9.4 Proposition for stakeholders

(Defines the goals and objectives of the action plan, outlining what will be achieved. Outlines the strategies and tactics to be implemented to achieve the set goals and objectives).

To guide this action plan, ITABIA - after having established the Marche Regional Hub - organized two meetings (Kick-off meetings) with the stakeholders, the first on a remote telematic platform (6 July 2023), the other in presence in Osimo at the AMAP headquarters (6 December 2023). As preparatory work before the KoM, based on the above analysis, together with AMAP, the priority objectives of the Marche HUB were identified to be discussed with the stakeholders. To this end, co-creation techniques were used, including a questionnaire created in person.

Objectives

The main objectives of the Hub emerged through a cocreation process conducted during the first online meeting (6 July 2023) between ITABIA, AMAP and 21 stakeholders who attended. On this occasion, a questionnaire was administered with the mentimeter program which allowed for immediate results. The outcome of the questionnaire was the subject of in-depth analysis and conclusions.

Below are the questions asked in the questionnaire and the related answers; those that aroused the greatest interest are highlighted in red.

Questionnaire (Mentimeter)

1. *Indicate your professional field*
   a) Agricultural enterprise (4)
   b) Forestry enterprise (0)
   c) Agro-industrial enterprise
   d) Sector associationism (5)
   e) Scientific research (7)
   f) Public administration (3)
   g) Technical consultancy (2)
   h) Finance (0)
   i) Other (specify)

2. *Indicate your sphere of interest (max 3 options)*
   a) Agricultural crops and floriculture (5)
   b) Food production and animal husbandry (8)
   c) Cosmetics/nutraceuticals/healthcare (3)
   d) Biorefineries (multiple products from biomass, extraction of active molecules) (8)

e) Bioconstruction and biomaterials (3)
f) Technical means for agriculture (biopesticides, biofertilisers, biochar) (4)
g) Textiles (clothing, furniture, technical textiles) (1)
h) Active molecule extraction (0)
i) Bioenergy (10)
j) Information/training (8)
k) Experimentation/innovation/technology transfer (12)
l) Corporate finance (1)
m) Other (specify)

3. *What are the opportunities related to the bioeconomy (max 3 options)*
   a) Ecological transition (more sustainable products) (15)
   b) New qualified employment (3)
   c) Social inclusion (3)
   d) New forms of income (5)
   e) Efficiency of production cycles (6)
   f) Short supply chains - valorisation of local renewable resources (14)
   g) Territorial development (6)
   h) Farm productive diversification (9)
   i) Public incentives (1)
   j) Innovation (8)
   k) Other (specify)

4. *What are the obstacles to the development of the bioeconomy (max 3 options)*
   a) Technological shortages (7)
   b) Shortage of (public) technical advice (7)
   c) Enterprise risk (4)
   d) Limited experience (12)
   e) Social acceptance (3)
   f) Weight of bureaucracy (14)
   g) Access to finance (2)
   h) Fragmentation of administrative competencies (4)
   i) Regulatory limitations (shortcomings and cumbersomeness) (11)
   j) Lack of cohesion between enterprises (5)
   k) Other (specify)

5. *What do you propose to strengthen the opportunity?*
   Free answer (one keyword)

   Information, training, collaboration, stakeholder networks, synergies, research, innovative enterprises

6. *What do you propose to overcome obstacles?*
   Free answer (one keyword)

Simplification, sharing, collaboration, regulatory clarity

7. *What do you expect from the Marche Regional Hub (max 3 options)*
   a) Ideas (5)
   b) Support for new initiatives (11)
   c) Problem solving (4)
   d) Exchange of good practices and useful information (18)
   e) Training (4)
   f) Business contacts (2)
   g) Positive lobbing actions (8)
   h) Establishment of Regional Technical Table on the Bioeconomy (8)
   i) Visibility (3)
   j) Other (specify)

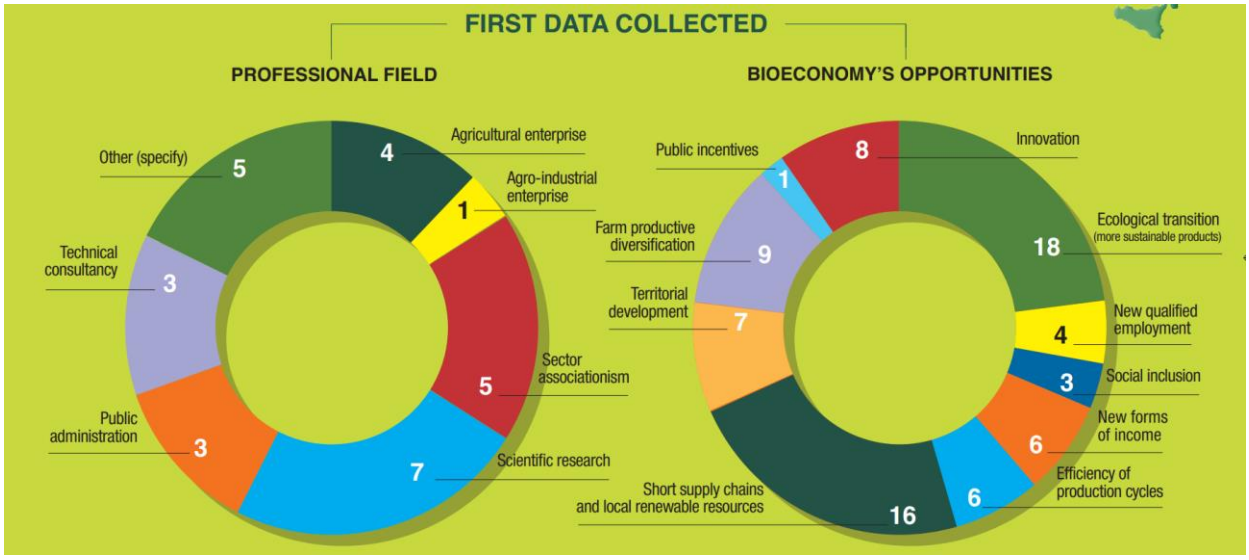


Figure 49 First data collected (Professional field and bioeconomy opportunities)

8. *Themes of greatest interest for training*
   a) Introduction to the bioeconomy (several options valid)
      i. Overview of the sector (7)
      ii. Sustainability of supply chains (16)
      iii. Strategies and incentives (21)
   b) Technical aspects (multiple options valid)
      i. Multifunctionality in agriculture and forestry (11)
      ii. Recovery and valorisation of by-products (18)
      iii. Nutrient recovery (7)
      iv. Good practices (11)
      v. Available mature technologies and innovative trends (18)
   c) Innovation & financing (several options valid)
      i. Funding opportunities (19)

ii. Cycle of venture capitalists & private financing (3)
iii. How to present a project hypothesis (pitch) (7)
iv. Innovation support and technology transfer (20)
v. Methods to increase collaboration (15)

9. *Specific sectors to be addressed*
   a) Agro-energy (Bioenergy and Agri-voltaic) (11)
   b) Biofertilisers and bioactive compounds (10)
   c) Bio-packaging (5)
   d) Hemp and minor crops (9)
   e) Forest products valorisation (wild fruits) (3)
   f) Other (specify)

10. *Specific requests for discussion*
    (Free short answer)

Figure 50 First data collected (Hub's role and selected supply chains)

This Action Plan takes into account the orientations collected during the meetings/confrontations that took place with the Hub's stakeholders. In particular, ITABIA and AMAP have established that it is appropriate to work on the 3 most requested supply chains (Agroenergy; Biofertilizers and bioactive compounds; hemp and minor crops) and not on two as envisaged by the Project. Furthermore, it was established that the idea of the "Establishment of Regional Technical Table on the Bioeconomy" should be developed in the best possible way.

From this perspective, the main objectives around which the Action Plan will be built are:

1. Development of the Agroenergy Supply Chain
2. Development of the Biofertilizers and bioactive compounds supply chain
3. Development of the Hemp and minor crops supply chain
4. The establishment of the Technical Table on the Bioeconomy

For each of these four objectives (GOAL), specific actions will be adopted (TASKS)

Tasks

To accompany the development of the three identified supply chains, the tasks deemed most suitable are:

a) Select Stakeholders (Cohesive working group on specific topics)
b) Coachig, mentoring, training (Technology innovation transfer, best practice models, design support, funding opportunities)
c) Study visit (Promoting the development of the circular bio-economy by showing concrete examples)
d) Supporting the use of the 'Rural spot' tool (Facilitating the use of the tool and the transfer of the information it contains)
e) Co-working (Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions)

The last point "Co-working" will serve to lay the foundations for defining the fourth goal of the Action Plan "Technical Table on the Bioeconomy" which has a marked strategic value as it will (hopefully) continue to operate even after the end of the RuralBioUp project as a precious legacy of the work carried out by the Marche Hub. At the moment the Tasks of this goal are not easy to establish, this will be possible with the Hub activities procedures.

4.9.5 Implementation part

(Provides a detailed timeline and step-by-step instructions on how the action plan will be executed).

The two meetings held with the stakeholders of the Marche Hub highlighted a strong interest in a series of activities considered important for the development of the bioeconomy in the local context. As we have already indicated in paragraph 4.1.

Stakeholders' reflection of bioeconomy deployment

At the pre-KoM (6 July 2023) discussing the opportunities related to the development of the bio-economy, the stakeholders of the Marche Hub indicated the following priorities:

Ecological transition of supply chains towards more sustainable products

Europe finally has a unified industrial plan for climate neutrality. On 1 February 2023, the EU published the Green Deal Industrial Plan for the Net-Zero Age, which aims to ensure EU industrial leadership in the fast-growing sector of technologies capable of zeroing fossil carbon emissions by 2050 to curb global warming. This requires local action (Grow local, go global) and the stakeholders gathered in the Hub are fully aware of this.

Developing Short Supply Chains

The Bioeconomy focuses on the valorisation of renewable and locally available raw materials and by-products. From this perspective, in addition to the development of renewable sources, it is important to support the development of promising supply chains such as green chemistry, green building, textiles, etc.; which generate economy by helping

to minimise the production of waste for disposal. An element that makes supply chains sustainable, in addition to the energy efficiency of production cycles, is the proximity of biomass supply basins to processing plants and the destination of finished products.

Productive diversification

The diversification of production activities gives the farm a multifunctional character and the opportunity for additional income. The circular bioeconomy in promoting the use of waste for the creation of new products with high added value provides economic, environmental and social benefits. Helping farms to diversify production or increase the range of products produced in-house is certainly an interesting challenge for the Hub Marche.

Regarding the ***obstacles for the development of the bio-economy***, the most reported aspects were:

The Limited Experience of Local Businesses

The agricultural sector in the Marche region is characterised mainly by small and medium-sized enterprises, including family-run ones. Supporting these companies in competing on larger markets or new products, perhaps through a local multi-stakeholder aggregation, can be a notable point of the RuraBioUp project.

The heavy burden of bureaucracy and the limits of regulations

In Italy, the Bioeconomy sector is showing great dynamism, but the brake of bureaucracy must be overcome. According to the Bioeconomy 2023 Report, Europe, through the implementation of specific 'go-to-market' measures, regulatory simplification and the identification of solid systemic indicators, could have a great opportunity to accelerate its competitiveness. On this topic, the Marche Hub, in collaboration with the regional Hub Contact Point staff, could draw up guidelines on possible variants that could be adopted to alleviate the burden and limits of regulations on stakeholders.

Lack of cohesion between enterprises

Today, more than ever, the 'lonely' company is struggling to hold its own against organisational systems with strong integration. Networking between companies makes it possible to establish collaborations with other professionals with similar aspirations and problems. The Marche Hub was created precisely as an articulated system of professions and companies active in selected bio-ecomic supply chains to create critical mass and cooperate.

Value Chains

As mentioned above, the selection made on the range of supply chains of the bioeconomy has oriented the Hub Marche's choice on the following three options.

Bioenergy and Agrovoltaics

Farms aim to diversify traditional markets by producing 'Food/Feed' and 'Fuel'. Bioenergy is energy generated from residual biomass (agricultural, forestry, agro-industrial) or

dedicated crops. Bioenergy represents a clean and renewable source of energy that can be produced on a small scale and with highly mature and efficient technologies. This category includes all forms of energy produced from biomass, bioliquids and biogas. Agri-voltaic systems are agricultural crops topped with photovoltaic panels that do not impede cultivation. The two activities (agricultural and energy) are not in competition with each other.

Biofertilisers and bioactive compounds

An alternative and effective approach for plant defense is given by the application of plant molecules with high biological activity, especially if associated with significant contributions of organic substance. Green chemistry as a replacement for synthetic chemistry with a high economic and environmental impact today presents very interesting solutions such as: biopesticides, corroborants, microorganisms, biological activators, etc.

Hemp and minor crops

Hemp is of great interest as a crop capable of being valorised in all the parts that make up the plant. The products that can be obtained are countless and range from fibers for textiles to oils for nutraceuticals or chopsticks for green building. Hemp is a very resistant crop that requires little input and can cope well with ongoing climate changes. Italy and also the Marche have an important tradition for this crop which deserves to be relaunched.

Objectives of the RuralBioUp Hub Marche

Below is a very summary table describing the 3 + 1 GOALS of the Marche Hub and the respective TASKS.

GOAL: Agroenergy	Description	Resouces needed
Duration	Gennaio 2024 - Ottobre 2025	
Collaboration Partners	Marche Region/AMAP/Research organisations/Experts	
Task 1 Expected impacts	***Select Stakeholders*** Cohesive working group on specific topics	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 2 Expected impacts	***Coachig, mentoring, training*** Technology innovation transfer, best practice models, design support, funding opportunities	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 3 Expected impacts	***Study visit*** Promoting the development of the circular bio-economy by showing concrete examples	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 4 Expected impacts	***Supporting the use of the 'Rural spot' tool*** Facilitating the use of the tool and the transfer of the information it contains	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 5 Expected impacts	***Co-working (Strategies)*** Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	

Table 37 Agroenergies supply chain

GOAL: Biofertilisers	Description	Resouces needed
Duration	Gennaio 2024 - Ottobre 2025	
Collaboration Partners	Marche Region/AMAP/Research organisations/Experts	
Task 1 Expected impacts	***Select Stakeholders*** Cohesive working group on specific topics	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 2 Expected impacts	***Coachig, mentoring, training*** Technology innovation transfer, best practice models, design support, funding opportunities	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 3 Expected impacts	***Study visit*** Promoting the development of the circular bio-economy by showing concrete examples	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 4 Expected impacts	***Supporting the use of the 'Rural spot' tool*** Facilitating the use of the tool and the transfer of the information it contains	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 5 Expected impacts	***Co-working (Strategies)*** Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	

Table 38 Biofertilisers and bioactive compounds supply chain

GOAL: Hemp	Description	Resouces needed
Duration	Gennaio 2024 - Ottobre 2025	
Collaboration Partners	Marche Region/AMAP/Research organisations/Experts	
Task 1 Expected impacts	***Select Stakeholders*** Cohesive working group on specific topics	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 2 Expected impacts	***Coachig, mentoring, training*** Technology innovation transfer, best practice models, design support, funding opportunities	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 3 Expected impacts	***Study visit*** Promoting the development of the circular bio-economy by showing concrete examples	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 4 Expected impacts	***Supporting the use of the 'Rural spot' tool*** Facilitating the use of the tool and the transfer of the information it contains	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	
Task 5 Expected impacts	***Co-working (Strategies)*** Consolidate the stakeholder network through a listening table to frame the problems of the sector and find appropriate solutions	n.a.
Target group of action	Public administrations, sector companies/associations, research organisations, experts/consultants	

Table 39 Hemp supply chain

Steps to achieve the above indicated objectives

SMART goals

- What – Workshops, courses, technical visits, webinars, etc.
- When – to be defined
- How – at the AMAP headquarters in Osimo (AN)
- Who – ITABIA staff in collaboration with SPRING, AMAP and the expert networks associated with them

4.9.7 Resource Allocation

(Identifies the necessary resources, such as budget, personnel, and equipment, required for successful implementation)

Budget

At the moment, since the activities that will make up this Action Plan have not been precisely defined, it is not possible to make a realistic estimate of the necessary budget.

However, we can report that on the occasion of the KoM held on 6 December in Osimo (AN) which included a technical visit in the morning and a workshop in the afternoon, we incurred expenses of around 3650 Euros (travel 1,650 Euros, staff 2,000).

Personnel

As a working group (personnel), the Marche Hub is based on:

- ITABIA staff (M. Monni, S. Mannelli, G. Croce, C. De Carolis, F. Scarpelli, V. Pignatelli, L.Calderaro)
- AMAP staff (A. Bordoni, C. Frittelloni, U. Testa)
- experts who are part of the ITABIA and AMAP network

Equipment

In the Marche region, the AMAP (Hub contact point) headquarters has multiple meeting rooms perfectly equipped for holding workshops or training courses (in person and remotely). These rooms will be made available free of charge for all Marche Hub initiatives included in the Action Plan.

4.9.8 Monitoring and Evaluation

(Establishes a framework for monitoring progress and evaluating the effectiveness of the action plan (KPI))

To carry out a constant and effective "Monitoring and Evaluation" action of the Action Plan, specific tools widely available today will be used. Among these we are evaluating some possible options such as:

- Sospact (https://www.sopact.com/)
- Tool4dev (https://tools4dev.org/blog/monitoring-and-evaluation-tools-for-projects/)
- Connexus (https://cnxus.org/resource/monitoring-and-evaluation-tools-methods-and-approaches/)

4.9.9 Risk Assessment and Mitigation

(Identifies potential risks or obstacles and outlines measures to minimize or address them)

To be defined

4.9.10 Communication Plan

(Specifies how the action plan will be communicated to stakeholders)

Once the plan has been defined, it will be calendarized in an Excel file which will be sent to all stakeholders as a reminder.

ITABIA will take care to promptly remind stakeholders of all the commitments included in the agenda via email. Following each activity, a specific report will be created and shared.

5. Monitoring, adjusting, sustaining

Monitoring, adjusting, and sustaining RuralBioUp co-creation processes is essential to ensure their effectiveness and success.

5.1 RuralBioUp key performance indicators (KPI)

Although the Action Plans of individual regional HUBs are open documents and sub-goals are likely to evolve along with the development of the local bioeconomy, value chains and current challenges in the region, or on the basis of a monitoring process. The HUB facilitator should constantly evaluate, monitor the progress and determine whether adjustments are necessary. Based on identified objectives, they should also identify specific metrics or indicators that can measure the success of the co-creation process. These KPIs should align with the goals set in the previous step and help track progress over time.

For the hubs, the project foresees expected outcomes (to be reached by the end of the project) as well as the expected impact (to be reached 5 years after the project lifetime):

RuralBioUp expected outcome	**To be implemented per hub**
150 inter- intra-value chains collaborations; 50 farmers/foresters involved in collaborations start to use their resources in bio-based business models	17 inter- intra-value chains collaborations; 6 farmers/foresters involved in collaborations start to use their resources in bio-based business models
>500 new stakeholders collaborating in Hubs and new regions adopting RuralBioUp approach	50 new stakeholders collaborating in Hubs and new regions adopting RuralBioUp approach
9 Hubs structured in a permanent way	1 hub per region
100 small-scale bio-based solutions adopted	11 small-scale bio-based solutions adopted
market uptake of 50 bio-based new products/services	market uptake of 5/6 bio-based new products/services
10 new companies start-up	1 /2 new companies start-up
>110M€ of private/public investments in Bioeconomy Hubs	12 M€ of private/public investments
>15 regions or other entities use the RuralBioUp One-Stop Shop results and recommendations to improve their strategies	N/A
>100 actors (T1, T8, T9, T10) reuse RuralBioUp actionable items	N/A

Table 40 Expected outcome of hubs after 3 years of project implementation

RuralBioUp expected Impact	To be implemented per hub
Sustainability (processes, business, etc.) improvement > 20%	Sustainability (processes, business, etc.) improvement > 20%
bio-based materials replacing fossil-based ones: >30%	bio-based materials replacing fossil-based ones: >30%
new jobs in rural areas >10%	new jobs in rural areas >10%
companies' turnover >10%	companies' turnover >10%
Differentiation in farmers/foresters incomes: >25%	Differentiation in farmers/foresters incomes: >25%
Bioeconomy maturity improvement (a.l. 1 level)	Bioeconomy maturity improvement (a.l. 1 level)
Regional innovation ecosystem improved (>5%);	Regional innovation ecosystem improved (>5%);
New jobs in bioeconomy sector >10%	New jobs in bioeconomy sector >10%
Bioeconomy awareness in Regional Hubs >10%	Bioeconomy awareness in Regional Hubs >10%
Increasing uptake of bio-based solutions and technologies >10%	Increasing uptake of bio-based solutions and technologies >10%
Increase of bioeconomy relevance in rural areas' policy priorities (bioeconomy strategy delivered or updated; >20% budget in EAFRD;	N/A
bioeconomy sector addressed by Operational Programmes for ESF	N/A

Table 41 Expected Impact after 5 years of project implementation

By actively monitoring, adjusting, and sustaining the co-creation process, it is possible to enhance collaboration, drive innovation, and achieve meaningful outcomes.

Concrete tools and guidelines have dedicated tasks(See in particular T3.3 and T5.1). To access the detailed tools and guidelines for monitoring and adjustment, we refer to Task T3.3 and T5.1 in the DoA document of the RuralBioUp project. These tasks are likely to provide specific instructions, methodologies, and tools designed for the impact assessment and monitoring of the hub building process.

6. Conclusions

In conclusion, we can summarize that by the end of 2023 year, RuralBioUp 9 Regional HUBs were successfully established. All HUBs jointly started establishing contacts with stakeholders and co-created the mission, value chains and main goals of the HUB, which they summarized together with sub-goals and tasks in HUB Action Plans. All HUBs are aware that the Action Plan is an open document that sets out the path of cooperation for the development of the bioeconomy in rural regions and that it is necessary to evaluate annually whether the HUB brings the necessary benefits to stakeholders and the region, whether it should expand its activities to other topics in order still remain an active partner in the region.

7. Appendix

Guideline for HUB facilitators - Kick-off meeting and first steps

1 Introduction

This document provides **instructions and methodology for the organisation of a flexible multi-actor common approach for the RuralBIOUp Kick-off meetings** (hereinafter referred as "KoM") in order to properly explain and highlight for the RuralBIOUp facilitators how to get ready and fully exploit KoM that be implemented in all RuralBIOUp regions of the project.

Task 3.2 follows Task 3.1 "Guide and capacity building programme to develop the Regional Hubs" that prepared a methodological support for the HUB facilitators and supported them in performing a basic mapping / identification of key stakeholders in the region to know whom to target for the KoM and the stop-shop. This process should result in lists and knowledge about stakeholders' demands and expectations. Task 3.1 resulted in **Deliverable 3.1 Handbook "How to build a RuralBioUp Regional Hub"** (available in the RuralBioUp Teams Group at: RuralBioUp_deliverable_3.1_final_(1).pdf) which deals with the preparation for the HUB's establishment, identification of goals and the planning for hub's implementation. The Handbook also elaborates on the engagement of stakeholders and the co-creation explaining various methodologies that can be used by the HUBs Facilitators to properly involve and engage their stakeholders in the HUBs activities, starting from the KoM . To that end, it elaborates on how the RuralBioUp kick-off meeting -aimed at working on the specification of value chains, the hub vision and the creation of the activities - could be designed in a co-creative way. In addition, it gives guidelines for the monitoring of the actions, the adjustments and the sustainable integration of activities.

2 Instructions – Methodology for the HUBs establishment

2.1 What is needed

Task 3.2 is essential for the establishment of RuralBioUp HUBs. According to the Description of Action, this task facilitates organisation and implementation of KoM as the crucial events when the RuralBIOUp HUBs are established. The RuralBIOUp HUBs are key for successful project implementation and moreover should act as inspiring case studies for the Followers (regions outside the consortium that would like to follow the methodology of RuralBioUp HUBs). Therefore, this document aims to support the RuralBioUp Facilitators in identifying what must be done in their HUBs and also providing suggestions for any additional (voluntary) activities.

The KoM will gather a great variety of stakeholders in each RuralBIOUp region, it is therefore crucially important to inform them about the newly established RuralBIOUp HUBs, inspire them with new bioeconomy perspective for their region, support their involvement into the RuralBIOUp activities so they can get fully engaged and co-create the activities of transforming towards circular bioeconomy.

We recommend (optionally) that some interviews, surveys and feedback meetings should be held with policy makers and stakeholders in general in the specific and broader context of the KoM to better assess needs and provide an action plan in a fully creative multi-stakeholder approach (see additional tips - 2.5 and 2.6 below for more information).

These activities will be implemented across all HUBs and led by the HUBs Facilitators, with ART providing overall guidance, Deliverable 3.1. will be fully utilised.

2.2 Deadlines for each step

Task 3.2 is planned in the DoA from M7 (July 2023) until M14 (December 23), as for the essential role that this task is delivering for the RuralBIOUp HUB establishment, Task Leader ART began implement this task from the very beginning M2 (November 2022). This approach enables to deliver the first version of this document as early as in M8 (August 2023). A presentation of the "Guideline for HUB facilitators – Action Plan" and "Guideline for HUB facilitators - Kick-off meeting and first steps" is planned for early September 2023 by bilateral meetings between ART and HUB facilitators with the ambition to have common understanding of these documents within September 2023 as a vast majority of KoMs are planned in the period from the end of September – beginning of December 2023).

KoM organized as a two-day event should be organized in each RuralBioUp region. All regional stakeholders should compile the results of the KoM, primarily in the Action Plan.

ART will produce a meaningful compilation of the results from all RuralBioUp regions KOMs into the Deliverable 3.2 that needs to be ready by the end of M14 (December 2023).

3.Identifying stakeholders

As a result of Task 3.1, each region should have identified a number of stakeholders (in line with the quintuple helix, i.e.: public sector, academia, SMEs, civil society and NGOs) in their regions (i.e. RuralBIOUp HUB Facilitators might identify them according to their influence and interest in bioeconomy).

Stakeholders can include individuals representing organisations belonging to all parts (N.B. by the end of the project each HUB must be composed of min. 30 stakeholders, but not all of them must be invited to the KoM – some can be added later, depending on the HUBs foreseen activities and objectives). RuralBIOUp HUB facilitators should dispose of a database of more stakeholders to be able to deliver the requested number of participants on the KoMs. Policymakers are important sub group of stakeholders as they are drafting of relevant policies for the bioeconomy sector. This could include people from the central authorities, regional authorities and/or local municipalities. Very important are representatives of chambers of commerce, experts belonging to research groups or organisations involved in bioeconomy related education.

The first general overview of stakeholder mapping can be found in the table that was the output of T 3.1. The information in the table will serve as a first look at the stakeholders in your region, which you will probably develop further.

Stakeholder involvement is crucial for the success of any project or initiative. Here are some reasons why it is important to get stakeholders involved (Jeffery 2009, Adema et al 2020, Bahadorestani et al 2020, Philipson et al 2012)

1. Improved decision-making: Stakeholders bring diverse perspectives and expertise to the table, which can lead to better decision-making. By involving stakeholders in the decision-making process, you can ensure that all relevant factors are considered and that the final decision is well informed.
2. Increased buy-in: When stakeholders are involved in the project from the beginning, they are more likely to feel invested in its success. This can lead to increased buy-in and commitment, which can help to overcome any resistance or obstacles that may arise during the project.
3. Reduced risk: Stakeholders can help to identify potential risks and issues early on in the project, which can help to mitigate or avoid them altogether. By involving stakeholders in the risk assessment and management process, you can ensure that all potential risks are identified and addressed.
4. Improved communication: By involving stakeholders in the project, you can improve communication and ensure that everyone is on the same page. This can help to avoid misunderstandings, reduce conflicts, and ensure that the project is moving forward in a coordinated and efficient manner.
5. Increased accountability: When stakeholders are involved in the project, they are more likely to feel accountable for its success. This can help to ensure that everyone is working towards the same goals and that everyone is doing their part to contribute to the project's success.
6. If you want to use a formal way to send invitations to stakeholders, we recommend using the prepared text of the letter for stakeholders.

There is a set of documents that we prepared to facilitate the invitation and engagement of stakeholders in the KoM:

- **Invitation letter**, available here: 1. Email (translated in all HUBs languages),
- **Informative flyer** about the project in general and HUBs' activities: 2. Informative Flyer (translated in all HUBs languages),

Stakeholder Involvement letter, available here: **text of the letter**

In order to ensure that the involvement activities are **GDPR compliant**, we ask each HUB Facilitator to carry out the **stakeholders' registration using the following form**: https://apre.sharepoint.com/:w:/s/ruralbioup/EY9j9g6EEIhCqzqr53eZyJ4BzJ35YD5k6JQRjuOBtRdg-g?e=ByBhFl (to be adapted by each Facilitator with the name of the hub).

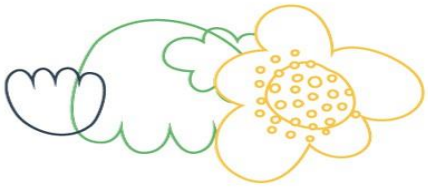
4. How to organize the KoM

Due to the practical difficulties in getting the key stakeholders of a region together, it is always possible to organise the KoM in the context of a larger event, or at the same time and space as another relevant event, or even online.

In any case, the RuralBIOUp KOMs are expected to be organise as a two-day events[28] to provide enough productive time in order to cover the following objectives/discussion points (possible agenda of the KOM):

1) Meet and greet
    - It is important to always choose an appropriate method for starting a workshop and warming up the participants. The focus of the methodology differs, depending on whether participants already know each other. If participants do not know each other, there is the need for a methodology addressing introduction and getting to know each other, like "Sociometry" or "Joint poster". If participants do already know each other methods to gather expectations and fears can be applied, like "Dreams and Nightmares".- for more information on the suggested methodologies see D3.1, chapter 4.6, p.30 or Ice breaker ideas on the website
2) Introduction of RuralBIOUp project to stakeholders (briefly)
    - general project ppt ready to be used - available in Teams
    - Presentation of the HUB and its stakeholders, and clarifying the context of the HUB as well as the overall co-creation strategy of the HUB
    - Some possible methodologies for introducing a project could include:
        a. Waterfall Methodology: This is a traditional approach where the project is divided into sequential stages such as project initiation, planning, execution, monitoring, and closure. Each phase is completed before moving on to the next, and the project is introduced in a linear fashion to stakeholders.
        b. Agile Methodology: This is a more flexible and iterative approach where the project is divided into small, incremental deliverables called sprints. The project team works collaboratively with stakeholders to prioritize and deliver these sprints, allowing for more frequent and ongoing project introductions and feedback.
        c. Lean Methodology: This methodology focuses on maximizing value and minimizing waste by continuously improving processes. The project team introduces the project by identifying the core goals and outcomes, and then iteratively adds features and functionality based on stakeholder feedback and needs.

[28] Upon prior agreement with the project coordinator (APRE), it is not necessary for these two days to be consecutive. It is possible to split the KoM into two days independently of each other, but no later than M14 (December 2023).



d. Design Thinking Methodology: This methodology involves a human-centered approach to problem-solving and innovation. The project is introduced by deeply understanding the needs and perspectives of stakeholders, and then co-creating and testing solutions with them. This methodology promotes empathy, creativity, and iterative learning.

- The choice of methodology for introducing a project will depend on factors such as project goals, stakeholder preferences, and organizational culture.

3) Potential for clustering and collaboration with initiatives and projects
   - In order to present the potential for clustering and collaboration with initiatives and projects, consider the following steps:
     a. Define the clustering and collaboration objectives: Clearly articulate the goals and benefits of clustering and collaboration for the initiatives and projects involved. This could include increased knowledge sharing, enhanced resource allocation, improved efficiency, and innovation.
     b. Identify potential clusters and collaborations: Analyze the initiatives and projects to identify areas of common interest and compatibility. Look for shared objectives, complementary resources or expertise, and alignment in strategic priorities.
     c. Develop a clustering and collaboration plan: Create a plan that outlines how the initiatives and projects will collaborate and cluster together. This should include specific activities, communication channels, and governance structures. Identify potential barriers and develop strategies to overcome them.
     d. Communicate the potential benefits: Prepare a compelling case for clustering and collaboration, highlighting the potential benefits for all stakeholders involved. Use data, examples, and success stories to demonstrate the added value of working together.
     e. Engage stakeholders: Present the potential for clustering and collaboration to key stakeholders, including project leaders, managers, and decision-makers. Clearly communicate the advantages, address concerns or objections, and actively involve stakeholders in the planning and decision-making process.
     f. Foster a collaborative culture: Create a supportive and inclusive environment that encourages collaboration and clustering. Foster open communication, trust, and mutual respect among stakeholders. Provide opportunities for networking, knowledge sharing, and skill development.

g. Monitor and evaluate: Regularly assess the progress and impact of clustering and collaboration initiatives. Monitor key performance indicators, gather feedback from stakeholders, and make necessary adjustments to optimize outcomes.

- Overall, effectively presenting the potential for clustering and collaboration requires a clear understanding of the objectives, thoughtful planning, and strong communication skills. It is important to engage stakeholders early on, foster a collaborative culture, and continuously monitor and evaluate the initiatives to ensure their success.

4) Decision on 2 value-chains and definition of aims and goals in which the HUB will carry out the pilot activities to adopt small-scale bio-based solutions in the region. (Vision and prioritisation of items/specification of value chain, narrowing down direction of value chains, focus of value chain). We also prepared a poster to support the HUBs identifying the value chain, which will guide you by prepared questions.
    - Remember that the choice of sorting and prioritising method will depend on the specific context, the number of participants, and the desired outcome. It's essential to select a method that aligns with the goals of the co-creation process and encourages meaningful participation from all stakeholders involved.
    - Eventually your aim is to arrive at decisions that the whole group can support. The advantages of reaching decisions collaboratively is that you will reach a greater commitment and trust for the implementation.
    - There are however challenges in collaborative decision making, such as the dealing with different hierarchies in the group (e.g. HiPPO effect - Highest Paid Person's Opinion: A group follows assumed opinions of a supervisor without raising direct questions to the supervisor.). Also be aware of the socalled "confirmation bias" (tendency that people select information that supports their prior beliefs) or the tendency of participants to prefer harmony over conflict.
    - In D3.1, p. 35, chapter 4.6 or in p. 43, chapter 5 you can find methods that will help you and your stakeholders choose from several options by prioritizing two value chains.
5) Summary of the lessons learnt about the regional situation and stakeholders' demands and expectations
    - Not only for your needs, but also for clarity and understanding of the discussed topics, we recommend summarizing and repeating the previous agenda items with an emphasis on stakeholders and their demands and expectations.
    - For summarizing, only a verbal summary is sufficient, which will be written in points on the board so that it is easily visible and

understandable to everyone. You can use the MIRO online tool, a ppt presentation or a paper flipchart.

6) Gaps and Strengths of your HUB - State-of-the-art brainstorming on potentials and needs (do you start from 0, or is there already a basis?)
    - Some common methods used to define the gaps and strengths of an online hub or platform are:
        a. User feedback and surveys: Conducting surveys or gathering feedback from users can help identify the gaps and strengths of a hub. It provides insights into user experiences, satisfaction levels, and areas where improvements are needed.
        b. Analytics and data analysis: Collecting and analyzing user data can provide information on user behavior, usage patterns, and engagement levels. This data can be used to identify gaps and strengths in terms of user engagement, content popularity, and user preferences.
        c. Comparative analysis: Conducting a comparative analysis of the hub with other similar platforms can help identify gaps and strengths. This analysis can be done by reviewing features, user interfaces, content offerings, and engagement levels of competitors.
        d. Expert evaluation: Seeking input from experts in the field can help identify gaps and strengths from a professional perspective. Experts can provide insights based on their experience and knowledge of best practices in the industry.
        e. Market research: Conducting market research can help identify gaps and strengths by analyzing the target audience, competition, and market trends. This research can provide valuable insights into user needs and expectations.
    - By using a combination of these methods, hub administrators or platform owners can gain a better understanding of the areas that need improvement as well as the strengths to capitalize on.
7) Presentation of KPIs foreseen for each RuralBioUp HUB - a detailed table with the KPIs can be found here: RuralBioUp_KPI tracking.xlsx (column 'E' of each tab in the table is related to KPIs foreseen for the hub. On the basis of the KPIs foreseen, the Facilitator can propose some activities to be included in the Action Plan).
8) Presentation of the initial draft of the Action Plan
    - definition of the Action Plan for the Regional HUB where the pilot activities will be defined and a plan for their implementation will be set out (including preliminary KPIs to measure the progress in the HUBs). According to the DoA, Action Plans should contain, among others:
        a. 'existing gaps to be addressed with training (choosing from topics contained in D4.1 and presented during the meeting),

b. business sectors in which organise networking activities, as well as services that have to be offered by WP4.
c. KPIs (will be identified to monitor and fine-tune the Action Plans').

9) Discussion about the proposed Action Plan
   - We recommend summarizing the prepared Action Plan and develop a future vision for your region.
   - D 3.1, p. 43 – recommended method is brainstorming or Prioritization Method: One sentence.
10) Discussions on potentials and gaps hubs' training:
   - Presentation of the Portfolio of Services and choosing at least 10 topics for training a first draft of the Portfolio of Services will be ready by September).
   - Trainings needs identification on top of the trainings included in the Portfolio of services and in the One-Stop-Shop, the stakeholders may identify other topics in which they would like to receive training.
   - Preliminary/tentative training schedule based on the discussion on the two above points. Trainings are to be implemented in the hubs from January 2024 until the project's end.
11) Conclusion and follow up steps
   - For the conclusion of your KoM, you can summarize the gaps and vision for next planed period, encourage stakeholders for clustering and collaboration with initiatives and projects and raise awareness about the HUB by project newsletter on social medias/your websites, or by sharing good practise on your websites.

If you manage to establish a closer activity with the stakeholders and arouse their interest in further and more intensive cooperation in the HUB, it is possible to include the following topics for discussion at the KoM. However, these topics can be discussed with stakeholders outside the KoM at any suitable meeting.

1) Presentation of the One-Stop-Shop.
2) Preliminary planning of networking events (described in T4.3). In case of questions on networking events, please contact APRE (Karolina or Maurizia).
3) Preliminary planning of study visits (described in T4.4). In case of questions on study visits, please contact IBF (Kevin or Filippo).

You can get a good inspiration for a proper stakeholder management in the D. 3.1. Handbook session 3.3., 4.2. – in these chapters you will also find other **tips on how to start a conversation**, or what **communication methods** to use to focus attention on the topic at hand. In D 3.1, p. 48 is also available to you a table "Example of a moderation sheet for a RuralBioUp Kick-off event" with exactly concrete agenda incl. details, methods, results and needed materials.

The organization of the KoM of your HUB is very important. We recommend not to underestimate the preparation and start to organize the KoM in advance. Very useful specific

tips on how to draw up the agenda of the entire KoM, what methods to use for familiarization and active involvement of participants in the discussion can be found in D.3.1. Handbook session 5.

The KoM must deal with the following 3 parts:

I) **Value Chains** (development and/or discussion, further refinement thereof)
II) Development of **Action Plan** (precise description of activities and actions including timeline, specific goal and target group, resources needed, responsibilities) – poster to help you is prepared
III) **KPIs** discussion and adaptation (in relation to the action plan)

5. Budget

Each hub has 3.000 EUR for the organisation of the kick-off meeting (venue, catering, materials, etc.). In addition, each facilitator has 800 EUR to travel to the place of the meeting. Reimbursement of travel costs of stakeholders is not directly foreseen. However, if a facilitator has some money left from the budget foreseen for the meeting organisation (i.e. form the 3.000 EUR) or for the facilitator's travel (i.e. from the 800 EUR), can reimburse stakeholders' travels.

Based on our (ART) experience and the good experience gained from bilateral meetings with HUB facilitators that we conducted in June 2023, we have compiled a ppt that will provide you with important tips and good tips for organizing KoM.

6. Additional tips

6.1 Surveys / feedback sessions in the context of the KoM

A survey in the form of a short questionnaire can be included as an additional activity at the introduction of KOM or during a coffee break. Survey refers to relatively simple and short questionnaires, mostly with closed-ended questions. This could help you get the feedback required for providing the action plan and to improve interaction and engagement of your stakeholders. You may use digital tool such as Slido, Gform ect. Alternatively, if they can be administered as conventional printed questionnaires.

A specific Survey Template is provided as a inspiration for you with the survey questions, you are welcomed to modify / adapt it to suit your case region. ITABIA has carried out such a survey with their stakeholders as apreparation for the KoM, so they provide the questionnaire. See the questionnaire in Chapter 3 Attachment.

6.2 Interviews

Another tool that can help you to better understand the needs of the region and stakeholders and will help you in drawing up an action plan are interviews.

Interviews can take place either in the context of the KOMs or at another convenient time during the specified period (July-December 2023). Interviews should be addressed specifically to policymakers, they take place in a one-on-one basis, are more in depth than the surveys, and

are entirely based on open-ended questions, although a recommended semi-structured format will be provided to give some guidance on key topics.

The interviews will be done to better evaluate the needs and level of detail that key stakeholders might share with you, the interview could help you to dig deep and get the information. Indicative questions are provided in the attachment.

The aim of both the surveys, feedback sessions and interviews will be to co-elaborate to an Action Plan to make sure it has been provided in a co-creative approach.

As already mentioned above, neither the survey nor the interviews are a mandatory part of creating an action plan, nor are they a mandatory part of the KOM agenda. However, they can help you establish a closer relationship with stakeholders and deepen your understanding of their needs, or validate your existing information.

7. How to utilise the KoM to its full potential – KoM follow up

To use the momentum of the KoM to it full potential, to advance upon the first connection that was established on the KoM with stakeholders, we have prepared a few tips for you:

- **Thank You Note:** Always start with a thank you note expressing gratitude to the attendees for their participation. Personalize the message if possible (i.e. show the apprehension for the stakeholders that support you with the organization, stakeholders who made some contribution (presentation) if applicable)
- **Timely Response:** Send out your follow-up communication within 24-48 hours after the event to ensure that the event is still fresh in the minds of the attendees. You might include a feedback survey that will help you understand what went well and what areas need improvement (and use this feedback for planning future events.
- **Event Summary:** Provide a brief summary of the event, highlighting key takeaways, memorable moments, and any significant outcomes, you might prepare two alternatives the first to be shared with the participants, the second as a press release communication
- **Share Event Materials:** If there were presentations, videos, or other materials from the event, share them with the attendees. This can be in the form of downloadable files, links to a website, or shared via cloud storage.
- **Photos and Videos:** Share event photos and videos, if available. Attendees appreciate visual recaps, and it can also serve as promotional material for future events.
- **Announce Upcoming Events:** If you have any upcoming events or initiatives, this is a good time to promote them. Provide dates, details, and registration links if applicable.
- **Engage on social media:** Share event highlights, photos, and videos on your social media platforms. Encourage attendees to do the same and use a specific event hashtag to consolidate posts.

- **Personalized Follow-Up:** For VIP guests, speakers, sponsors, or specific attendees, consider sending a personalized follow-up email or even a handwritten note or gift to show appreciation.
- **Open a Line of Communication:** Encourage attendees to reach out with any further questions, ideas, or feedback. Provide contact details and ensure that you respond promptly to any inquiries.
- **Evaluate and Analyze:** Internally, gather your team to evaluate the feedback and discuss the overall success of the event. Use this analysis to make improvements for future events.
- **Stay Consistent:** If you promise to send out additional information, resources, or follow-ups in the future, make sure to stay true to your word. Consistency builds trust.
- **Networking Opportunities:** If attendees showed interest in networking or connecting with others, consider facilitating these connections post-event.
- **Offer Exclusive Content or Discounts:** As a token of appreciation, you can offer attendees exclusive content, resources, or discounts related to the event topic or your organization.

Please, remember, the key to effective follow-up communication is to be genuine, timely, and provide value to the attendees. It's not just about expressing gratitude but also about building and nurturing relationships for the long term.

7.1 The press release after the end of the KOM

The exact template will be delivered by LOBA.

When writing your press release, keep the following tips in mind to help you get the message right.

1. Catchy Headline: Start with a compelling and concise headline that summarizes the main news in a way that sparks interest.
2. Subheadline: Use a subheadline (or deck) to provide a bit more detail or context about the news, complementing the main headline.
3. Dateline: Begin the body of your press release with the city of origin and the date.
4. Lead Paragraph: The first paragraph should answer the 5 W's: Who, What, When, Where, and Why. It should provide a clear overview of the news and its significance.
5. Body:
    - Provide Details: Expand on the information provided in the lead, giving more specifics and background information.
    - Use Quotes: Include quotes from key stakeholders, such as company executives or experts, to provide insights or opinions on the news.
    - Keep it Concise: Press releases should be succinct, ideally between 400-500 words. Avoid jargon and overly technical language.

6. Multimedia Elements: Consider adding relevant images, videos, or infographics to make your press release more engaging. Ensure you have the rights to use these and provide captions or credits as necessary.
7. Boilerplate: Include a standard "About" section at the end, giving brief information about your company or organization.
8. Contact Information: Clearly list the contact details (name, phone number, email address) of the person who can provide additional information or answer media inquiries.
9. Clear Formatting: Use short paragraphs, bullet points, and subheadings to make the press release easy to read. Avoid large blocks of text.
10. Call to Action (Optional): If relevant, include a call to action, directing readers to a website, event registration page, or other relevant links.
11. End Notation: Signal the end of the press release with three hash symbols (###) or "ENDS."
12. Proofread: Ensure there are no grammatical or factual errors. Accuracy is crucial for credibility.
13. Timing: Send out your press release at a time when it's most likely to be seen. Typically, Tuesday to Thursday mornings are best. Avoid weekends and public holidays.
14. Distribution: Use press release distribution services, email lists of relevant journalists, and your organization's social media channels to disseminate the press release.
15. Follow Up: Consider following up with key journalists or media outlets to ensure they've seen the release and to offer any additional information or interviews.

Remember, the goal of a press release is to convey news in a clear, concise, and engaging manner. It should be newsworthy and relevant to the audience you're targeting. With a well-crafted press release, you increase the chances of your news being picked up and shared by the media.

8. Attachment

ART recommended sort of questions for KoM:

1. Which is the main economical limit related to the current linear economic system that concern your region and acts as a growth inhibitor?

2. Are there any national/regional policies that impact/limit the future development of the targeted linear economies in your region?

3. In your opinion, which sector is the most developed in your region? (multiple answers can be selected)
    - Industry
    - Agriculture
    - Forestry
    - Waste management
    - Biofuels and renewable energy

- Biotechnology
- Other:

4. Which sector has the greatest potential for development in your region?

5. Which tools are needed for the transformation to sustainable development or is the bioeconomy specifically lacking or would it be appropriate to improve it in your region? (multiple answers can be selected)
    - Information from the regional administration
    - Regional networks - clusters, platforms, associations
    - Innovation and research capacities
    - Other:

6. Do you think that the possibilities and sources of financing are sufficient for the transformation to sustainable development or bioeconomy in your region?
    - Yes
    - No
    - I don't know

7. If, in your opinion, the sources of financing the transformation to sustainable development or circular bioeconomy, what specifically should be improved?

8. What events do you like to attend the most and in what form? (multiple answers can be selected)
    - Online seminars/conferences/workshops
    - Online connection via initiative/association
    - Face-to-face seminars/conferences/workshops
    - Face-to-face fairs/open days
    - Other:

9. What area of knowledge expansion would be needed in your region for the development of the bioeconomy and an easier transition from a linear economy to a bioeconomy, or to more environmentally friendly production and consumption? (multiple answers can be selected)
    - External financial instruments (funds that can be drawn)
    - Management tools
    - Technological processes leading to a circular economy
    - Presentation of good practice
    - Knowledge of the infrastructure and its possibilities
    - Legislative and normative regulations
    - Other:

10. Which activities should be intensified in order to overcome existing barriers and improve the situation in your region? (multiple answers can be selected)
    - Education and awareness
    - Demonstration of good practice
    - Advice on subsidy options
    - Research and transfer of results into practice
    - Legislation and administrative simplification
    - Other:

QUESTIONNAIRE (mentimeter)

Provided by ITABIA for regional HUBs.

1. ***Indicate your professional field***
    - Agricultural enterprise
    - Forestry enterprise
    - Agro-industrial enterprise
    - Sector associationism
    - Scientific research
    - Public administration
    - Technical consultancy
    - Finance
    - Other (specify)

2. ***Indicate your sphere of interest (max 3 options)***
    - Agricultural crops and floriculture
    - Food production and animal husbandry
    - Cosmetics/nutraceuticals/healthcare
    - Biorefineries (multiple products from biomass, extraction of active molecules)
    - Bioconstruction and biomaterials
    - Technical means for agriculture (biopesticides, biofertilisers, biochar)
    - Textiles (clothing, furniture, technical textiles)
    - Active molecule extraction
    - Bioenergy
    - Information/training
    - Experimentation/innovation/technology transfer
    - Corporate finance
    - Other (specify)

3. ***What are the opportunities related to the bioeconomy (max 3 options)***

- Ecological transition (more sustainable products)
- New qualified employment
- Social inclusion
- New forms of income
- Efficiency of production cycles
- Short supply chains - valorisation of local renewable resources
- Territorial development
- Farm productive diversification
- Public incentives
- Innovation
- Other (specify)

4. ***What are the obstacles to the development of the bioeconomy (max 3 options)***
   - Technological shortages
   - Shortage of (public) technical advice
   - Enterprise risk
   - Limited experience
   - Social acceptance
   - Weight of bureaucracy
   - Access to finance
   - Fragmentation of administrative competencies
   - Regulatory limitations (shortcomings and cumbersomeness)
   - Lack of cohesion between enterprises
   - Other (specify)

5. ***What do you propose to strengthen the opportunity?***
   Free answer (one keyword)

6. ***What do you propose to overcome obstacles?***
   Free answer (one keyword)

7. ***What do you expect from the Marche Regional Hub (max 3 options)***
   - Ideas
   - Support for new initiatives
   - Problem solving
   - Exchange of good practices and useful information
   - Training
   - Business contacts
   - Positive lobbing actions
   - Establishment of Regional Technical Table on the Bioeconomy
   - Visibility
   - Other (specify)

8. ***Themes of greatest interest for training***
    - Introduction to the bioeconomy (several options valid)
        - Overview of the sector
        - Sustainability of supply chains
        - Strategies and incentives
    - Technical aspects (multiple options valid)
        - Multifunctionality in agriculture and forestry
        - Recovery and valorisation of by-products
        - Nutrient recovery
        - Good practices
        - Available mature technologies and innovative trends
    - Innovation & financing (several options valid)
        - Funding opportunities
        - Cycle of venture capitalists & private financing
        - How to present a project hypothesis (pitch)
        - Innovation support and technology transfer
        - Methods to increase collaboration

9. ***Specific sectors to be addressed***
    - Agro-energy
    - Biofertilisers and bioactive compounds
    - Bio-packaging
    - Hemp
    - Forest products valorisation (wild fruits)
    - Other (specify)

10. ***Specific requests for discussion***

    (Free short answer)

PART I. Action Plan

The Action Plan summarizes activities focused on stakeholders' engagement, training and events for each Regional HUB and indicates how to enhance the desired bio-based solutions. The Action Plan is not envisaged as a static document, on the contrary it is a managerial tool and therefore an open document that serves for multiple purposes: to compare partial results and discussion modifications to reach KPIs (i.e. Action Plan is a vital for monitoring (partial) results monitoring, self-evaluation and impact assessment).

Monitoring and Evaluation function of the Action Plan focuses on the process of tracking and assessing progress towards meeting key performance indicators (KPIs). This involves comparing the partial results obtained during the implementation of the action plan and discussing any necessary modifications to ensure that the KPIs are achieved.

The monitoring component of the action plan involves regularly collecting data and assessing the extent to which the planned activities and strategies are being implemented. This data collection can include progress reports, surveys, interviews, or any other relevant method. Evaluation, on the other hand, involves assessing the effectiveness and impact of the action plan. It goes beyond just monitoring the implementation and examines whether the desired outcomes, as indicated by the KPIs, are being achieved. This assessment may involve analyzing quantitative data, qualitative feedback, or conducting impact assessments. By comparing the partial results obtained through monitoring with the desired outcomes specified in the action plan, it becomes possible to identify any gaps or areas where adjustments need to be made. This information is then used to guide discussions on modifications to the strategies, timelines, or resource allocation to ensure that the KPIs are met. Overall, this part of the action plan is essential for assessing progress, self-evaluation, and impact assessment.

Hereby the Action Plan is a key tool for each Regional Hub in the discussion and decision making about a strategy that can guarantee autonomous continuation of the Hub structure and activities after the end of the project. Hereby the Action Plan, as a managerial tool, should support HUB Facilitators with information required for goals setting and mapping out the essential actions required to achieve specific objectives and resolve particular challenges present in the region in the context of bioeconomy development. This entails setting clear time frames, specific targets, and identifying the appropriate methods for monitoring progress at each step of the process.

An example of a content table for an Action Plan with short descriptions of each chapter:

1. Introduction
   Provides an overview of the action plan and its purpose.
2. Goals and Objectives
   Defines the goals and objectives of the action plan, outlining what will be achieved.
3. Target Audience
   Identifies the specific group or individuals the action plan is intended to reach and benefit.

4. Situation Analysis

Analyzes the current state of affairs, including strengths, weaknesses, opportunities, and threats.

5. Strategy Development

Outlines the strategies and tactics to be implemented to achieve the set goals and objectives.

6. Implementation Plan

Provides a detailed timeline and step-by-step instructions on how the action plan will be executed.

7. Resource Allocation

Identifies the necessary resources, such as budget, personnel, and equipment, required for successful implementation.

8. Monitoring and Evaluation

Establishes a framework for monitoring progress and evaluating the effectiveness of the action plan.

9. Risk Assessment and Mitigation

Identifies potential risks or obstacles and outlines measures to minimize or address them.

10. Communication Plan

Specifies how the action plan will be communicated to stakeholders and the

The Action Plan should support overcoming specific problems, in particular it means identifying and finding solutions to particular challenges or obstacles that may hinder the progress towards achieving identified goals[29]

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[29] *Here are some suggestions for action plan goals across various domains connected to bioeconomy development:*

a. Environmental Sustainability:

- *Decrease carbon emissions by implementing energy-efficient practices in buildings.*
- *Increase recycling rates by implementing a comprehensive recycling program in a community.*
- *Promote sustainable transportation options by encouraging the use of public transit and cycling infrastructure.*

b. Education:

- *Improve literacy rates by implementing reading intervention programs for elementary school students.*
- *Increase access to quality education in rural areas by establishing mobile classrooms or digital learning initiatives.*
- *Enhance skills development by implementing vocational training programs for unemployed youth.*

c. Economic Development:

- *Increase employment opportunities by supporting entrepreneurship through business incubation programs.*
- *Enhance tourism and local economies by developing and promoting cultural and heritage attractions.*
- *Improve financial literacy and access to financial services in underserved communities.*

d. Social Justice:

- *Promote gender equality by implementing policies to reduce the gender pay gap.*

To describe it more concretely, an action plan, one of its key functions is to support the identification and resolution of specific problems that may hinder progress towards achieving the set goals. This involves conducting an in-depth analysis to identify any challenges or obstacles that may arise during the implementation phase and then developing effective solutions to address them. The identification of problems typically involves a comprehensive assessment of the current situation and an understanding of the factors that could potentially impede progress. This could include factors such as resource limitations, external constraints, technical difficulties, organizational barriers, or any other relevant challenges specific to the context. Once the problems are identified, the action plan proceeds to develop solutions that mitigate or overcome these obstacles. This involves strategizing and determining appropriate actions to address the identified challenges. Solutions may include revising timelines, reallocating resources, seeking additional funding, training staff, partnering with relevant stakeholders, or implementing alternative approaches. It is important for the action plan to outline these solutions in detail, providing clear steps and strategies for implementation. By addressing the specific problems and obstacles, the action plan aims to enhance the chances of successfully achieving the goals set forth and ensuring smooth progress throughout the implementation process. Regular monitoring and evaluation, as mentioned earlier, also play a crucial role in identifying emerging problems during implementation.

These problems can be barriers, difficulties, limitations, or any other factors that may cause setbacks or impede the desired outcomes. Overcoming them involves analyzing the root causes, finding alternative approaches, and implementing strategies to address and resolve those problems effectively. Developing an Action Plan means outlining the steps needed to accomplish specific goals and it also includes strategies to tackle and overcome any specific problems or challenges that may arise along the way.

The **6 key steps to develop an Action plan** are:

1. Define your objectives: Begin by clearly identifying your goals and objectives. These should be specific, measurable, achievable, relevant, and time-bound (SMART goals). Understand what you want to achieve and why it is important.
2. Break it down into actionable tasks: Once you have your objectives, break them down into smaller, manageable tasks or actions. These actions should be specific and concrete steps that can be taken to move closer to achieving your goals.
3. Assign responsibilities: Determine who will be responsible for each task or action item. Assigning clear responsibilities ensures accountability and helps in tracking the progress of the action plan.
4. Set deadlines: Establish deadlines for each action item. This creates a timeline and sense of urgency, ensuring that tasks are completed in a timely manner. Consider the dependencies and sequence of tasks when setting deadlines.
5. Identify necessary resources: Determine the resources, such as finances, equipment, or personnel, that are required to carry out each task. This ensures that you have the necessary means to execute the action plan effectively.

- *Strengthen social inclusion by creating programs*

6. Develop a monitoring and evaluation system: Create a system to monitor and evaluate the progress of the action plan. This can include regular check-ins, progress

Tip

When developing the action plan, we recommend **keeping in mind the long-term sustainability strategy of the HUB** (this activity/strategy is part of T5.4, which takes place M24-M36). The strategy should guarantee the autonomous continuation of the HUB's structure and activities after the end of the project. On the one hand, it will guarantee that ongoing actions (e.g. research into new solutions to be adopted within the selected value chain) will not be interrupted; on the other hand, it will allow the regions to capitalize on the knowledge gained.

We therefore recommend that, when developing an Action Plan, you think about how it will be possible in the future (after the end of the project) to identify already existing business models, how to develop business potential, e.g. how to support new opportunities (market requirements, new biomass and the need for new technologies), etc.

Objectives

Objective of your HUB, please try to be precise and propose measurable performance indicators

- It would be advisable to link the objectives with the identified value chains
- Your objectives might reflect the networking and good practice exchanges likewise capacity building for HUB coordinator & facilitator

Each Action plan needs a specific goals/objectives. To developed them follow these necessary steps:

1. Define the goal: Clearly articulate what you want to achieve. Make sure your goal is specific, measurable, attainable, relevant, and time-bound (SMART).
2. Identify the objectives: Break down your goal into smaller objectives or milestones that will help you track progress and stay focused.
3. Conduct a gap analysis: Assess the current situation and identify the gap between where you are now and where you need to be to achieve your goal. This will help you understand what needs to be done.
4. Brainstorm actions: Generate a list of actions or strategies that will help you bridge the gap and reach your objectives. Don't evaluate the ideas at this stage, just focus on quantity.
5. Evaluate and prioritize: Evaluate each action idea based on its feasibility, impact, and resource requirements. Prioritize the most effective and achievable actions that will have the greatest impact on your goal.
6. Create a timeline: Establish a timeline for each action, determining when it needs to be started and completed. Be realistic and consider dependencies between actions.

7. Allocate resources: Identify the resources (financial, human, technological, etc.) needed to execute each action. Ensure you have the necessary resources or access to them before proceeding.

8. Assign responsibilities: Assign specific tasks or actions to team members or individuals who will be responsible for their implementation. Clearly communicate expectations and deadlines.
9. Monitor progress: Develop a system to track and monitor the progress of each action and objective. Regularly review and update the status to make sure you are on track.
10. Adjust and adapt: Continuously assess the effectiveness of your action plan and make adjustments as needed. Be flexible and willing to adapt your approach if obstacles or challenges arise.

To overcome specific problems in developing your Action Plan, consider the following strategies:

1. Break down the problem: If you are facing a complex problem, break it down into smaller, more manageable parts. This will help you analyze and address each aspect individually.
2. Seek input and collaboration: Involve others who have expertise or experience in the problem area. Collaborate with them to gather diverse perspectives and generate potential solutions.
3. Research and gather information: Take the time to gather relevant information that can help you understand the root causes of the problem and identify possible solutions. Use reliable sources and data to inform your decision-making.
4. Set realistic expectations: Be honest with yourself about what can be realistically achieved. Set reasonable goals and timelines that take into account constraints and limitations.
5. Prioritize and focus: Identify the most critical and impactful actions that will address the problem. Avoid spreading your efforts too thin by prioritizing the most important tasks.
6. Seek support or resources: If you lack the necessary resources or expertise to overcome a specific problem, consider reaching out for support. This can be from colleagues, mentors, experts, or even external consultants who can provide guidance or assistance.
7. Stay persistent and resilient: Problem-solving and action planning can be challenging and may require perseverance. Be prepared to face setbacks and obstacles along the way and maintain a positive mindset to keep moving forward.
8. Reflect and learn: Continuously reflect on your progress, evaluate the effectiveness of your actions, and learn from both successes and failures. Adjust your approach as needed based on the feedback and insights you gather.

Remember, developing an action plan is not a one-time event. Regularly review and update your plan as circumstances change, and remain flexible to adapt to emerging opportunities or challenges.

You can get a good inspiration in the D. 3.1. Handbook session 3.2.

Tasks

Task you need to perform to accomplish the objectives, please indicate the time frame and estimate resources. Your hub should carry out the pilot activities to adopt small-scale bio-based solutions in the region. (Vision and prioritization of items/specification of value chain, narrowing down direction of value chains, focus of value chain)

The dataset of the One Stop Shop should support your planning, likewise the available training

All your objectives must be aligned with the activities in the project must lead to meeting the KPIs.

During the KoM your tasks needs to be elaborated in more details, the following table can be a good tool for you as example:

Areas for improvement	Definition of the identified problem + root causes	Potential solutions	Success measure	Task owners	Timeline
Provide more adequate training opportunities	Supervisors were unable to implement proper training programs due to the lockdown	Scattered and distributed teams can feel isolated, this provides a way to make employees feel appreciated	90% staff receive 100 hours of training by the end of the year	HR to brief heads Heads to brief supervisors Supervisors to brief all staff	HR to brief all heads by the first week of Jan Heads to brief all supervisors by the 3rd week of Jan
More exposure to domain knowledge	Most new employees come from outside this industry and need to be brought up to speed in the nuances of this sector	Webinars talks with industry leaders	All new employees will have a more in-depth understanding of industry knowledge	HR to brief heads Heads to brief supervisors Supervisors to brief all staff	All new employees to be brought up to speed by the next appraisal cycle
Create an environment where employees are more easy recognized for achievemnet	Scattered and distributed teams can feel isolated, this provides a way to make employees feel appreciated	Create a peer-based review system that celebrates employees wins	Establish a new organizational culture with 100% participation	HR to brief heads Heads to brief supervisors Supervisors to brief all staff	New system to be implemented by first week of March

TIP

If you still don't know how to write an action plan for your HUB, the *tutorial on the website* might help you. It describes in detail what and how to elaborate an action plan. Very advisable to read through and develp some steps to follow.

Or you can get inspired on the *website*, where templates, examples and "How To" advice are also available.

PART II. KPIs

KPIs, which stands for **Key Performance Indicators**, are measurable values or metrics that are used to evaluate the success of an organization, project, or individual performance against set objectives or goals. They provide a quantifiable way to monitor progress and performance and enable organizations to make informed decisions to improve efficiency and effectiveness.

KPIs, or Key Performance Indicators, are metrics that organizations use to measure and evaluate their performance against specific objectives or goals. They play a crucial role in tracking progress, identifying areas for improvement, and facilitating data-driven decision-making.

To effectively work with KPIs, organizations must:

1. Define clear and measurable goals: KPIs should be aligned with the overall objectives of the organization or project. It is important to clearly define what success looks like and establish metrics that can measure progress towards those goals.
2. Select appropriate KPIs: Choosing the right KPIs is essential. They should be relevant, specific, and able to provide actionable insights. It is important to focus on a few key metrics that directly impact the desired outcomes.
3. Collect and analyze data: Organizations need to collect relevant data to measure KPIs accurately. This can involve gathering data from various sources, such as sales figures, customer feedback, employee productivity, or website analytics. Effective data analysis is necessary to identify patterns, trends, and areas requiring improvement.
4. Set targets and benchmarks: KPIs need to have specific targets or benchmarks to compare against. These targets can be based on industry standards, historical performance, or desired improvements. By setting benchmarks, organizations can track progress and measure the effectiveness of their initiatives.
5. Regularly monitor and review KPIs: KPI monitoring should be ongoing and systematic. Regularly reviewing KPIs allows organizations to identify trends, spot issues or bottlenecks, and take corrective actions in a timely manner. Real-time or near-real-time reporting tools and dashboards can be helpful in visualizing the data and keeping stakeholders informed.
6. Adjust strategies and tactics: KPIs provide insights into the effectiveness of strategies and tactics. If KPIs indicate underperformance or lack of progress, organizations may need to reevaluate their strategies and make necessary adjustments to achieve the desired results.
7. Communicate and align stakeholders: KPIs should be communicated to all relevant stakeholders within the organization. This promotes transparency, accountability, and a shared understanding of organizational goals. Regular communication and collaboration ensure that everyone is aligned and working towards the same objectives.

In essence, working with KPIs involves setting clear objectives, selecting appropriate metrics, collecting and analyzing data, monitoring progress, adjusting strategies as needed, and fostering open communication within the organization. KPIs provide organizations with valuable insights to optimize performance and achieve their goals.

It is important to note that KPIs should be **relevant, measurable, achievable, and time-bound**. Additionally, they should align with the overall goals and objectives of the organization or project.

In summary, KPIs are crucial tools for organizations to track performance and progress towards desired outcomes. By selecting the right KPIs and analyzing the data it provides, organizations can make informed decisions and take actions to drive success and growth.

Even the RuralBioUp project has its set indicators, which I have to fulfill with our activities. These KPIs are related to the project, but they are tied to the activities and establishing and existing HUBs. So we ask you to keep these KPIs below in mind and include them in your goals when compiling the Action Plan and activities of your HUB. The list of KPIs is available on Teams.

1. Expected results: To be reached by M36 of the project (September 2025):

WP	Task	Expected results	Responsible partner(s)	To be implemented per hub	Proposed MONITORING measures	Proposed VERIFICATION measures	Deadline
	Task 3.2 Establishing the Regional Hubs	Establishment of 9 Hubs	ART + ALL RFs	1 kick-off meeting organised per hub	Monthy Hubs' meetings	a report from each kick-off meeting included in D3.2	31/01/2024
		Establishment of 9 Action Plans on 18 value chains	ART + ALL RFs	1 Action Plan on 2 value chains in each hun	Monthy Hubs' meetings	summary of each Action Plan incuded in D3.2	31/01/2024
	Task 3.3 Regional Hubs' Action Plans implementation and monitoring	min. 270 stakeholders involved in 9 Hubs	CIVITTA + ALL RFs	min. 30 stakeholders per Hub		Deliverable 3.3.	30/09/2025
		50 inter-value chains collaborations	CIVITTA + ALL RFs	6 inter-value chains collaborations per hub		Deliverable 3.3.	30/09/2025
	Task 4.2 Implementing supporting activities	Min. 4000 people trained	CIVITTA + ALL RFs	444 persons trained per hub		Deliverable 4.2	31/07/2025
		Min. 1000 assistance activities (emails, meetings, calls, etc.)	CIVITTA + ALL RFs	111 assistance activities per hub		Deliverable 4.2	31/07/2025
	Task 4.3 Networking events	18 networking events in 9 hubs	APRE + ALL RFs	2 networking events per hub involving approx. 120 people		Deliverable 4.3	31/07/2025
	Task 4.4 Sharing knowledge between Regional Hubs & RuralBioUp Followers	Min. 18 study visits	IBF + ALL RFs	2 study visits per hub		Deliverabe 4.4 + D Deliverable 4.5	30/06/2025
		Min. 30 RuralBioUp Followers from 15 countries not covered by the consortium	IBF + ALL RFs	3/4 Followers per hub		Deliverabe 4.4 + D Deliverable 4.5	30/06/2025

2. Expected outcomes: To be reached 3 years after the project:

WP	Task	Expected outcome	Responsible partner(s)	To be implemented per hub	Proposed MONITORING measures	Proposed VERIFICATION measures	Deadline
WP3	Task 3.3. Task 3.3 Regional Hubs' Action Plans implementation and monitoring	150 inter- intra-value chains collaborations; 50 farmers/foresters involved in collaborations start to use their resources in bio-based business models	CIVITTA + RFs	17 inter- intra-value chains collaborations; 6 farmers/foresters involved in collaborations start to use their resources in bio-based business models			3 years after the project end
		>500 new stakeholders collaborating in Hubs and new regions adopting RuralBioUp approach	CIVITTA + IBF + RFs	50 new stakeholders collaborating in Hubs and new regions adopting RuralBioUp approach			3 years after the project end
		9 Hubs structured in a permanent way	CIVITTA + RFs	1 hub per region			3 years after the project end
		100 small-scale bio-based solutions adopted	CIVITTA + RFs	11 small-scale bio-based solutions adopted			3 years after the project end
		market uptake of 50 bio-based new products/services	CIVITTA + RFs	market uptake of 5/6 bio-based new products/services			3 years after the project end
		10 new companies start-up	CIVITTA + RFs	1 /2 new companies start-up			3 years after the project end
		>110M€ of private/public investments in Bioeconomy Hubs	CIVITTA + RFs	12 M€ of private/public investments			3 years after the project end

3. Expected impacts: to be reached 5 years after the project:

WP	Task	Expected Impact	Responsible partner(s)	To be implemented per hub	Proposed MONITORING measures	Proposed VERIFICATION measures	Deadline
WP3	Task 3.3. Regional Hubs' Action Plans implementation and monitoring	Sustainability (processes, business, etc.) improvement > 20%	RFs+ALL	Sustainability (processes, business, etc.) improvement > 20%			5 years after the project
		bio-based materials replacing fossil-based ones: >30%	RFs+ALL	bio-based materials replacing fossil-based ones: >30%			5 years after the project
		new jobs in rural areas >10%	RFs+ALL	new jobs in rural areas >10%			5 years after the project
		companies' turnover >10%	RFs+ALL	companies' turnover >10%			5 years after the project
		Differentiation in farmers/foresters incomes: >25%	RFs+ALL	Differentiation in farmers/foresters incomes:			5 years after the project
		Bioeconomy maturity improvement (a.l. 1 level)	RFs+ALL	Bioeconomy maturity improvement (a.l. 1 level)			5 years after the project
		Regional innovation ecosystem improved (>5%);	RFs+ALL	Regional innovation ecosystem improved (>5%);			5 years after the project
		New jobs in bioeconomy sector >10%	RFs+ALL	New jobs in bioeconomy sector >10%			5 years after the project
		New jobs in bioeconomy sector >10%	RFs+ALL	New jobs in bioeconomy sector >10%			5 years after the project
		Bioeconomy awareness in Regional Hubs >10%	RFs+ALL	Bioeconomy awareness in Regional Hubs >10%			5 years after the project
		Increasing uptake of bio-based solutions and technologies >10%	RFs+ALL	Increasing uptake of bio-based solutions and technologies >10%			5 years after the project

PART III. Example of our preparation for Action Plan - first draft

ART has not yet organized a KoM for our region. For now, we are carrying out the preparation, when we are preparing information about stakeholders, the state of the bioeconomy in the region, threats and needs of the region. We have also started preparing a draft of the Action Plan, which we will use as a template, and until the KoM and the next meeting, we will validate the information from the preliminary research with the stakeholders and then continue developing the Action Plan based on this.

Below we show you a **preview of our preparation** (pre-research of the region), which we will further develop with stakeholders.

Action Plan BIOEAST HUB CZ Charles Spa Region

Draft version July 24th

1.Intro

Charles Spa Region shares a major part of its border with Germany, the Krušné hory Mountains stretch across the region along the state border with the highest point Klínovec (1,244 m). The lowest point is located on the Ohře River near the border of the region. Neither the climate, nor the composition of the soils favor agriculture. Natural resources and mineral wealth (i.e., mineral springs and medicinal waters) belong to the key assets of the region.

Region covers an area of 3 310.1 km2 and thus occupies approximately 4.2% of the territory of the Czech Republic. In terms of the number of municipalities in the region, the Karlovy Vary Region is the smallest in the Czech Republic. The average area of a municipality is 24.7 km2. In total, there are 133 independent municipalities of various sizes and the Hradiště Military District. **The population in the region has been declining quite steeply since** 2010 and on the top of that it is getting older (the regional average is 43.5 while the national average is 42,7) that is also caused by a low birth rate and outflow of younger population to less advantage regions.

The regional economy has been specialized in mining and energy for a long period of time; there are significant lignite mining capacities in the region, however, the reserves are gradually becoming thinner and the mining industry in the region is gradually closing down its activities (the closure is expected within a few years) and trying to replace them with other ones (e.g. activities of Sokolovská uhelná, a.s. related to the new use of areas after coal mining). In particular, the activities of engineering companies are linked to traditional industries, and the

chemical industry also plays a role.[30] One of the main pillars of the economy of the region[31] is **lignite mining and related industry**.

2. Preparation for the HUB Establishment

BIOEAST HUB CZ is a working tool of the BIOEAST initiative of Central and Eastern European countries, it is also the first national bioeconomy BIOEAST HUB in the BIOEAST region established in line with the BIOEAST Governance and Roadmap and with the support of BIOEAST NCP and the Ministry of Agriculture CZ to gather stakeholders and support their engagement in bioeconomy.

In line with the DoA the goal of the RURALBioUP project is to establish the BIOEAST HUB CZ Charles Spa Region. The BIOEAST HUB CZ team did the following activities to prepare the BIOEAST HUB CZ Charles Spa Region establishment:

- Desk research of the public strategies, statistical data analysis focused on the regional priorities related to circular bioeconomy transition, identifying key stakeholders
- Providing a data base from public resources of entrepreneurs and NGOs focuses on areas related to circular bioeconomy
- Interviews with key stakeholders – representative of the reginal development agency (KARP), members of the regional research and innovation advisory board, entrepreneurs and NGOs

3. Charles Spa Region and its state of art

3.1 Public strategies and policy instruments

There are a few public strategies and policy instruments that are relevant to the transition towards sustainable development, circular economy, and economy independent on fossil fuels. **One of the key documents addressing the regional transformation oriented towards all three pillars of sustainable development from a fossil-based economy is the Just Transition Plan[32]**, that indicates infrastructure activities, short and long term, investments in the territory and development of people's potential. The primary policy instrument for the transformation is the Operational Programme Just Transition Funding that is enhancing **circular economy by introducing related technologies, processes, and methods,** supporting **transformation of existing businesses towards low-carbon operations,** support for new business development,

support for innovation, digitalization, science, and research.

Development Programme of the Region 2021-2027 that is introducing the principles of circular

[30] https://www.mmr.cz/getmedia/cbc417b6-d56e-45e3-8b5c-989b7e691852/Priloha-Aktualizace-SR-Aktualizace-vstupni-analyzy-SR.pdf.aspx?ext=.pdf

[31] JTF, https://dotaceeu.cz/getmedia/70636969-9d91-49ae-b41d-af4b5027234e/PSUT-dokument_2.pdf.aspx

[32] https://dotaceeu.cz/getmedia/70636969-9d91-49ae-b41d-af4b5027234e/PSUT-dokument_2.pdf.aspx

economy and improving waste management including several measures such as sufficient capacity of waste treatment and recovery facilities, technologies processing biomass. **The Territorial Energy Concept of the Karlovy Vary Region, Update 2017 - 2042**[33] sets out the objectives and principles of energy management in the territory of the region and careful management of natural energy resources. The primary focuses of the **Charles Spa Regional Innovation Strategy of the region** is to promote innovation and cooperation in the quadruple helix framework. The SWOT analysis indicates the potential for recycling of raw materials, bio food, renewable resources and new materials and as an opportunity for business innovation and applied research. The strategy also defines strengths and opportunities for innovative entrepreneurship, research and development in sectors other than traditional sectors or at the interface of several sectors with potential for branching out (raw material recycling and new materials, renewables and energy, bio-food, etc.).

3.2 Biomass production and utilization

There were 707 farmers in 2020, 302 holdings dispose of an area of agricultural land up to 10 ha in size. In 2020,1 016 342 m3 of wood was harvested, this wood was not affected by bark (unlike lots of forest in the Czech Republic).

	2019	2020	2021
Agricultural producers	**739**	**707**	**678**
with agricultural land up to 10 ha	313	302	283
Utilised agricultural area (hectares)	**97 255**	**96 599**	**97 541**
Arable land	34 864	35 124	35 463
Fallow land	430	295	386
Permanent grassland	62 087	60 827	61 643
Output of the agricultural 'industry' (current prices)			
Total (CZK million)	2 064	2 234 [3)]	2 417
Crop output	1 122	1 290	1 562
Animal output	877	875	782
Agricultural services output	19	20	22
per hectare of agricultural land (CZK)	21 293	23 012 [3)]	24 651

[33] http://www.kr-karlovarsky.cz/samosprava/dokumenty/Documents/koncepce/OZZ_uzemne_energeticka_koncepce.pdf

Crop production			
Harvest (tonnes)			
Cereals	103 204	108 250	106 148
Potatoes	2 577	2 104	2 717
Rape	16 910	19 360	14 486
Animal production			
Livestock density			
Cattle[1)]	45,0	44,5	44,2
Pigs[2)]	45,6	46,8	46,9

[1)]head per 100 ha of the utilised agricultural area; as at 1 April
[2)]head per 100 ha of the arable land; as at 1 April
[3)]half-finalised results

Table 1. Agriculture production 2019 – 2021 (Cezch Statistical Authority)

The most promising technologies for biomass utilization are composting units and biogas plants. These bio economical technologies have the potential to connect entrepreneurs in value chains, there is a great potential for innovation, digitalization and enhancement of new products and services.

In the Karlovy Vary Region, there are currently 11 composting plants in operation disposing a total capacity of 51,100 t/year. 6 plants are operating under the Waste Act regime, 5 are mostly smaller community composting plants, where mainly compostable "waste" from municipal green maintenance is processed (there is no need to comply with the Waste Act regime).

The capacity of composting plants in the region may seem sufficient at first sight, but the closer look of the entire territory shows that there are district where the composting units are missing (i.e. from the logistic point of view and transport costs it is not economical to transport waster further than 30 km)[34]. The composting plants and listed below (also the capacity is provided).

Composting plants - larger facilities (5)

- A. S. A., spol. s r.o., Březová (at the Tisová landfill); capacity = 10 000 t/year
- AVE CZ waste management s.r.o., Hradiště (at the landfill); capacity = 26 000 t/year
- REGENT PLUS Žlutice spol. s r.o., Žlutice; capacity = 4 800 t/year
- Landfill Chocovice s.r.o., Třebeň u Františkových Lázní; capacity = 5 000 t/year

[34] http://www.kr-karlovarsky.cz/samosprava/dokumenty/Documents/koncepce/ODPADY_POH_KVK_analyticka_cast_26_10_2015.pdf

- Spa Parks Administration, contributory organisation, Karlovy Vary; capacity = 3 500 t/year

Small and community composting (6)

- Technical Services of the City of Kraslice o.p.s. - Kraslice (community composting plant on the body of the landfill), (capacity not specified)
- Městské lesy Kraslice, spol. s r.o. - Kraslice - small composting plant under the Waste Act with a capacity of 150 t/year
- Bublava Municipality - Bublava - community composting plant behind the cemetery on plot no. 1225/2 in k.u. Bublava, (capacity not specified)
- Municipality of Stříbrná - Stříbrná - community composting plant at the local cemetery, plot No 1419/2 in the cadastral area of Bub Bublava Stříbrná, (capacity not specified)
- Ašské služby s.r.o. - Aš - community composting plant with a capacity of 700 t/year
- Municipality Krásná - Krásná u Aš - community composting plant with a capacity of 500 t/year

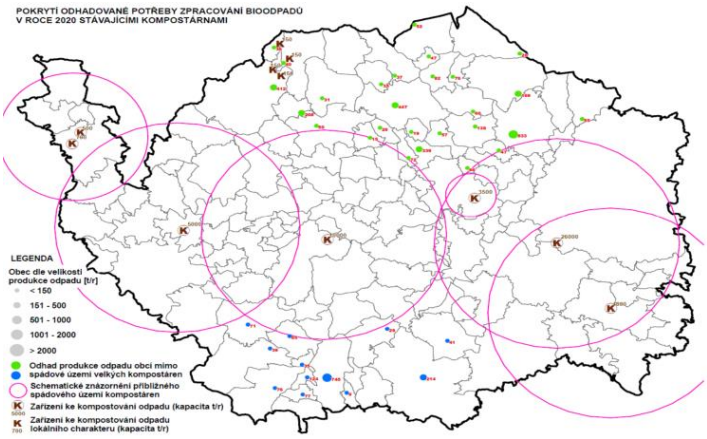

Figure 1. Network of composting unit

There are 14 biogas plants, and 103 wastewater treatment plants are in operation with a total capacity of 126 338 m3/day. Their distribution is shown in Figure2 below.

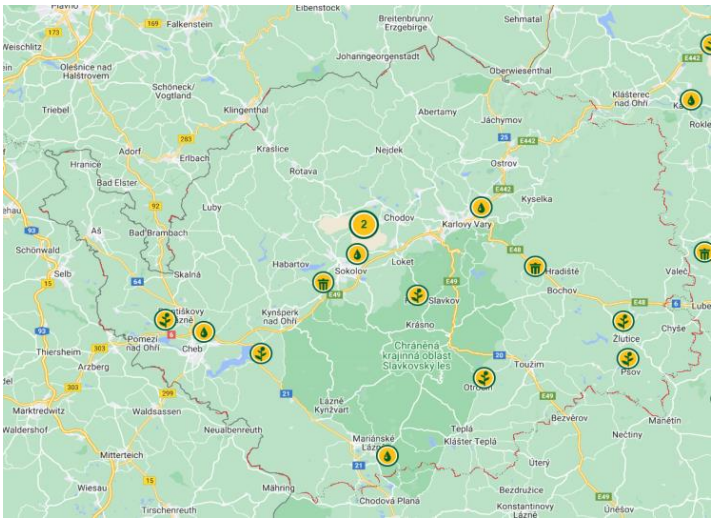

Figure 2. Network of biogas plants and wastewater treatment plants

Transformation towards circular bioeconomy enhances sustainable electricity production and reduction the dependence on fossil-based resources.

4. Conclusions from state of the art in each region (strengths and gaps)

Define some "Fields of actions" i.e. education, cooperations, ….

5. Conclusions from stakeholder mapping

You can use the documents and knowledge you provided in the Task 3.1. a brief summary will be very usefull.

STAKEHOLDER GROUP	Indicate ALL INSTITUTIONS you have mapped so far (please also indicate if they are in the hub CORE TEAM[1] or have some other specific role in the hub)	Ideas to DESIGN OUTREACH ACTIVITIES to reach/inform/involve them (tools, formats, etc. - e.g. information leaflet...)	Do you have any REQUESTS to RuralBioUp to better reach out to stakeholders (e.g. specific information, dissemination material, etc.)?
policy/administration	BIOEAST HUB CZ: Informal intermin. group - Ministry of Agriculture, Ministry of Industry and Trade, Ministry of Education, Youth and Physical Education, Technology Agency of the Czech Republic,	BIOEAST HUB CZ: good practice of • regular on-line meeting • providing support in concept papers Cp development (f.e. Cp 4 nat BE str, Cp nation agriculture research, RIS 3	RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.

	BIOEAST HUB CZ Charles Spa - Regional Development Agency (KARP) • Regional Council for R&D	strategy, JTF instruments for all 3 regions) • Managing stakeholder consultations on strategies provided by policy makers (f.e. National Circular Economy Strategy) • (Co)organazation of internal national events f.e. under the Czech EU Presidency BIOEAST Support for the Danube Lighthouse Implementation, BIOEAST Bioeconomy Education perspective) BIOEAST HUB CZ Charles Spa • cooperation on content development for events organized by regional policy makers, I.e. awareness raising for bio economy, showcasing good practices from other regions to inspire, encourage, engage and involve local businesses into bioeconomy • Providing comparative analysis with other regions • Planning study visits and training	
private sector/business	BIOEAST HUB CZ: • A few SMEs are members and has recently become members • AgriKomp Bohemia • ProPelety • VepaSpol BIOEAST HUB CZ Charles Spa • The initial database is being provided • Recommendation from the members of BIOEAST HUB CR	BIOEAST HUB CZ: good practice of • regular on-line meeting • information about brokerage events, opportunities in national and international programme; BIOEAST HUB web pages post all available NL (ERDF, Interreg, CBE – JU) • support tools for project development and networking with R&D Institutions and methodologies BIOEAST HUB CZ Charles Spa • awareness raising events • networking • promotion for regional SMEs (in preparation)	RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.
Research and innovation	BIOEAST HUB CZ	BIOEAST HUB CZ: good practice of	RuralBIOUp project has a great

	• VSB- Technical University Ostrava, MENDELu Agro Faculty • Research organizations (ZVT, Agritech, Comtes FHT to name but a few examples • Association of Research organizations • Czech Agriculture Academy of Science • Czech Technology Platform Plants for the Future BIOEAST HUB CZ Charles Spa • the biggest challenge of this region is the missing R&D infrastructure (there are no research organizations neither universities) • The goal of this regional department is to provide connections between local SMEs and research institutes from the neighboring regions, primarily Pilsner Region (good practice of AVO)	• regular on-line meeting • Supplying information about new projects possibilities (inter)national programs • Promoting and active participation in the info days (f.e. CBE-JU, HE) • Development of the first e-map that connects R&D organizations and businesses • Development of methodologies how to effectively manage R&D focused on SMEs and how to implement BE innovations BIOEAST HUB CZ Charles Spa • Promoting and active participation in the regional info days (f.e. JTF) • Awareness raising about the available tools and good practices	potential to exchange information, learn from each other, build new connections.
Education community	BIOEAST HUB CZ: • BIOEAST HUB CZ is the coordinator of the macro-regional BIOEAST TWB BE Edu • BIOEAST HUB CZ established BIOEAST uni net BIOEAST HUB CZ Charles Spa • Since there's no universities the focus is on secondary school	BIOEAST HUB CZ: good practice of • discussion in the wider (i.e. macro-regional) perspective • Macro-regional network enables sharing experience among different projects focused on education (BIObec, BIOGOVnet, GenBe, BIOEco-Up) • regular on-line meeting BIOEAST HUB CZ Charles Spa • BIOEAST HUB team developed on-line mini site and also tutorials for Secondary School teachers focused on bioenergy, composting and biogas including	RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.

		interactive videos, these will be shared in the region	
Civil society (NGOs, associations, interest representation, etc.)	BIOEAST HUB CZ: • Czech Technology Platform Plants for the Future • ZERA Regional Development Agency • Cluster Mechatronica BIOEAST HUB CZ Charles Spa • We are building the connection with a special focus to local action groups	BIOEAST HUB CZ: • Facilitating the co-organisation of common events and participation on national events (Nabočany - Our Fields, Southern Bohemia Zeměživitelka, Tech Agro Fair in Brno) • Common projects focused on innovation and technology transfer, composting campaign, new breeding techniques, international cooperation to name but a few examples • Development of strategic documents, f.e. Technology foresight of applied research, Road Map of applied research, National Concept paper for bioeconomy strategy. BIOEAST HUB CZ Charles Spa • Building bridges between regional actors and organizations from other regions in relevant areas (composting, innovation, and technology transfer) • Support for SMEs how to develop R&D activities in bioeconomy	RuralBIOUp project has a great potential to exchange information, learn from each other, build new connections.

Conclusions from mapping of stakeholders' needs:

Education and R&D: very low R&D infrastructure and expenditure (no mention to biotechnology), there is no university located in the Charles Spa Region only departments of the Western Bohemia University (located in Pilsner Region) and department of a private University of Management and Public Governance (locate in Prague) no relevant education for circular bioeconomy, lack of entrepreneurial mentality

Funding: low investment in innovation and new technologies; Innovation vouchers, more funding methods are currently under negotiation and are expected to facilitate the transition

Networks: there is not any cluster or technology platform working in the region

Potential for value chains:

- limited land for agriculture doesn't allow for extensive energy use
- enhancement the disposable infrastructure of biomass utilization

6. Added value for stakeholders

RuralBioUp HUB of the Charles Spa Region can network stakeholders, enable sharing good practice, providing the connection to research organisations and provide training focused on bioeconomy and innovation management.

Added value proposition tailored made for key stakeholder groups:

1) Public administration
   - cooperation on content development for events organized by regional policy makers, I.e. awareness raising for bio economy, showcasing good practices from other regions to inspire, encourage, engage and involve local businesses into bioeconomy
   - providing comparative analysis with other regions
   - organizing study visits and training
2) Private sector/business
   - awareness raising events
   - networking and enhancememnt
   - promotion for regional SMEs (in preparation)
3) Research and innovation
   - Promoting and active participation in the regional info days (f.e. JTF)
   - Awareness raising about the available tools and good practices
4) Education community
   - BIOEAST HUB team developed on-line mini site and also tutorials for Secondary School teachers focused on bioenergy, composting and biogas including interactive videos, these will be shared in the region
   - Civil society (NGOs, associations, interest representation, etc.)
   - Building bridges between regional actors and organizations from other regions in relevant areas (composting, innovation, and technology transfer)
   - Support for SMEs how to develop R&D activities in bioeconomy

7. Implementation part

Objectives

This topic should be co-created together with your stakeholders and HUB members – this is the first proposed goals (let say "template") - so that stakeholders understand the direction in which the goals need to be thought about.

1) Act as a regional network of stakeholders interested in exploring and implementing circular bioeconomy
    - Provide tailored training focused on circular bioeconomy (min 444 stakeholders)
    - Provide assistance for stakeholders (explanation, briefing (111)
    - Organise networking events (2) and bringing new stakeholders (50)
2) Bridge Charles Spa Region with other EU regions and shared good practice how to implement bioeconomy
    - Organise study visits
    - Sharing knowledge with followers (3 – 4 outside RuralBIOup project)
3) Enhance innovation and technology transfer in Charles Spa Region
    - Support intra value chains collaboration (17, 6 farmers and foresters), new companies / start-ups (1/2)
    - Adopt small bio-based solution (11) and market uptake of 5-6 new bio-based products /services
4) Support the enhancement of value chains (6 value chains)
    - Bring public / private investments (12 mil EUR)

Tasks

Each of the action needs an explicit and detailled outline of the requested elements (target group, time line, resources, progress, KPIs) – will be also developed with stakeholders on meeting.

- Organising networking events, sharing good practice, and learning from each other (O1)
- providing the connection to research organisations – introducing e-tool for searching relevant R&D infrastructure (O2)
- organise match making events (O1, O2)
- provide training focused on bioeconomy and innovation management (02, 03)
- sharing good practice from BIOEAST HUB CZ members from other regions of the Czech Republic (01, 03)