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D5.3 – Bio-based initiatives lab

Fundación CIRCE

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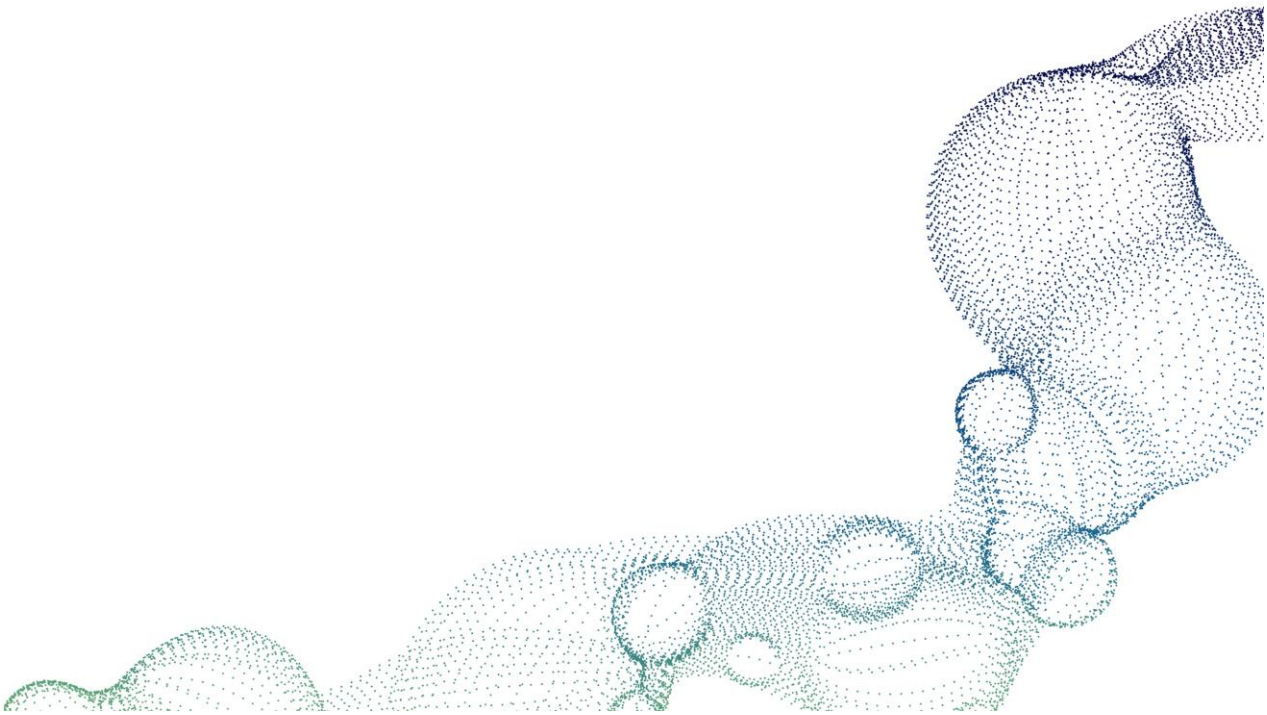

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DISSEMINATION AND UPTAKE

The document is confidential only for members of the consortium (including the Commission Services). It shall be used by all partners within the project.

VERSIONS AND HISTORY OF CHANGES

Version	Due date	Author/Editor	Contributors/Reviewers	Description
V1	09.01.2024	CIRCE	CIRCE, UHOH, DGA, CERTH, AUP, BICB, ACIS, DOOR, RCISD, BUAS, AVO, GA, SPRI, ZSI	First version of the D5.3 sent to the WP5 leaders (ZSI) for their revision and feedback
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1. Introduction

The BIOLOC project supports twelve European regions on identifying and developing local potentials through sustainable, innovative, and participative routes to achieve a green transition. In the context of a circular bioeconomy (CBE), this project aims to amplify the impact of social innovation while revitalising communities and accelerating their transition to resource-efficient, circular, and bio-based production/consumption systems. The social innovation is a key element of BIOLOC activities, in which inclusive business models are envisioned to address the challenges faced in several regions, such as ageing population, rural migration, scarce services and infrastructure, high unemployment rates and the existence of socially marginalized groups.

BIOLOC is structured in work packages (WPs) to *i)* describe and analyse in detail the selected European regions (WP2 - *Barriers and opportunities assessment to revitalise local EU communities by tailoring bio-based systems to their specific needs*); *ii)* mobilise and develop novel circular systems in said regions (WP3 – *Catalogue of bio-based solutions and good practice examples* and WP4 - *New and updated network-oriented business models, governance and local capacity building)*; *iii)* apply, support and monitor solutions (WP5 – *Support the deployment of bio-based solutions for the revitalisation of local communities*) and *iv)* reach out both to general and specific audiences, enabling replication of the project in other contexts (WP6 – *Communication, Dissemination and Exploitation*). In detail, the WP5 has the objective to foster the deployment of local hubs for interaction with local stakeholders and for a participative development of bio-based solutions tailored to each specific context and able to being positive impacts and trade-offs for the communities and environment in the 12 selected regions.

WP5 is comprised of four different tasks, among these the T5.3 – *Bio-based initiative labs*. This task involves the organisation of workshops in all communities with stakeholders from various sectors (academia, government, civil society, industries, and primary sector), following a standard structure adapted to each context. The workshops will be followed by dedicated interviews and meetings to define the most promising initiatives to support, accounting for both social inclusion and sustainability (circularity, bio-based byproducts valorisation) aspects. This deliverable describes the results of T5.3., including the methodology used for planning and implementing the workshops, the supporting materials prepared to ensure homogeneous outcomes along all regions, and the outcomes themselves described per region (brief description of the region, main planning info, attendance and photos, and main insights and discussions that took place, concluded by the defined path forward). This task has synergies with all WPs of BIOLOC, as illustrated in Figure 1

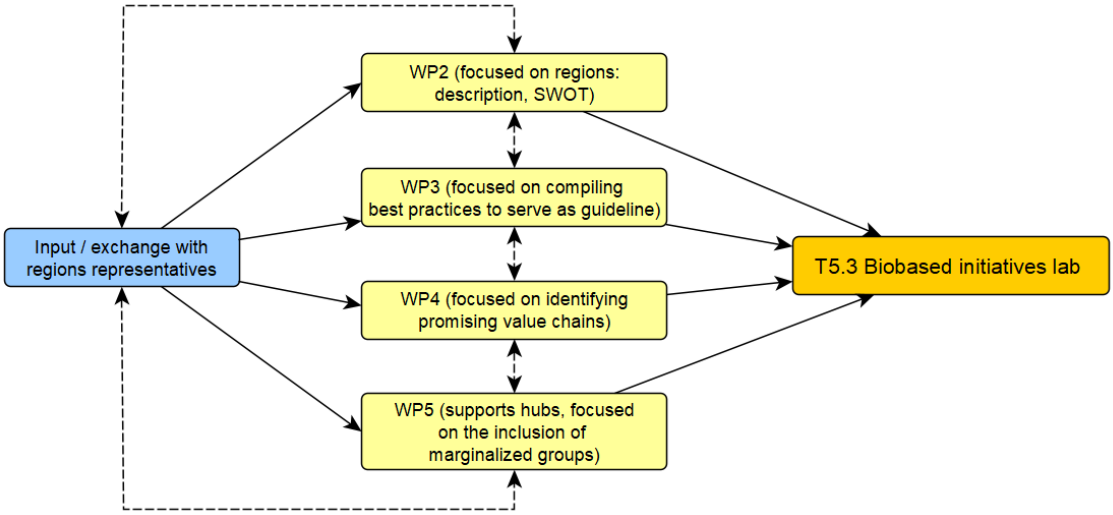

Figure 1. Interactions between activities of T5.3 and WPs 2-5 of BIOLOC

Task 5.3 and deliverable D5.3 were structured by CIRCE, being a compilation of the collective efforts from all region representatives (UHOH, DGA, CERTH, AUP, BIC, ACIS, DOOR, RCISD, BUAS, AVO, GA, SPRI) and the WP5 leaders (ZSI). These partners actively contributed to the methodology design which also took into consideration the outcomes reported in DV2.2 and 2.3 and overall workshop organization, as well as ensured a proper gathering of information after the workshops took place. The revision of the first version of D5.3 was done by ZSI, while the second draft version was reviewed by all the BIOLOC regional partners representatives. The twelve regions from twelve different European countries that participate in BIOLOC are described in Table 1. BIOLOC regions and corresponding NUTS-2 regions below.

Table 1. BIOLOC regions and corresponding NUTS-2 regions

	Country	**BIOLOC regions**	**Corresponding NUTS-2 regions**
1	Bulgaria	Plovdiv region	South Central Bulgaria (Yuzhen Tsentralen)
2	Czech Republic	Moravian-Silesian region	Moravian Silesian (Moravskolezsko)
3	Germany	Baden-Württemberg region	Stuttgart, Karlsruhe, Freiburg, Tübingen
4	Greece	Western Macedonia region	Western Mazedonia (Dytiki Makedonia)
5	Spain	Aragón region	Aragón
6	Croatia	Adriatic region	Adriatic Croatia (Jadranska Hrvatska)
7	Italy	Campania region	Campania
8	Hungary	Northern region	North Hungary (Észak-Magyarország)
9	Netherlands	Apeldoorn region	Gelderland
10	Romania	West region	Western Romania (Vest)
11	Slovenia	Whole country	Eastern Slovenia (Vzhodna Slovenija) Western Slovenia (Zahodna Slovenija)
12	Slovakia	Nitra region	Western Slovakia (Západné Slovensko)

2. Methodology used for the planning and implementation of the workshops

The T5.3. workshops were planned by CIRCE with a very relevant participation of the WP5 leaders (ZSI) and feedback from all regions' representatives. The main idea was to define the goals and non-goals of the event and to equip partners with tools and guidelines to support them in organizing and facilitating the workshops in an effective manner. An important aspect was to ensure a certain homogeneity among the workshops in the different regions – while there was freedom for each partner to adapt the event to local particularities, hub status and attendees, several materials were developed to obtain harmonized output and feedback, as well as to have a good base of specific information to be used in the next steps of the task and along the BIOLOC project.

Accordingly, the following list of general guidelines were prepared and shared with the task participants:

1. Strive for a balanced attendance (stakeholders from industry, government, academia, citizens). A way to engage people is to formulate well how they will benefit from participating. See some examples below:

    - **Biomass suppliers (farmers, cooperatives):** Valorizing agri-residues can lead to a new source of income to streams typically discarded or used in very low value applications. Please check for any local initiatives from this sector to valorize biomass residues.
    - **Industries:** Bio-based value chains (using agricultural residues for example) can have a very positive impact on industrial decarbonization, improving the sustainability aspects of industrial processes. Target industries are those that can easily integrate biomass in their processes, namely: energy-intensive industries in terms of heat demand (metallurgy, cement, chemicals, food and beverages, glass…); industries that can incorporate biomass in their products and/or extract valuable ingredients from it (materials, chemicals, cosmetics). Check beforehand if said local industries have a decarbonization/sustainability agenda, and even if they don't, contacting them can serve as a first incentive.
    - **Social representatives and associations**: New local value chains can generate jobs and know-how, promoting the inclusion of disadvantaged groups and avoiding the depopulation of rural areas.
    - **Academia and R&D centers**: These partners can contribute with their experience in similar projects by bringing proven solutions and best practices, as well as the possibility for knowledge transfer and upscaling/replication. Real case studies within the local context are a rich opportunity to exchange ideas and expertise, generate knowledge and specific guidelines for local development aligned with the circular bioeconomy.
    - **Government representatives**: This is an opportunity to share with other stakeholders about any functioning or planned (in the short term) instruments/incentives that could i) help including socially marginal groups or increasing employment rates; ii) improve the sustainability of local industries; iii) support the modernization of primary activities such as agriculture. Knowing the information of current governmental actions and subsidies in the region (related to BIOLOC's activities) can really help to promote new socially responsible value chains in the local bioeconomy.

2. Importantly, implement the workshop in your local language. Translate the materials provided by us so all participants fully understand their content and are comfortable to actively participate.
3. The workshop can be carried out online or in-person – we do recommend in-person for better interaction and engagement from participants.
4. Please reserve at least 2h (up to 4h) for the workshop – if you plan activities that will extend 2h, it is advisable to add a small break in between. Adapt the slides content and activities to the duration of your workshop.
5. Send the documents by e-mail in advance if the workshop will include interactive activities such as a collaborative whiteboard. If people come to the event prepared and have an idea of the activities, it will be easier to kick-off discussions, as well as to identify local challenges and opportunities.
6. Before start sharing materials/presenting slides, we advise to have a short introduction round where each participant present him/herself and the organization they represent. Make use of the provided attendance list for the event with names, organization, and sector (industry, academia, government, civil society, etc.).
7. Read the post-workshop template file containing the expected outcome of the workshop.
8. Starting with short (5-10 minutes) icebreakers or team-building exercises is useful to create a comfortable environment and build rapport among participants from different backgrounds.
9. The slides presentation shouldn't last more than 30 minutes, as the most important part of the workshop is the exchange of ideas and dynamic activities so that stakeholders engage and openly discuss.
10. If you have an attendance of >8 people, it might be good to break participants into smaller groups mixed with representatives from different stakeholder categories for the activities. Assign each group a specific topic or question to discuss. This encourages diverse perspectives and cross-pollination of ideas. Then, return to de big group and start the open discussion and brainstorming sessions where participants can freely share their thoughts and ideas.
11. Conclude the workshop with action planning. Have participants collectively identify actionable steps, assign responsibilities, and set deadlines. This ensures that the ideas generated during the workshop translate into tangible outcomes.

Besides general guidelines for organizing the events, CIRCE and ZSI shared various options of online and off-line tools and activities to engage participants.[1-10] For instance, the training "Ideas for workshops methods for BIOLOC hub partners" (Lindorfer, Tschank, Handler) was held in the BIOLOC monthly hub call in September 2023. Openers and warm-up activities were suggested so that participants feel comfortable in the group and get to know each other, create a basis for further cooperation, and get warm with the topics addressed in the event. Table 2 shows some examples of openers.

Table 2. Examples of openers that can be used in the BIOLOC workshops.

Method	Description	Advantages
The constellation	During the activity, participants line up in the room according to predefined questions. Questions can move from being very "light" ("how far do you live?") to more topic-specific ("how involved to you feel in the topic xy?"). As a facilitator you can go around and ask questions ("please tell us your name and explain why you stand where you stand").	Quick and easy, but you need space.
Commonality Poster	Make a short group exercise and let groups collect commonality, which they find among themselves and write/draw on a poster. You might be very open on commonalities and focus on the "getting to know" each other (hobbies, food, etc) or ask also for more specific commonalities, which concern the workshop topic (backgrounds, expectations, etc.).	Takes a bit longer, but people interact more personally.
Artefact exercise	Provide a selection of different objects on a table (or ask your participants to bring one). Participants choose an object based on a question that you give ("what represents your relation/feeling to todays' topic?", etc.). Every person introduces himself/herself and explains why he/she chose said specific object.	More creative than a classic introduction round.
Two truths, one lie	Tell attendees to think of two true statements, and one that is false, about themselves. People move around and vote on the false statement. In the end players provide the solution.	It is a cheerful game.

Activities to brainstorm and generate ideas were suggested to stimulate thinking, encourage out-of-the-box ideas, and foster collaboration, as well as explore new possibilities with an open mindset. Table 3 shows some examples.

Table 3. Examples of brainstorming activities that can be used in the BIOLOC workshops.

Method	Description	Advantages
Brainwalk	This is a useful method to tease out knowledge and experiences of participants by walking silently in a room. You hang up several posters in the room with specific topics or questions. Every participant receives a block of post-it notes and a marker. Silently, they walk around the room and	Participants can reflect a moment for themselves in silence.

	share their ideas about the topics/questions on the posters by sticking post-it notes.	
World café or idea circle	Several tables with flipcharts and pens are set up in a room. Each table has a moderator. 4-6 participants discuss a question/problem on a table for 15-30min. Then participants change tables, where moderators give a summary of previous discussions and continue discussing and writing thoughts down on flipcharts. In the end moderators sum up results. The formulation of the questions is crucial for the result.	Good for the development of collective intelligence.
Handstand	With this method, you reformulate your challenge and twist it into exactly the opposite. They literally turn the problem upside down (ask what does not work, what prevents to achieve your goals) to generate new perspectives and ideas.	Consciously breaks through the need for harmony.
Simulated group interview	Divide participants in groups of 4 and assign roles: one interviews and asks questions (e.g., on bioeconomy potential in his/her region), the other 3 take notes and report. They take turns and present the outcome.	Good way to exchange experiences.

Activities to prioritize ideas were also suggested in cases where it is needed to sort ideas according to different criteria, narrow them down and reach decisions as a group that everyone support. Table 4 shows some examples.

Table 4. Examples of activities that can be used in the BIOLOC workshops for sorting and prioritizing ideas.

Method	**Description**	**Advantages**
Dot voting / quick voting	Participants vote with an equal number of sticky dots on their favorite items. It is important to determine the specific purpose of the voting process.	Quick and easy.
Matrix	Prioritise on an idea matrix: define two axes (e.g. “impact on target group” and “feasibility”) and visualise a graph. You can tape the axes to the floor with tape or draw posters where you clearly indicate the axes. Ask attendees to allocate each idea on the graph (0 to 10 points for each variable). The final picture helps you to make a diversified selection.	Visually organizing ideas based on main criteria helps identifying what needs immediate attention and what can wait.
MoSCoW	This technique categorises items into four prioritisation levels: Must-haves, Should-haves, Could-haves, and Won't-haves (or Will-not-haves). It helps in distinguishing between essential	helps teams make informed decisions about what to prioritize

	and optional features or requirements, allowing the group to focus on the most critical aspects first.	and what can be deferred or excluded
Elevator pitch	Participants summarize main results in 1 min or in 1 sentence.	Quick exercise, to focus on most important points from the attendees' perspective

Closure activities were suggested to promote a reflection, acknowledge the participation of attendees, bring an opportunity for immediate feedback, create a good last impression and build confidence in the agreed direction of impact and next steps. Table 5 shows some examples.

Table 5. Examples of closure activities that can be used in the BIOLOC workshops.

Method	**Description**	**Advantages**
ABC-method	Divide your group in sub-groups and let each group find one term for each letter of the alphabet asking e.g., "what stays in your memory from today's meeting?" (**A**-fternoon coffee, **B**-enchmarking, etc.). Participants write down terms on a poster. This is a good way of summing up what you did during the workshop.	Consolidates learnings
What do I take, what do I leave	Ask each participant "what do you take away from todays' workshop" and "what do you leave here" (e.g., "I leave my fear of...")	Foster reflection and conveying main take away messages

Typical online collaborative tools were also introduced to the region representatives, notably the ones listed below:

- **Miro**: A collaborative online whiteboarding platform for brainstorming, planning, and visual collaboration. Other tools are available such as mind maps, flowcharts, etc.

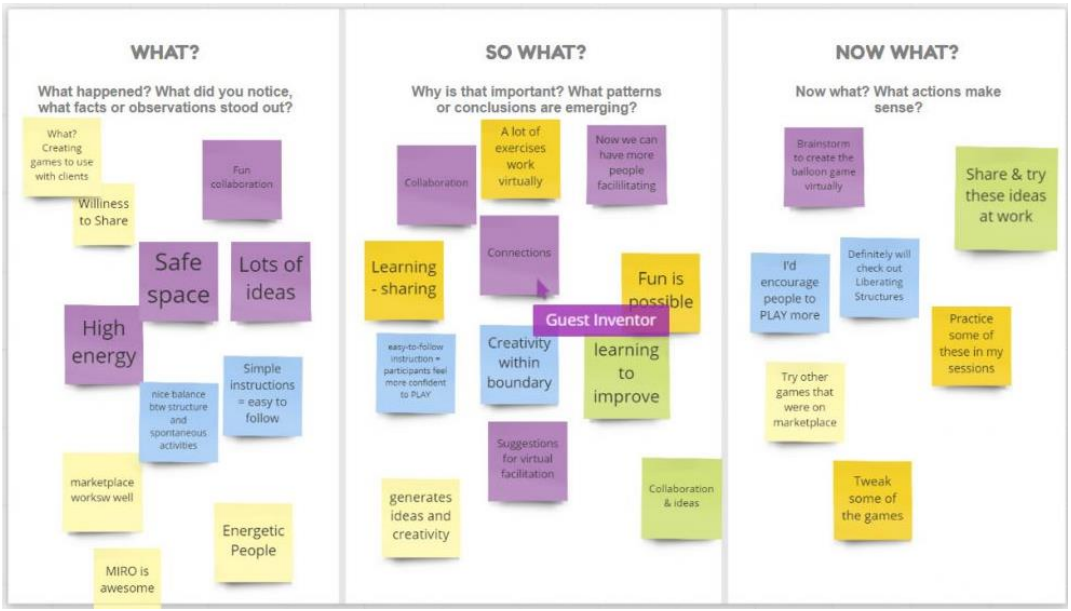

Figure 2. Example of a Miro online whiteboard

- **MindMeister:** Helps teams create and share mind maps for idea generation and planning.

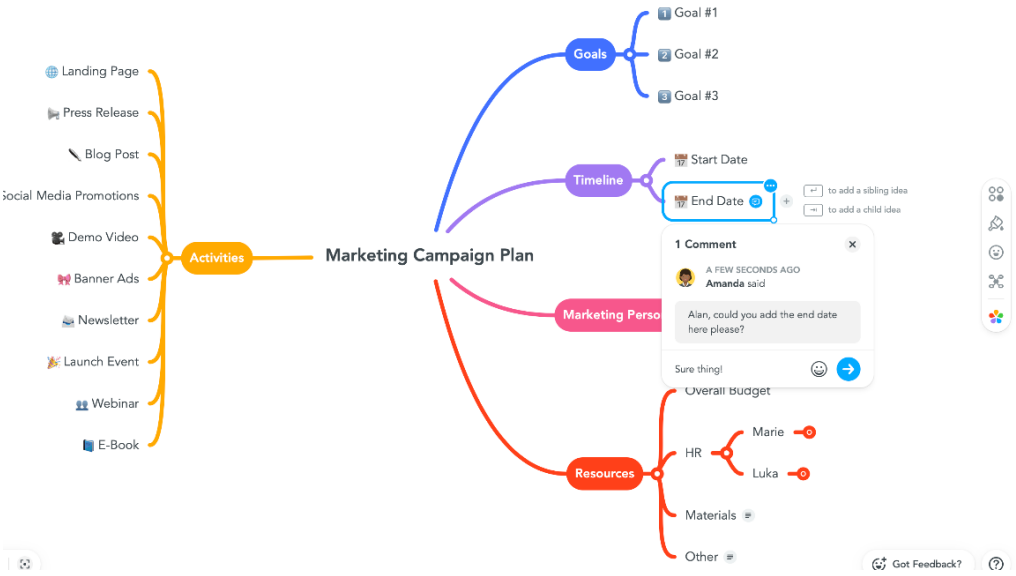

Figure 3. Example of a MindMeister collaborative mind map

- **Mentimeter**: gathers quick feedback, opinions, and preferences from participants during the workshop. You can create quizzes, games, and polls. This tool is very useful as an icebreaker for the beginning and/or a closure activity. It is easily accessible from your mobile phone.

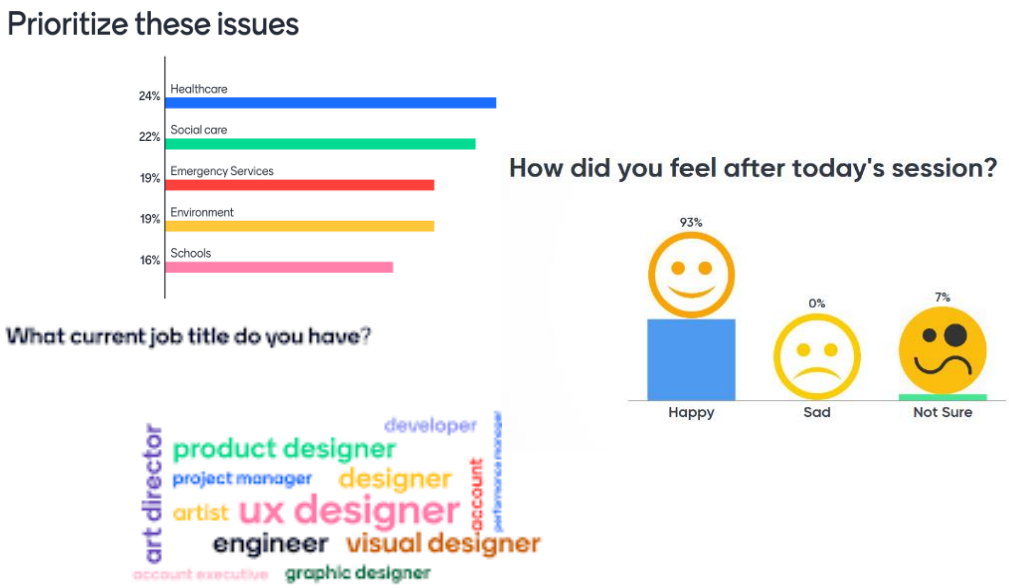

Figure 4. Examples of overviews generated by Menti

2.1 Supporting materials prepared for the workshops

As aforementioned, a series of materials were prepared to support the organization and implementation of the T5.3. workshops in all twelve BIOLOC regions. These are divided into pre-workshop, workshop and post-workshop materials.

Pre-workshop

- Guidelines and reference material per region: This document contains general guidelines as described in the previous section and an overview table with the following information of each region (gathered from D2.2): Population and regional figures, key sectors, bio-based resources and main sectors of activity, potential bio-based value chains, missing actors to promote bio-based value chains, preliminary selection of targeted marginalized social groups and regional specificities. A folder containing the guidelines with information from all regions is available in the shared BIOLOC folder.
- Pre-workshop reflection (general): Set of key questions that can serve as a base for each stakeholder to reflect upon and enrich the discussion during the workshop, see Annex I. This material use was optional and totally up to the organizer.

During workshop

- Base PowerPoint presentation: Template containing important concepts related to the project (bioeconomy, social innovation, and bio-based value chains), an introductory slide about the BIOLOC, general information about the workshop (such as goals and benefits to stakeholders) and a specific section to be prepared by each region representative / workshop organizer with regional details and the plan for the interactive working sessions. The presentation is concluded with take home

messages and action points and it is available in the BIOLOC shared folder (together with all other materials described in this deliverable).
- Two working sessions were proposed: one focused on promising local bio-based value chains and the other focused on socially disadvantaged groups that can benefit from said value chains. A whiteboard example was prepared as a suggestion for the working sessions (either online or offline), see Annex II. This material use was optional and totally up to the organizer.
- A template of an attendance list was provided, see Annex III.

Post-workshop
- Template: We prepared a template to be filled out after each workshop, see Annex IV.
- A template of a certificate of attendance was also provided, see Annex V. This material use was optional and totally up to the organizer.

3. Workshops' outcomes per BIOLOC region

In this section, an overview of the workshops is presented per region, including a brief description of the region, general planning information such as the location, modality and agenda, attendance and photos, and main outcomes from the event.

3.1 Bulgaria – Plovdiv region

3.1.1 Region description

Plovdiv, with a population of 663,000 people, is situated in the South-central zone of Bulgaria and spans an area of 6,000 km^2. The region boasts a relatively low unemployment rate of 3.2%, with 75.1% of the population residing in urban areas. Known for its economic diversity, Plovdiv hosts a range of industries including wine production, leather, cosmetics, machine building, recycling, fishing, textile, pharmaceuticals, pulp and paper, alongside the presence of numerous NGOs and research organizations. This multifaceted business landscape contributes to the vibrancy and richness of the region. In terms of bio-based sectors, agriculture dominates, primarily with cereals such as wheat, sunflower seeds, corn, and various vegetables. Agricultural residues, including rice straw and maize stover, find applications in horticulture and livestock breeding. Forestry covers 25% of the territory, mainly state-owned, producing timber, cellulose, wood mulch, and pellets, primarily used in construction and paper production. Livestock farming, centred on dairy production from cows, sheep, and buffalos, is marked by smaller-sized farms. Residues from livestock activities, including slurry and manure, are largely exploited. Additionally, primary food processing, focusing on plant-based oils, thrives in the region, alongside other bio-based industries like textile manufacturing. The region's energy profile, however, is still largely dependent on non-renewable sources, with only 13% derived from renewables, primarily hydroelectric power.

The agricultural sector has witnessed a significant decline due to both modernization efforts and the sector's lower profitability compared to others. Notable environmental challenges exist in the region, such as land threatened by soil erosion, contamination from nearby metallurgical sites, and crop production hindered by factors like drought, heat, and pest diseases. Despite these limitations, the region benefits from a robust

human resource base marked by both quantity and high levels of professional qualification. As a significant academic hub with numerous educational institutions, Plovdiv is well-positioned to leverage its solid research potential for regional development. Recognizing the need for bioeconomic opportunities and considering the existing challenges, there is a call to focus on creating new bio-based value chains in the Plovdiv region.

3.1.2 Workshop planning - general info

Two workshops took place in the Plovdiv region. The general info of each event is presented below.

Table 6. General info about the first workshop in the Plovdiv region (Bulgaria)

BIOLOC region	Region South Central (Bulgaria)
Workshop date and time	29/09/2023 9.00h – 16.00h
Modality	In-person
Workshop location	Plovdiv, AUP
Number of attendees	17

Table 7. General info about the second workshop in the Plovdiv region (Bulgaria)

BIOLOC region	Region South Central (Bulgaria)
Workshop date and time	09/10/2023 9.00h – 16.00h
Modality	In-person
Workshop location	Plovdiv, AUP
Number of attendees	30

The workshops were carried out in-person for better interaction and engagement from participants.

Workshop 1 was structured in the following manner:

1. Introduction from the participants – background, expectations, needs, present occupation and activities, etc.
2. Slides presentations:
   2.1. Major principles and content of the bioeconomy, why it is important for the region.
   2.2. Objectives of the BIOLOC project, relevance for the region and the rural development, goals and non-goals.
   2.3. Group discussions and plenary discussions, plus brainstorming session on:
   - Reflecting on the local bioeconomy sectors and the possibilities they provide for the rural population. How the industries that can incorporate biomass in their products and/or extract valuable ingredients from it (materials, chemicals, cosmetics).

- Discussion on local and regional agri-food value chains and how to be efficiently involved in them. How they can generate jobs and know-how, promoting the inclusion of disadvantaged groups and avoiding the depopulation of rural areas. Exchange on experiences and best practices on bioeconomy and on social integration, identifying most promising bio-based value chains and identifying existing incentives and challenges for implementation.
- Valorising agri-residues can lead to a new source of income to streams typically discarded or used in very low value applications.
- New small business opportunities or improving the existing ones e.g. small-scale organic farming and marketing.

3. Mapping the regional characteristics of local bioeconomy and value chains.
4. Discussion on Challenges and opportunities for social inclusion in local value chains.
5. Conclusions, further actions, and responsibilities.

The second workshop was carried out in person as a continuation and follow-up of the previous workshop and to improve the interaction of participants' engagement. The workshop was held at the Agricultural University and the following Agenda was followed:

1. Introduction from the participants – background, expectations, needs, present occupation, and activities, etc.
2. Slides presentations:
   2.1. Major principles and content of the bioeconomy, and why it is important for the region.
   2.2. Objectives of the BIOLOC project, relevance for the region and the rural development, goals and non-goals.
3. Introducing the regional Hub activity
4. Questions and Answers
5. The following activities were carried out during the workshop:
   - Introducing the possibilities of the regional bioeconomy of the Plovdiv region and deepening the involvement of the industries.
   - Possibilities of industries to recycle and reuse the biomass from the production process in their products and extract valuable ingredients from it (materials, chemicals, cosmetics).
   - Showing the Local and regional value of the agri-food chains
   - Generating new jobs for targeted marginalized groups
   - Sharing the know-how for developing regional bioeconomy as a possibility for increasing the demographics coefficient of the region by the active involvement of marginalized groups and the primary industry.
   - Exchange on experiences and best practices on bioeconomy and on social integration, identifying the most promising bio-based value chains and identifying existing incentives and challenges for implementation.
   - New horizons and opportunities for improving the bio-based orientation of the existing small and medium-sized businesses and the marginalized groups.
6. Discussion and concluding remarks.

3.1.3 Workshop attendance and photos

The 17 attendees of the first workshop were from different sectors: 1 (government), 3 (academia, R&D), 12 (agri-food value chain, seasonal workers in primary agri-food activities activities), 1 (civil). The organisations represented in the event were small primary agriculture producers (incl. from marginalized groups), local industries, (manufacturers of rose oil, orchid oil, biomass producer), agro-tourism, University of Plovdiv, and the NGO “Miasin”. Photos of the event are displayed as Figure 5.

Figure 5. Photos of the first workshop in Plovdiv (Bulgaria)

The 30 attendees of the second workshop were from different sectors: 10 (government), 3 (academia, R&D), 12 (agri-food value chain, seasonal workers in primary agri-food activities activities), 5 (civil). The organisations represented in the event were small primary agriculture producers (incl. from marginalized groups), local industries, (manufacturers of rose oil, orchid oil, biomass producer), agro-tourism, associations, and NGOs. Photos of the event are displayed as Figure 6.

Figure 6. Photos of the second workshop in Plovdiv (Bulgaria)

3.1.4 Main outcomes

Synergies: There were synergies between different stakeholders and representatives involved in the workshop. The small-scale farmers/seasonal workers, small-scale agri-food SMEs and crop growers with low income are looking for opportunities for social inclusion and small business in the region. This is because a) the municipality wants to keep the socially disadvantaged groups in order to provide working force at the place, b) business, which is mostly using bio-based materials and resources, needs skillful work force, and c) marginalized groups are keen to increase their qualification either to work in the local bio-based factories or start a small business. However, they needed capacity building and training in the field of bioeconomy to gain skills and experience. Main interests of the audience were in the field of running small bio-based value chains and trade with bio-based (organic) products.

Marginalized groups: The following marginalized groups were involved in the workshop: small-scale farmers, small-scale agri-food SMEs and crop growers with low income; seasonally employed single families in agriculture (crop, animal farms) and/or in food and waste-processing businesses; seasonally (or part-time) self-employed workers in bioeconomy sectors (including minorities). These groups are very important for the region in the light of increasing depopulation of rural municipalities, lack of available skilled workforce and demands of the bioeconomy sectors for (at least primary/secondary or VET) educated labour.

During the AUP previous workshops, organized by AUP and the Municipality of Brezovo (in the target region of the marginalized groups) and the Local Action Group (LAG), the AUP has conducted a preliminary analysis, and received useful feedback from the participants. They, together with the local policymakers, suggested

what type of marginalized groups of the rural population could be included. The main objective was to include said groups and increase their professional capacity in terms of education and qualifications, leading to skilled workforce for the bio-based industries in the region and an increase the social and economic power of these people. The NGOs and Brezovo social workers are the local facilitators, providing help to the socially disadvantaged groups to have better access to the labour market and social services.

Besides inclusion via job creation, the marginalized groups can be effectively involved in the local bioeconomy through the following instruments:

- Centralized financing to small business ideas to start a local bio-based business e.g. by fellow bio-based business (branch associations) or by the municipality (state programmes).
- Municipality may organize centralized markets for (organic) farming products and foods to stimulate demand from the regional industry/traders.
- Municipality can use funds for regional development and for agricultural development to organize training on sustainable bioeconomy topics.

In the regional context, the two following sectors and related marginalized groups were identified:

1. Forestry sector: jobless rural people and seasonal workers, socially weak single parents. After the invasion of Russia in Ukraine there is a need for cheap constructing materials to rebuild the destroyed buildings. Constructing materials from biomass are a cheaper alternative for the traditional materials used like concrete and bricks. Local refugees can gain skills and experience in the field of production of hempcrete concrete to provide it to their community in Ukraine.

2. Agri-food (organic) value chains: farmers in small-size agri-food SMEs and crop growers with low income; seasonally employed single families in agriculture (crop, animal farms) and/or in food and waste-processing businesses, seasonally (or part-time) self-employed workers in bioeconomy sectors (including minorities).

Industrial context: Industrial partners have sustainability strategies including recycling of biomass (composts, bio-fertilisers, etc.), utilization of food processing waste, markets of agri-food products at the place of production (regional sales), etc. They also include several social initiatives like: (1) hiring people from disadvantage groups (10% as a minimum share of total employees); (2) providing free accommodation for disadvantage groups; (3) providing training for free to obtain a good level of professional skills in the agri-food value chains and bioeconomy sectors; (4) providing opportunities for marginalized groups to do marketing of their products.

Governmental instruments: The main funding instruments supporting the development of bioeconomy are – (1) Strategic Plan for development of agriculture (2021-2027) within the EU CAP and the National program for implementation of the “From farm to fork” strategy; (2) Recovery and resilience plan of Bulgaria; (3) Strategy and action plan for transition to a circular economy of the republic of Bulgaria 2021–2027. (4) Regional development plan of the Municipality of Brezovo.

Main bio-based value chains: Some new examples of bio-based value chains pointed out by the workshop focus groups: (1) about a quarter of the region is occupied by forest resources as a biomass source. The forestry sector is mostly dominated by state-owned enterprises, which indicates the interest in reacting quickly in the regulatory framework to support forestry to become a part of the local bioeconomy. The biowaste amounts to up to 50% of the wood harvested in the forest holdings. Residual lignocellulosic

products represent a huge raw material source for industry and energy for the size of the region. (2) Agriculture in the region generates 25% of GDP in the regional economy. In rural areas, it is the only business activity, which provides livelihood for the residents and provides raw materials for related industries. The rural population employed in the agriculture sector operates mainly in small-sized farms and they constitute a significant source of income for their owners. Subsidizing these farms determines the annual employment rate in rural areas. (3) The Bulgarian rose oil industry is a key national industry and a factor of national pride. Being a unique activity characterizing the country, the rose oil industry and its products are famous not only in Bulgaria but also exported to many countries. The companies engaged in the chain of rose production are not a lot because of the specific geographical area where the roses grow. These companies are not only a motor for industrial growth, but also help national tourism making Bulgaria famous in the world. (4) Value chains of other essential oils, such as lavender oil, can be also considered. Lavender oil producers and farmers involved in the lavender production have participated in the workshop, and production in the region is increasing due to its potential in the context of bioeconomy and due to the state policy for the sustainable development of the sector.

The results from mapping the potential of the local bioeconomy show several promising business models and value chains, listed below:

- Production of conifer pellets and coloured mulch from forest residues.
- Sustainable-by-design biodegradable wafer cups/plates.
- Production of abrasive from walnut (and another nut) shells.
- Production of liquid organic fertilizers.
- Biogas production from residual biomass.
- Production of hempcrete concrete and construction materials from biomass

Main bottlenecks: General challenges for bioeconomy development and social inclusion of disadvantaged groups in the Plovdiv region are:

- Lack of financing for starting businesses, the marginalized groups do not have proper assets and money to become a player, or part of local bio-based value chains.
- Insufficient knowledge and know-how in the field of organizing small businesses in bioeconomy sectors (e.g. organic farming and processing, forestry, etc.)
- Limited access to the regional labour market because of insufficient awareness, information, skills, and availability of small-scale technologies.
- Local SMEs, which are using regional bio-based resources, cannot grow, because of the limited capital, inflation, lack of smart technologies for recycling, etc., therefore they cannot hire additional labour.
- Old social infrastructure in the target rural area distracts the young generation and forces migration to urban areas. It prevents the efficient social integration of marginalized groups e.g., the proactive measures by the local decision-makers, industry and educational-research institutions are present on-the-spot but the outcomes cannot be developed in the long term.

Action points for the coming period: The following action points are planned for the BIOLOC hub of Plovdiv (Bulgaria):

- Continuously organise annual regional/municipality Round Tables to increase the awareness of the rural (local) marginalized groups on the bioeconomy and possibilities for them.
- Continue to provide information and knowledge on the local bioeconomy – via online (a website) and written sources – with the aim to prepare for capacity-building activities. Collaborate with the Agricultural University of Plovdiv and the Local Action Group (LAG).
- Organise annual meetings with local and regional businesses to encourage the development of local initiatives and projects related to bioeconomy e.g., national and EU projects and programmes, and initiate dialogue between entrepreneurs and local workforce, incl. marginalized groups.
- Further develop sustainable business models (forest, agri-food and recycling/waste utilisation) for the small-scale local SMEs, which are using regional bio-based resources, including inter alia how to assess local bio-based resources, how to obtain capital, how to employ smart technologies also for recycling and waste utilization, how to efficiently use the human resources, etc.
- Provide training to change the attitude of the rural population towards saving their natural resources, smart use of bio-based materials and adopting digital technologies, so that bioeconomy becomes an integral part of their daily life.
- Organize further follow-up and disseminate the project activities with other partners related to the bioeconomy and social inclusion topics.

3.1.5 Selection of most promising initiatives

Plovdiv is a region with great potential in bioeconomy, as it has a large forest area and agriculture is an essential economic activity. Additionally, the availability of marginalized groups that could be potential labour force and the need for trained workers in the bioeconomy sectors creates an interesting opportunity. Local authorities together with stakeholders could develop a training programme to train people from marginalized groups in the skills needed to engage them in bio-based value chains.

Based on the current analysis of the region, the forestry sector has a lot of potential since there is a wide range of state-owned forest area. Furthermore, the experience in bioeconomy-related economic activities such as agriculture or essential oils, especially rose oil, are a plus point. The targeted marginalized groups so far are small-scale farmers/crop growers with low income, often seasonally employed and from minority groups.

3.2 Adriatic region (Croatia)

3.2.1 Region description

The region encompasses an area of 24,705 km^2 with a significant rural population. The unemployment rate stands at 9.4%, and the region's primary economic activities include wholesale and retail trade, transport, accommodation, food services, and information and communication. Agriculture and fisheries are crucial sectors, utilizing 38,000 ha for cereals, soybeans, fruits, vegetables, and lavender cultivation. By-products from arable crops are increasingly used for traditional purposes and converted into agropellets for fuel and

feed. Forestry, covering 96,840 ha, is mainly state-owned, providing sawn wood, chips, wood pellets, and other products. Livestock farming takes place on 140,000 ha and focuses on milk production, with residues often reused as fertilizers. The food processing industry, particularly in wine, olive oil, fish, and salt, employs a significant portion of Croatia's workforce. Energy production relies on seven biomass power plants, contributing to a 31.7% share of renewable energy. About 20% of biowaste is recovered through composting and anaerobic digestion, while 7% undergoes recycling. The region holds significant biomass potential for optimization of current valorisation pathways. Marginal/unused land offers opportunities for low-ILUC biomass production. Expansion of family farms into tourism, production of healthy food for the European market, and the use of bio-based products align with increasing consumer demand. Forest and agriculture biomass availability establishes a foundation for diverse bio-based value chains.

In the Adriatic region of Croatia, 43% of the population resides in rural areas. The region faces significant challenges tied to poverty, particularly in the agricultural sector. Obstacles such as lack of education, limited information accessibility, poor mobility, and weak connections to urban centres hinder the participation of rural marginalized groups. The local landscape experiences severe soil erosion, threatening environmental balance and nutrient levels needed for agriculture. Only 1% of the utilized agricultural area is irrigated. Education is identified as a key factor for both current and new generations of farmers to adopt sustainable practices. Trends in livestock subsectors show a shift toward larger farming units due to competitiveness issues among smaller family farms. Around 34,000 ha of forestland, including the Adriatic, is temporarily out of management due to mined areas. Strengthening energy security, increasing domestic production, enhancing energy infrastructure, and improving energy efficiency are vital short and mid-term goals. The region boasts significant biomass potential for bio-based initiatives, aligning with consumer interest in sustainable products. The lack of strategic integration and cross-sectoral interaction, combined with depopulation, migration, low business sector investment, and insufficient applied research, poses challenges to the deployment of bio-based initiatives.

The local population in the Adriatic Croatia region values the revitalization of industrial heritage and traditional spaces, which contribute to historical and cultural identities. The "field to fork" chain, generating 70% of the value added in bioeconomy, plays a central role in employment. However, the current linear bioeconomy in Croatia faces challenges, particularly in high GHG emitting sectors like manufacturing, agriculture, forestry, fishery, aquaculture, and electricity supply. Together, these sectors contribute to a significant portion of employment, and gross value added, highlighting the primary sector's dominant role in the region's bioeconomy.

3.2.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Croatia is presented below.

Table 8. General info about the BIOLOC workshop in the Adriatic region (Croatia)

BIOLOC region	Region Adriatic Croatia (Croatia)
Workshop date and time	10/10/2023 12:30h – 15:00h
Modality	In-person

Workshop location	Production park Torpedo, Rijeka, Croatia
Number of attendees	23

The event was organized with the following structure:

1. Welcome speech

2. Intro presentation: Key bioeconomy concepts and project BIOLOC

3. Ice-breaker activity: getting to know each other and Slido word cloud poll

4. Discussion and experience exchange:

   – Best practice examples

   – Identification of obstacles and possible solutions

5. Game: Role-play in bioeconomy

3.2.3 Workshop attendance and photos

The 23 attendees of the BIOLOC workshop were from different sectors: 6 (government), 9 (academia, R&D), 2 (industry, primary activities), 6 (civil). The organisations represented in the event were the Faculty of Engineering Rijeka, Carpentry and Engineering School Rijeka, Production Park Torpedo, Local action group Gorski kotar, the entrepreneurial support association Step Ri, the local development agency PINS, the NGO WWF Adria, the local Ministry of Agriculture, the Rijeka development agency PORIN, and FINVEST CORP and Vesela Motika as industry representatives (sawmilling, food production). Photos of the event are displayed as Figure 7.

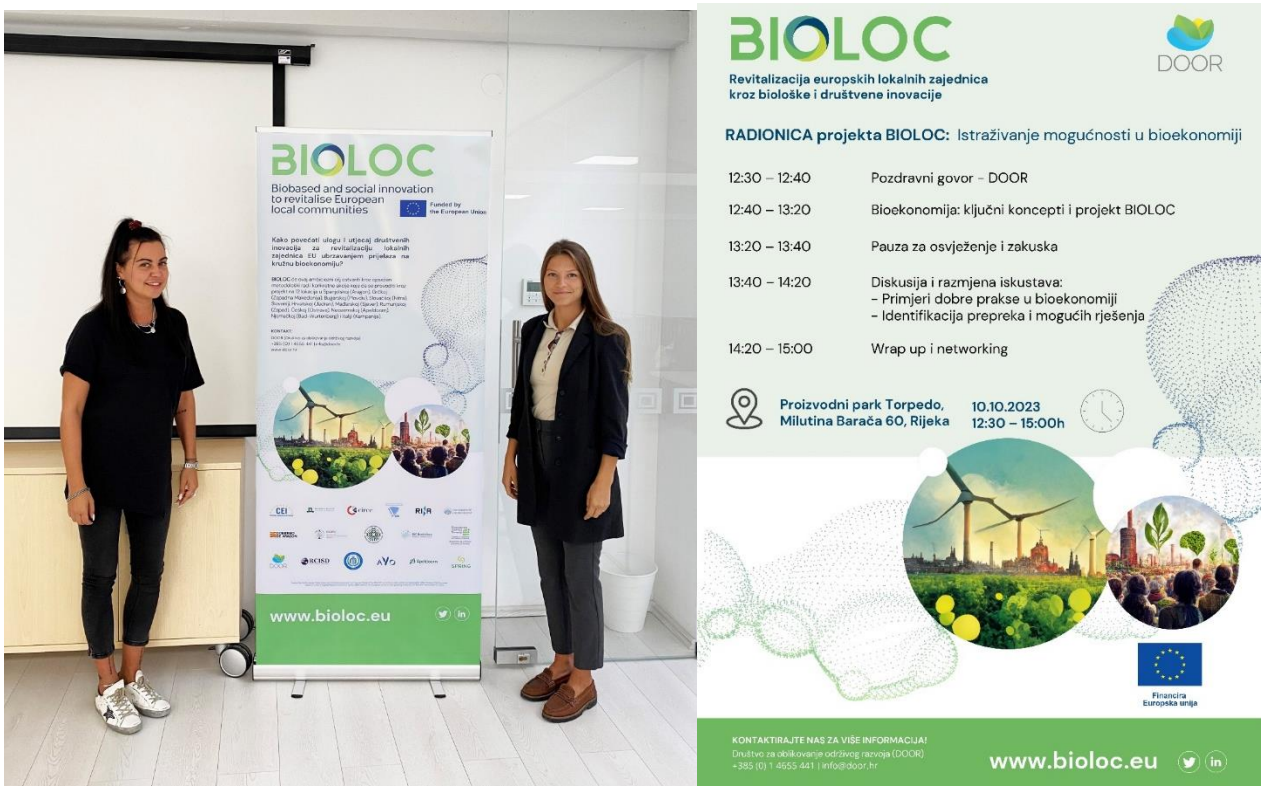

Figure 7. Photos of the BIOLOC workshop in the Adriatic region of Croatia

3.2.4 Main outcomes

Synergies: Synergies were identified among the participants. For example, the Ministry of Agriculture is establishing a Croatian national bioeconomy hub, and DOOR will establish regional hub for Adriatic Croatia, which might come under the national and be connected to it. Furthermore, synergies were identified between other projects related to circular economy – there is possibility of mutual workshops in the future.

Marginalized groups: There was representation from marginalized groups, sawmilling industry and youth from woodworking educational sector. There was an obvious interest to include rural population from all organizations, but also all of them concluded it is not easy to reach and educate said groups. Examples of issues to tackle are the lack of public services (education, healthcare) in rural areas, language barriers (in case of immigrants), needs for training, basic needs such as housing and transportation.

Based on the discussion, it is concluded that rural populations, especially in the forestry sector, can benefit the most from novel bio-based value chains. This means that even small sawmills could benefit by utilizing by-products of production to create new sources of income. Additionally, there is recognized benefit for young forestry students who can gain new knowledge and experience through these innovative value chains and contribute with their ideas. An important point of discussion referred to the lack of education among young people, and the fact that education on bioeconomy and circularity should start as early as in early childhood, even in kindergartens. Additionally, emphasis was given on common issues related to project

implementation due to lack of information and knowledge, highlighting the need for increased training to all actors involved in the field of innovation.

Industrial context: Industrial partners don't have specific sustainability strategies in the form of documents, but they have defined goals they would like to achieve and are striving towards. Social initiatives are also underdeveloped, and it is precisely through our project that we aim to encourage them to take social actions.

Governmental instruments: There are various funding instruments for entrepreneurial project, but not for bioeconomy specifically.

Main bio-based value chains: Specific value chains have been identified in sustainable forestry, where wood biomass is used as the primary raw material for various bioproducts, including biofuels, bioplastics, and biochemicals. Furthermore, they encompass the transportation, storage, and distribution of wooden bioproducts in the market, along with the continuous advancement of new technologies and innovations to enhance manufacturing processes and create new bioproducts. The importance of recycling and reusing bioproducts to reduce environmental impact is particularly emphasized. Additionally, the significance of integrating new technologies into production processes and products to increase the efficiency and diversity of bioproducts is highlighted.

Main bottlenecks: The main bottlenecks identified relate to the lack of interest from people and limited acces to information/knowledge and issues related to administration/system failure/slowness of processes.

Action points for the coming period: It is essential to enhance the project's promotion through various events and media outlets. Moreover, careful consideration and a decision should be made regarding the initiation of a small pilot project involving a marginalized group, while conducting interviews with them to understand their current and future needs.

3.2.5 Selection of most promising initiatives

The large forest area of the region and the experience in this sector makes the promotion of new value chains in this area one of the most promising initiatives. In addition, it would be interesting to involve forestry-students by developing traineeships programs, for instance. In this context, the development of new value chains, utilizing wood biomass for bioproducts such as biofuels or biochemicals. The importance of recycling, innovation, and integrating new technologies in production processes should be considered. The marginalized groups targeted so far are rural populations involved (or willing to) in forestry activities, particularly the youth.

3.3 Czech Republic - Moravian-Silesian region

3.3.1 Region description

In the Moravian-Silesian region of the Czech Republic, 90% of municipalities have fewer than 5,000 inhabitants. Known for its industrial prowess, the region is characterized by heavy industry activities such as

engineering, metallurgy, and coal mining. Agriculture covers 50.2% of the territory, focusing on cereal, rapeseed, and potato production. Despite a decrease in the number of agricultural enterprises, large farm sizes support industrial-scale practices. Forestland constitutes 35.8% of the region, mainly state-owned, with coniferous species dominating. Challenges like wildlife damage necessitate new approaches to reforesting. Livestock activities involving cattle, sheep, goat, and horse breeding. Agroindustries, particularly in dairy, meat processing, bakery, and fruit and vegetable processing, generate various residues with potential valorisation pathways.

Bio-based industries in the region focus on biodegradable waste processing, biomass energy use, wood pulp, natural cosmetics, medicine, and supplements. Non-renewable energy, primarily from black coal, dominates the energy sector, but there is potential for biogas use, especially in agriculture. Municipal solid waste (MSW) management involves handling 661,961 tons, with 287,706 tons being landfilled. Utilizing agricultural waste as a soil improver addresses soil quality concerns resulting from heavy and mining industries. Exploring alternative energy sources like biogas and biomethane is crucial to reduce coal consumption. The region's optimal strategy includes growing energy plants on unused arable land, potentially increasing biomass for various bio-based applications.

As regional specificities, the industry sector covers most of the employment, followed by agriculture (although agriculture workers are not heavily represented in the country). The average salary is lower than in the rest of Czech Republic. The soil quality of the region needs to be improved due to the damage caused by heavy industry and mining industry, and agricultural enterprises have been decreasing significantly, which is a worrying trend that needs to be addressed.

3.3.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Czech Republic is presented below.

Table 9. General info about the BIOLOC workshop in the Moravian-Silesian region (Czech Republic)

BIOLOC region	Region Moravian-Silesian (Czech Republic)
Workshop date and time	22/11/2023 10:00 – 12:30
Modality	In-person
Workshop location	Etáž Café, Vítkovická 3369, 702 00 Moravská Ostrava
Number of attendees	16

The event was organized with the following structure:

1. Presentation of project goals and bioeconomy term
2. Introduction of participants
3. Discussions: Bioeconomy as an opportunity for the region
4. Discussions: Main drivers and barriers in the region
5. Discussions: Any functioning value chains in the region?

6. Presentation of next steps

3.3.3 Workshop attendance and photos

The 16 attendees of the BIOLOC workshop were from different sectors: 5 (government), 2 (academia, R&D), 7 (industry, primary activities), 2 (civil). The organisations represented in the event were primary agriculture stakeholders, local industries and SMEs, local university, and research and counselling actors. Photos of the event are displayed as Figure 8.

Figure 8. Photos of the BIOLOC workshop in the Moravian-Silesian region of Czech Republic

3.3.4 Main outcomes

Synergies: No synergies were identified in a relevant extent in this first moment.

Marginalized groups: The event had the presence of undergraduate individuals and individuals thinking about changing his field of working. There was an interest from the participating organizations to include socially disadvantaged groups, particularly through additional education and retraining. It was overall agreed that the young unemployed have great potential to join bio-based value chains, provided that this option is available to them and there is a base knowledge on bioeconomy, as well as adequate education to be able to fit the labor market.

Industrial context: Overall, industrial partners do not have any sustainability strategy in place, but the circumstances (government policy) are slowly moving them towards it.

Governmental instruments: There are local and national resources, but not much is known about them, and they seem to be difficult for individuals to administer. The funds are more for social inclusion. Bioeconomy is not a very well-known concept, and the government is not yet working with it very much.

Main bio-based value chains: While parts of the discussion relied on large manufacturing companies from the primary and food sectors, the overall bio-based value chain has not yet been identified.

Main bottlenecks: The Moravian-Silesian region in Czechia faces notable bottlenecks hindering both bioeconomy development and social inclusion. There is low awareness about bioeconomy, coupled with a narrow perspective among policymakers. This lack of understanding may lead to insufficient policy frameworks and support systems for the region's bioeconomic initiatives. Furthermore, the scarcity of education, absence of systemic thinking, and an unfavourable public perception pose significant challenges. The shortage of educational resources inhibits the development of a skilled workforce essential for bioeconomy-related activities, while negative public perceptions can impede the acceptance of bio-based

initiatives. Lastly, the region struggles with the challenge of having several contact points for international programs of public support. This fragmentation might result in a lack of cohesion and streamlined efforts in leveraging external support, potentially hindering progress in innovative endeavours and social inclusion initiatives. Addressing these bottlenecks is crucial for fostering a more robust bioeconomy and ensuring broader societal participation in the Moravian-Silesian region.

Action points for the coming period: The following steps have been outlined to address the bottlenecks hindering bioeconomy development and social inclusion in the Moravian-Silesian Region of Czechia. Firstly, there is a plan to raise awareness regarding the significance of bioeconomy and to inform stakeholders about its long-term impact. This aims to create a broader understanding of the subject. Secondly, a strategy involves showcasing and disseminating existing good practices to inspire stakeholders. By sharing success stories, the goal is to encourage positive engagement and participation in bioeconomy initiatives. Thirdly, there is an initiative to support policy makers in enhancing education focused on bioeconomy. This involves addressing the current lack of education and promoting a system-thinking approach. Lastly, the plan is to provide comprehensive information about international support programs related to bioeconomy. This step is crucial for ensuring that stakeholders are aware of and can benefit from relevant public support programs.

3.3.5 Selection of most promising initiatives

The discussion that took place during the workshop did not conclude which bio-based value chains were the most promising. However, as there is a lack of awareness of bioeconomy, and the industrial sector seeks to make its processes more sustainable but has not yet established a strategy, the first step should be to educate and to increase the knowledge related to bioeconomy in the region. Then, specific further steps will be defined according to the needs of the region. The marginalized groups targeted so far are unemployed young people interested in bioeconomy.

3.4 Greece - Western Macedonia region

3.4.1 Region description

In the Western Macedonia region of Greece, a population of 283,689 people live across 9,451 km^2, in which a substantial portion (56%) reside in rural areas, contributing to its low population density of 30 persons per km^2. Marked by a high unemployment rate of 19.1%, the region faces economic challenges, exacerbated by its historical reliance on coal-based energy production, which, while significant, now demands reduction to meet environmental objectives, impacting other sectors.

Various manufacturing activities diversify the region's economy, encompassing traditional sectors like marble, saffron, fruits, local wines, furs, leather manufacturing, and specialized arts and crafts. Agriculture thrives on 270,000 ha of land, predominantly cultivating wheat and barley through individual farmers and cooperative associations. Residual biomass finds purpose in energy production, biogas, fertilizers, and pellets. Forestland constitutes 19% of the territory, predominantly state-owned, engaged in technical/industry wood and firewood production. Livestock occupies 73,000 ha, focusing on cows, poultry,

goats, and sheep for meat and milk production. Unique to the region, saffron cultivation adds to agroindustries, along with mushrooms, red Florina Peppers, prespa beans, and aromatic and pharmaceutical plants. Family-owned businesses thrive, producing essential oils, hydrolates, and cosmetics from aromatic and medicinal plants, as well as commercial exploitation of hive products. Bio-based industries include three biogas units processing livestock and agricultural residues. The region produces approximately 92,000 tons of municipal solid waste yearly and the organic fraction undergoes composting, reflecting efforts towards sustainable waste management.

This region is a pivotal energy center of Greece with a historical focus on lignite-based electricity, thus facing significant transformations. The impending cessation of all coal activities by 2028, as mandated by the Greek government, places around 160,000 jobs at risk. Despite being an energy hub, the region experienced a decline in traditional sectors like agriculture, resulting in negative environmental impacts. Mainly inhabited by ethnic minorities, including Muslims from various regions, the region is characterized by a low population attributed to its mountainous terrain. Remote mountainous areas pose challenges for accessibility to social structures and services, compounded by limited resources for transportation costs. In the realm of bioeconomy, the region leans on agriculture and agroindustry, engaging small-sized farms, companies, and cooperatives. With a focus on managing manure for soil improvement or biogas production, efforts are directed toward sustainable and safe practices. Presently, a considerable part of the agriculture sector specializes in low-value, low-labor crops and livestock activities.

The development of Energy Communities, anticipated to reach around 260 by 2023, offers prospects for the bio-based value chain. Utilization of forestry residues and by-products from cereals, vineyards, and tree crops becomes essential. Additionally, the ongoing construction of an extensive natural gas network hints at evolving energy dynamics. Fortunately, there are no specific limitations regarding soil quality, which, on average, remains good at the regional level.

3.4.2 Workshop planning - general info

General info regarding the two-day BIOLOC workshop in Greece is presented below.

Table 10. General info about the BIOLOC workshop in the Western Macedonia region (Greece)

BIOLOC region	Region Western Macedonia (Greece)
Workshop dates and time	13/12/2023 10.00 – 17.00 14/12/2023 10.00 – 15.00
Modality	In-person
Workshop locations	CERTH-CPERI, Ptolemaida (13/12/2023) “Koventarios” Municipal Library of Kozani (KMLK), Kozani (14/12/2013)
Number of attendees	20 each day (32 different people for the two days)

The event was organized with the following structure:

1. Presentation: Emphasis was given to understanding bioeconomy terminology and activating the potential of the circular bioeconomy in Western Macedonia.

2. Round table discussions on "Challenges and Opportunities in the Circular Bioeconomy" in the regional context

3.4.3 Workshop attendance and photos

The 32 attendees of the BIOLOC workshop were from different sectors: 3 (government), 9 (academia, R&D), 9 (industry, primary activities), 11 (civil). The organisations represented in the event were: R&D organisations and universities (CERTH, University of Western Macedonia, University of Thessaly); governmental actors (Regional Development Fund of Western Macedonia); civil society representatives (JTIG – Just Transition Institute Greece, InCommOn – Innovative Communities Onwards, Staramaki); local industry actors (CluBE-Cluster of Bioeconomy and Environment of Western Macedonia, DIADYMA SA, Waste Management Company, Optimal Agro - Consulting Company, Foodscale Hub – Incubation Accelaration) and, notably, various actors related to marginalized groups (Association of Persons with Disabilities of the Kozani Regional Unit of the Region of Western Macedonia, Disabled Association of the Enlarged Municipality of Servia, Disabled Association of Grevena "Winners of Life", Regional Federation of Disabled Persons, Atherosclerosis Association, Association of parents, guardians and friends of the disabled of Western Macedonia, Disabled persons Social enterprise APANEMO). Photos of the event are displayed as Figure 9.

Figure 9. Photos of the BIOLOC workshop in the Western Macedonia region of Greece

3.4.4 Main outcomes

Synergies: The discussion focused on the following 3 organisations, which share common interests and similar activities. Social enterprise APANEMO is looking for revenues and for a sustainable business model, customized to the capabilities and capacities of disabled persons, as 50% of the members of the social enterprise are disabled. Currently they are trying to set up their business activities in the repair sector of damaged wooden toys, an undertaking which has lots of drawbacks and malfunctions. Staramiki, which is the most successful social enterprise in Greece, explained how difficult it is to set up a social enterprise, in terms of paperwork and access to funding. The University of Thessaly provided a simple business model suited for disabled persons.

Marginalized groups: A specific marginalized group was identified as having a particular interest in the value chain related to wood pallets. The group is KOISNEP (Social enterprise in EN) APANEMO, which showed a keen interest in business models involving the reuse and repurposing of wood pallets. Accordingly, KOISNEP

APANEMO, an organization representing marginalized individuals or those with special needs, sees potential in the wood pallet value chain as a means of creating opportunities and fostering inclusivity. The repurposing of wood pallets can provide accessible and meaningful employment opportunities, skill development, and a platform for creative expression. This venture not only aligns with environmental sustainability but also promotes social inclusion, offering a path for marginalized groups to engage actively in productive and economically beneficial activities. The University of Thessaly was interested to work with this group and to support them by providing them advice and consultation, on technical and entrepreneurial matters. Potential challenges to include the socially marginal groups are the lack of public services (education, healthcare), language barriers (in case of immigrants), need for training, basic needs such as housing and transportation means.

Industrial context: No information so far about sustainability strategies in place, but programs for social inclusion are envisioned (see point 2 of next item).

Governmental instruments: The following programs will be launched:

1. Actions for the Development, Support and Promotion of the Social and Solidarity Economy (SSE)

Funded under the program Human Resources and Social Cohesion. Special Target: Modernizing labor market institutions and services to assess and anticipate skills needs and to ensure timely and personalized assistance and support for matching supply and demand, transitions and mobility in the labor market.

2. "Special program to support employers to hire 2,000 unemployed people from vulnerable social groups" (Launched in 2022)

The program subsidizes for 12+12 months 90% of the total cost (salary and non-salary) for the recruitment of unemployed people from private and public companies, bodies and organizations that carry out economic activity, as well as from Municipal and Regional enterprises. The program involves the recruitment of 2,000 registered unemployed Persons with Disabilities (PWDs), rehabilitated drug addicts, released persons, young offenders or young persons at social risk, female victims of gender-based violence, victims of domestic violence, transgender persons, victims of human trafficking and persons who continue to reside in child protection and care units after reaching adulthood and are registered in the relevant National Register.

Main bio-based value chains: The following value chains were identified as relevant in the regional context.

- Wood Residues: Utilizing wood waste from various sources, this value chain focuses on transforming wood residues into valuable products, such as biofuel, particleboard, or artisan crafts, promoting waste reduction and resource efficiency.
- Reuse of Wood Pallets: In this value chain, damaged or discarded wood pallets are either repaired, refurbished, or creatively repurposed. This approach extends the life of pallets and reduces waste, leading to the creation of innovative products like furniture and decorative items.
- Mixture of Wool and Wood: An inventive combination, this value chain explores integrating wool with wood materials. The potential products range from wool-insulated wooden structures to textiles reinforced with wood fibers, offering unique properties and applications.
- Qualitative evaluation of industrial hemp fibers: Work was presented assessing the technical feasibility of manufacturing new composite products (particleboard) from agricultural residues (unusable parts of industrial hemp stems).

These value chains exemplify sustainable resource use, environmental responsibility, and innovation, aligning with circular economy principles. They create opportunities for economic growth, community engagement, and skill development, while also fostering a more sustainable approach to material utilization and product design.

Main bottlenecks: During the discussions, several challenges and bottlenecks were identified in implementing the bio-based value chains involving wood residues, the reuse of wood pallets, and the mixture of wool and wood, especially concerning the integration of marginalized groups like KOISNEP APANEMO.

- Resource Acquisition: Securing a steady and reliable supply of raw materials, such as wood residues and damaged pallets, can be challenging. This includes logistical issues and competition for resources.
- Funding and Financial Resources: Obtaining the necessary funding to start and sustain these projects can be a significant hurdle. This includes capital for equipment, workspace adaptation, and operational costs.
- Technical Skills and Training: Providing adequate training and skill development for the workforce, particularly for marginalized groups, to ensure they can effectively contribute to and benefit from these value chains.
- Regulatory Compliance and Quality Standards: Navigating legal regulations and maintaining quality standards for products.

Action points for the coming period: Based on the discussions, several action points were defined for the upcoming period to address the challenges and capitalize on the opportunities within the bio-based value chains involving wood residues, the reuse of wood pallets, and the mixture of wool and wood. These action points aim to ensure successful implementation and sustainability of these initiatives:

- Training Programs and Workforce Development: Implement training programs for skill development, particularly focusing on the marginalized groups. This includes technical skills for processing materials and soft skills for enhancing employability.
- Quality Control and Compliance: Set up a system for quality control to ensure products meet necessary standards. Stay updated with regulations and compliance requirements relevant to the production and sale of these items.
- Supply Chain and Logistics Planning: Develop a robust supply chain and logistics plan that ensures smooth operations from sourcing of raw materials to the distribution of finished products.

3.4.5 Selection of most promising initiatives

Based on the results of the workshop, the most promising bio-based value chains are related to wood and wool. In this context, the development of valorisation schemes could have an interesting potential, such as reuse of wood pellets, wool-wood mixture products or hemp fibers. Moreover, it would be possible to include marginalized social groups because there are synergies as the university and business could promote training and the social group is keen on working to promote sustainability.

3.5 Germany - Baden-Württemberg region

3.5.1 Region description

Baden-Württemberg, a dynamic region in Germany, boasts a population of 11 million people within its 35,750 km^2 expanse. The region maintains a commendably low unemployment rate of 3.4%, a testament to its robust economic activities. The economic backbone is intricately tied to technology sectors, particularly automobile production, and mechanical and electrical engineering, alongside flourishing agrifood industries. Notably, Baden-Württemberg fosters a diverse ecosystem of bio-based industries, encompassing agri-food, fishery, feed, bio-based materials, biotech, and waste management. In agriculture, where 1.5 million hectares are predominantly devoted to wheat, barley, and corn, individual farmers own varying-sized plots. The residual biomass finds versatile applications, from industrial pulp production for hygiene products to biogas generation. The forestry sector, covering 38% of the region, reflects a circular approach. Wood products undergo multiple reuses, contributing to constructions and energy production. Livestock and agroindustries, primarily focused on cows, pigs, milk, and meat, play a crucial role, employing 1.1% of the workforce. The biotechnology sector emerges as a significant industry in Baden-Württemberg, featuring 156 biotech companies engaged in research, development, and services. These enterprises, with a collective workforce of 18,680 employees, generated a taxable revenue of 5.03 billion euros in 2014, emphasizing the region's prowess in biopharmaceutical production. Despite this economic vibrancy, municipal solid waste (MSW) management presents a challenge, with limited public information about its valorization strategies.

The regional specificities of this area are marked by significant challenges and transformative initiatives. The imminent shift towards electromobility by 2030 is poised to impact jobs directly associated with traditional combustion engine manufacturing. The region reflects a diverse demographic with a substantial migrant population, including individuals with Turkish, Polish, Russian, Romanian, and Italian backgrounds. Agriculture exhibits a balanced distribution between small farms (<20 ha) and medium-large farms (>20 ha), with discernible trends towards organic practices, smart farming, and an emphasis on regional products. The agrifood industry is highly industrialized, and the region has embarked on a pioneering pilot project for biorefineries. In response to climate protection goals, there is a strategic imperative to elevate the share of renewable energies in gross electricity consumption to 80% by 2030. Accelerated expansion of wind and solar energy, coupled with the exploration of alternative sources such as biogas and biorefineries, is pivotal for achieving energy independence and efficiency. Notably, the region grapples with energy-intensive industries, particularly in steel, metal, and paper sectors, necessitating focused attention to meet climate targets. Baden-Württemberg aspires to be a trailblazer in sustainable and circular economic practices, exemplified by innovations in biomass production, novel processes in the food supply chain, and the production of fine/special chemicals through biotechnology and microorganisms. The state government underscores the importance of circular economy management, emphasizing the efficient utilization of byproducts, waste, sewage, and CO_2 as valuable resources in the quest for environmental sustainability.

3.5.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Germany is presented below.

Table 11. General info about the BIOLOC workshop in the Baden-Württemberg region (Germany)

BIOLOC region	Region Baden-Württemberg (Germany)
Workshop dates and time	04/10/2023 9:30 – 12:00
Modality	In-person
Workshop locations	University of Hohenheim
Number of attendees	5

The event was organized with the following structure:

1. Opening and round of introductions
2. PPT presentation of the BIOLOC project and goals of the workshop
3. First interactive session: Bio-based value chains in Baden-Württemberg
4. Second interactive session: Including NEETs
5. Summary and closing words

3.5.3 Workshop attendance and photos

The 5 attendees of the BIOLOC workshop were from different sectors: 1 (government), 2 (academia, R&D), 1 (industry, primary activities), 1 (civil). The organisations represented in the event were a start-up on urban gardening and a meadow orchard project, together with the university and governmental partner. Photos of the event are displayed as Figure 10

Figure 10. Photos of the BIOLOC workshop in the Baden-Württemberg region of Germany

3.5.4 Main outcomes

Synergies: Similarities between different value chains and the projects (case urban gardening and case meadow orchard) were identified, but no clear synergies that might end up in collaboration were found in this first moment.

Marginalized groups: Unemployed people, are so-called NEETs, meaning young people not engaged in education, employment, or training (630,000 in Germany) were selected as preliminary groups for BIOLOC activities. These persons can be trained for so-called green jobs to work in the industries of the circular, bio-based economy. A person within the age range of NEETs was present in the workshop, but he is currently in education. No additional marginalized groups were identified because the discussion was built around the target group of NEETs. Young people and therefore also NEETs often look for a meaning in their profession, beyond the financial incentive. Overall, there was interest from the participating organizations to include socially disadvantaged groups. In general, they actively seek personnel (as seen in the case of urban gardening) or volunteers (as observed in the case of the meadow orchard).

Industrial context: The participant from the stakeholder industry founded an urban gardening start-up (urban gardening can be categorized as social innovation). The participant from the stakeholder group civil society is actively engaged in an orchard meadow project.

Governmental instruments: Baden-Württemberg's government set up a bioeconomy strategy. Within the frame of this strategy, several funding and support measures are offered, such as the funding program for research and development "Sustainable bioeconomy as an innovation driver for rural areas", "Network initiatives for the further development of the lead region of sustainable bioeconomy Baden-Württemberg", "Bioeconomy ideas competition – innovation for rural areas". In addition to that, the ministry of rural affairs and consumer protection offers a bioeconomy innovation and investment program for rural areas. There are even more programs on the national and European level. In general, there are funding programs for young people and also training programs and campaigns, but a specific funding program for NEETs was not identified.

Main bio-based value chains: Focus was on orchard meadow, (urban) gardening, since the participants were involved in these activities. Nonetheless, other value chains regionally relevant are wood construction, flax farming, grains farming, orcharding, viniculture, vegetable farming, agroforestry, agri-photovoltaic.

Main bottlenecks: A major challenge is to contact NEETs to find out their individual motivations and goals and then to establish contacts between NEETs and industry actors. Furthermore, when we talk about the target group of NEETs, we are dealing with a very heterogeneous group of people. An interesting and important question raised during the workshop was why NEETs should be interested in the bioeconomy and not in any other industry.

Action points for the coming period: Further examination of the target group (NEETs), Getting in contact with them or at least someone who has contact with the target group, assessing how to include them in the value chains.

3.5.5 Selection of most promising initiatives

The main bio-based value chains discussed included orchards, (urban) gardening, wood construction, flax cultivation, cereal cultivation, fruit cultivation, viticulture, vegetable cultivation, agroforestry, and agro-photovoltaics. A deeper study is needed with respect to the social group in order to further define how to involve them. The marginalized groups targeted so far are NEETs, meaning young people not engaged in education, employment, or training.

3.6 Hungary - Northern region

3.6.1 Region description

Észak-Magyarország, Hungary's northeastern region, boasts a population of 1.2 million across its expansive 14,000 km^2 territory. Characterized by a relatively low unemployment rate of 4.4%, over half of its settlements accommodate less than 5,000 inhabitants. The region's economic landscape is led by the service sector, closely followed by industry, with agriculture contributing less than 5%. In the primary sector, agriculture is a key player, notably three main crops—corn, wheat, and sunflower. Large landowners, individuals, and companies cultivate the land, sustaining 3.3% of the region's employment. The unique natural characteristics of Hungary create favourable conditions for a diverse agricultural sector, playing a pivotal role in the national economy. Forestry covers 9.7% of the region, predominantly state-owned (60%). Its primary uses include firewood, logwood, paper wood, and other industrial wood. Livestock activities are centered around milking cows and meat cattle, generating residues like slurry and manure, which are currently utilized. The region's bio-based industries, encompassing meat production, dairy, frozen foods, condiments, beer, beverages, pastures, crops, forage, plants, and fruits, collectively employ 6.5% of the workforce and largely consist of individual companies. In the energy sector, 3.5% of the electric energy consumption is sourced from biomass, while solar energy emerges as the primary renewable source. Municipal solid waste (365 kt) undergoes a valorisation scheme, primarily focused on energy production through incineration. Észak-Magyarország, with its blend of economic activities and rich agricultural diversity, stands as a significant contributor to Hungary's regional and national prosperity.

In this region, a complex set of challenges and opportunities defines its current landscape. Approximately 24% of jobs are currently at risk, with 11% of those requiring a university degree. Ethnic diversity is observed, with 9.4% of Romanians classified as ethnic minorities based on 2011 data. The quality of arable land in the region faces several threats, including a lowering water table, intensive agricultural practices, excessive pesticide use, soil erosion and deforestation. Notably, the agri-food industry in North Hungary boasts the presence of influential players like Coca-Cola, Nestlé, Dr. Oetker, and Friesland Campina. Key regional challenges encompass labor shortages, a deficit in cutting-edge knowledge and insufficient funding for investment. The bio-based value chain holds significant potential, particularly in biogas production linked to waste management, organic animal husbandry, and the development of bio-based materials for construction applications. Despite the high energy prices acting as facilitators, the region faces a deficiency in social cooperation, which needs urgent attention for the successful deployment of new bio-based value chains. Amidst these challenges, the agricultural sector emerges as a beacon of opportunity, providing a platform for rural areas to leverage local resources, create value, and sustain livelihoods for local communities. The

regional plan places emphasis on supporting generational renewal in agriculture, aiming to facilitate the establishment of 8,800 young farmers, thereby fostering sustainable growth and resilience in North Hungary.

3.6.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Hungary is presented below.

Table 12. General info about the BIOLOC workshop in the Northern region of Hungary

BIOLOC region	North Hungary Region (Észak-Magyarország)
Workshop dates and time	08/11/2023, 10.00-13.00
Modality	In-person
Workshop locations	Varsany, Nograd county, North Hungary region
Number of attendees	14

The event was organized with the following structure:

1. Oral presentation of project goals
2. Introduction of participants
3. Discussions: Energy poverty in the region
4. Discussions: Social challenges in the region
5. Discussions: Biomass usage: experiences and challenges
6. Discussions: Further steps
7. Lunch

3.6.3 Workshop attendance and photos

The 14 attendees of the BIOLOC workshop were from different sectors: 8 (government), 1 (academia, R&D), 2 (industry, primary activities), 1 (civil). The organisations represented in the event were related to agriculture and forestry, social services, and research and counselling. Photos of the event are displayed as Figure 11

Figure 11. Photos of the BIOLOC workshop in the North Hungary Region

3.6.4 Main outcomes

Synergies: Synergies among participants were not identified in a relevant extent so far (but the possibility was circumscribed by participants).

Marginalized groups: A social organization dealing with child poverty and people living in peripheral rural settlements were present in the event. The participating organizations were interested on including socially disadvantaged groups, for instance by fostering solutions against energy poverty by utilizing alternative energy sources. It was mentioned that unemployed people could largely benefit from BIOLOC-promoted activities, which could opportunities for people and avoid energy poverty by developing higher-quality and more eco-friendly heating systems for the region. It was highlighted that education and training are needed so that socially marginalized groups can be able to fit the labor market.

Industrial context: So far, no substantial decarbonization goals/sustainability strategy were identified in the local industrial ecosystem. There were some sustainability strategies on behalf of an industrial partner (SME), which are currently on hold.

Governmental instruments: Governmental instruments exist only at a very early stage (such as social firewood distribution, but not directly and not as a part of a strategical plan). Local governmental social institutions are overall overwhelmed and underpaid.

Main bio-based value chains: Value chains were identified but as very early stage. Notably, a value chain of used clothes-processing for export- international industry (as clothes rag, see e.g.: https://geprongyok.hu/en/) could be envisioned.

Main bottlenecks: Several significant bottlenecks impede progress in the region. The prevalence of extreme poverty and a persistent culture of poverty create barriers for individuals to integrate into the labor market, compounded by a lack of even basic education. Moreover, the absence of substantial subsidies, whether from governmental or international sources, hampers the region's economic development. Climate change poses an additional challenge, necessitating the adaptation of regional agriculture to new environmental conditions. Additionally, the region grapples with issues related to extremely poor health conditions and substance abuse, further complicating efforts to foster social and economic well-being. Addressing these multifaceted challenges requires comprehensive and targeted strategies to uplift the community and create a foundation for sustainable development.

Action points for the coming period: In preparation for the upcoming period, several crucial action points have been defined. Firstly, a concerted effort will be made to relay valuable insights, identified problems, challenges, and potential solutions to the national government. This communication aims to foster a collaborative approach and encourage governmental involvement in addressing key issues. Additionally, there is a focus on broadening participation, with a specific emphasis on the inclusion of stakeholders from the forestry and industrial sectors. This expansion seeks to ensure a more comprehensive and diverse representation, thereby enriching the perspectives and strategies employed in addressing the region's challenges. Through these action points, the aim is to cultivate a robust framework for collective problem-solving and sustainable development in the upcoming period.

3.6.5 Selection of most promising initiatives

The northern region of Hungary is developing new bio-based value chains, but they are preliminary and not yet well stablished. This is an interesting opportunity for the BIOLOC project, as the hub could help with expanding the expertise regarding bioeconomy and possibilities in the local context. Regarding the marginalized social group, unemployed people living in peripheral rural settlements were targeted so far.

3.7 Italy – Campania region

3.7.1 Region description

In the Italian region of Campania, a challenging economic landscape is marked by a high unemployment rate of 19.7%, with a significant gender employment gap where women's employment rate stands at 25.9% compared to Italy's average of 43.5%, and a lower average salary compared to the national average. Agriculture takes a key role in this region, covering 515,545 hectares and employing 5.3% of the population. Key crops include lettuce, strawberry, tomatoes, and olives. Residual biomass, notably 5,000-10,000 tons of tomato waste, finds purpose in fertilizers, animal feed, and biogas production. Forestry occupies a substantial portion with 650,620 hectares, 51% of which is state-owned. Energy production, bio-based products like paper, pulp, and wood-based panels, and soil amendment are the primary uses. Livestock farming, covering 172,000 hectares, plays a crucial role, particularly in cattle farming (97,000 ha for milk production), sheep farming (36,000 ha), and pig farming (20,000 ha). This sector contributes to 8% of national employment, with main residues being manure and slurry. Campania's agroindustry, represented by 8,000 industries, focuses on tomatoes, mozzarella di bufala, wine, citrus fruits, olive oil, artichokes, and chestnuts processing. Despite its significance, challenges such as small farm sizes and agricultural field fragmentation affect production. Residues produced by agroindustries, like olive mill wastewater, citrus waste, tomato pomace, wine residues, and cheese waste, are repurposed for various uses, including animal feed and biogas production. The region boasts a strong presence in bio-based industries, with over 50 companies contributing to 8.8% of national employment. Residues from agriculture, horticulture, aquaculture, forestry, hunting, fishing, and food processing are notable, along with wastes from wood processing, leather, textile, and organic chemical processes. Energy production in Campania primarily relies on non-renewable sources, with only 17.8% coming from renewables. Municipal solid waste management is a critical aspect, with around 4.2 million tons produced yearly. The region actively exploits various waste fractions for recycling, composting, and biogas production from organic waste, demonstrating a multifaceted approach to waste management and sustainability.

The region exhibits distinct characteristics that shape its economic and environmental landscape. Erosion is a significant concern, with a rate reaching 16.82 t/ha, indicating a high risk as it surpasses the critical threshold of 12 t/ha/year. Forest fires further pose challenges, with 559 incidents burning a total of 5,372 ha of precious forestland. However, amidst these environmental concerns, Campania has outlined a forward-looking strategy for circular bioeconomy detailed in the Regional Circular Bioeconomy Plan adopted in 2019. The economic challenges are multifaceted, with jobs at risk particularly affecting the manufacturing sector, notably in textiles and clothing, which has witnessed decline due to the pandemic. Similarly, the transportation industry faces impacts stemming from reduced travel and mobility restrictions. On a positive note, Campania has a robust aerospace industry marked by significant international players, including Leonardo, EMA, GE Aviation, and others. This structuring of the supply chain, with large companies at its core, has led to the development of a network of small and medium-sized enterprises. Opportunities within the aerospace sector span across various areas, such as smart manufacturing, new air mobility, security and defense, aeronautical technologies with low environmental impact, space economy, and advanced systems and materials. In addition to aerospace, the Blue Economy emerges as a strategic sector for Campania's long-term development. Comprising seven production sectors, it encompasses the fish supply chain, marine extraction industry, marine renewable energy, port activities, shipbuilding and repair, maritime transport,

and coastal tourism. Each sector contributes uniquely to the economic fabric, ranging from fishing and marine resource extraction to offshore wind farms, port infrastructure, shipbuilding, maritime transport, and coastal tourism-related activities. These strategic focuses underline Campania's commitment to sustainable development and economic diversification.

3.7.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Italy is presented below.

Table 13. General info about the BIOLOC workshop in the Campania region (Italy)

BIOLOC region	Campania Region (Italy)
Workshop dates and time	25/11/2023 10:00 – 13:00
Modality	In-person
Workshop locations	Oliveto Citra (Salerno)
Number of attendees	21 local actors + around 100 students

The event was organized with the following structure:

1. Slides presentation (introduction to BIOLOC project)
2. Presentation of bioeconomy with a focus on Campania Region
3. Discussion on bio-based supply chains in Campania: from Agroforestry and dairy to industrial productions
4. Experiences of local businesses
5. Discussion on social inclusion in Campania in the bio-based sector.
6. Mentimeter x 2: for local actors and for students
7. Networking

3.7.3 Workshop attendance and photos

The 21 attendees of the BIOLOC workshop were from different sectors: 4 (government), 5 (academia, R&D), 7 (industry, primary activities), 5 (civil). The organisations represented in the event were the University of Salerno (Academia), University of Napoli Vanvitelli (Academia), Isuschem (startup), Rufolo (livestock industry), Moscato (dairy industry), Oleificio senese (agricultural sector), Iavarone Wood Technology (agro-forestry sector), Regione Campania (Counselor of Agriculture and Counselor for the Environment) and Confagricoltura and Coldiretti (representatives of primary sector). Photos of the event are displayed as Figure 12

Figure 12. Photos of the BIOLOC workshop in the Campania region of Italy

3.7.4 Main outcomes

Synergies: Synergies will be sought in the following meetings. This first event allowed local actors to get to know each other, share needs, obstacles, and set the stage for future dedicated discussions to further develop the bioeconomy in the region while including socially disadvantage groups.

Marginalized groups: Small livestock farmers and agro-forestry workers were present. These groups were also represented by two organizations: Coldiretti and Confagricoltura. From the data collected in the

mentimeter, all the organizations present confirmed the interest in including socially disadvantaged groups. A focus was put on young people migrating from rural areas. Besides work opportunities, opportunities for training and the need for increased education, starting from early childhood, were highlighted. Furthermore, inclusion should involve the active participation of the community. Engaging the disadvantaged groups in decision-making processes, involving them in community projects, and recognizing their cultural contributions can foster a sense of belonging and empowerment.

Industrial context: Some industrial partners have in place or are developing sustainability strategies aimed at reducing environmental impact, striving for zero emissions, and implementing the concept of circularity. We have no practical evidence of industrial partners with active social inclusion initiatives, but there is great interest in starting them in the near future.

Governmental instruments: In Campania Region the following instruments are in place:

- Common Agricultural Policy 2023-2027 - regional rural development complement. Objectives: Promote employment, growth, gender equality, including women's participation in agriculture, social inclusion, and local development in rural areas, including circular bioeconomy and sustainable forestry.
- TerraNext - acceleration program for innovative startups and SMEs operating in the bioeconomy sector (based in Campania).
- Strategy for inner areas in Campania.
- Next Generation Campania with 6 missions for growth and development. In detail, mission n.5 is aimed at "Inclusion and Cohesion".
- Regional Operational Program - European Social Fund+ 2021-2027 = Campania Region program to support employment, education, training, and social inclusion of Campania citizens. Specific Objective 8 aims to stimulate active inclusion, to promote equal opportunities, non-discrimination, and active participation, and improve employability, particularly of disadvantaged groups.
- Campania Region recognizes and promotes the principles of the circular bioeconomy: incentives and system conditions will be provided to induce innovation in production processes at the technological, organizational, and corporate social balance levels.

Main bio-based value chains: Value chains related to agroforestry and the valorisation of zootechnical residues (dairy chain) were deemed the most promising regionally for the bioeconomy development coupled with social inclusion.

Main bottlenecks: Several bottlenecks have been identified within the bioeconomy landscape. One prominent challenge is the scarcity of a workforce equipped with the requisite skills and knowledge. To address this, a pivotal recommendation is to enhance awareness and promote training initiatives. Another hindrance lies in the competition with fossil-based products, which often boast lower prices than their bio-based counterparts. Additionally, there is a lack of a comprehensive reference framework for those translating bio-based solutions into tangible products. Keeping pace with the evolving European regulations presents an ongoing challenge. Furthermore, overcoming the "insiders' perspective" of bioeconomy requires concerted efforts in engaging with the general public. Addressing these bottlenecks is vital for fostering a robust and sustainable bioeconomy ecosystem.

Action points for the coming period: Two main points were defined in the workshop: One-to-one meetings with marginalized groups and representatives, and a next Hub workshop at the beginning of 2024.

3.7.5 Selection of most promising initiatives

The workshop carried out in Campania obtained different conclusions. One of them was that value chains related to Agroforestry and the valorisation of zootechnical residues (dairy chain) would be the most promising bio-based value chains for regional bioeconomy development coupled with social inclusion. The marginalized groups targeted so far are small-scale farmers.

3.8 The Netherlands – Apeldoorn region

3.8.1 Region description

The Apeldoorn region in the Netherlands showcases a diverse economic and environmental landscape. The unemployment rate stands at a low 3.5% of the labour force, reflecting a robust local economy. In terms of non-commercial services, agriculture plays a crucial role, with 473,759 ha dedicated to crop cultivation, encompassing vegetables, grains, and horticultural produce. Residual biomass from agriculture, totalling 298 kt/year (wet), is predominantly manure, utilized partly for fertilizer and biogas production. Forestry covers a significant portion of the region, occupying 48% of the territory, primarily in private ownership. Forest biomass finds applications in the manufacture of board materials, sawing, and packaging wood. Some areas are dedicated to growing wood for energy purposes, indicating a growing focus on sustainable practices. Livestock farming involves a considerable area dedicated to feed production, hosting a breakdown of livestock that includes cows, milk cows, goats, pigs, and chickens. Agroindustry focuses on animal feed and food production, with challenges arising from the volume of manure produced. Reductions in livestock numbers could impact slaughterhouse operations and feed production. The paper industry holds relevance in the region, boasting four paper mills. Side-products from the paper production process generate 77 kt/year, predominantly consisting of chemical waste, paper waste, and residual waste. Although there are initiatives to explore new bio-based materials, the paper industry remains anchored to virgin and recycled paper. Energy-wise, Apeldoorn is actively pursuing a neutral strategy, with wind and solar energy being the primary renewable sources. The management of municipal solid waste involves meticulous separation, with bio-waste, paper, plastics, textile, and residual waste forming the composition. Landfill is prohibited, and waste fractions are either sold to other industries or incinerated for electricity production. Apeldoorn hosts a prominent composting and biogas production facility, Attero, contributing to sustainable waste management. Greenferm stands as the sole manure converter in the region, producing wastewater and composted, purified solid manure. Overall, Apeldoorn's comprehensive approach underscores its commitment to sustainable practices and environmental responsibility.

Apeldoorn faces specific challenges and opportunities reflective of its regional context. Eutrophication and water scarcity, exacerbated during dry seasons, have become pressing concerns at both regional and national levels. The nitrogen crisis poses a particular challenge, impacting farmers whose activities near natural areas,

like the Veluwe within the municipality, who may face cessation. This necessitates a shift in earning models for affected farmers. Moreover, excess nitrogen hinders housing development despite the national housing shortage, potentially leading to a reduction in livestock sector activity in the coming years. To address these challenges, adjustments in managing manure are crucial to avoid exacerbating existing surpluses. The region is exploring bio-based solutions, fostering regional initiatives to link the demand for high-quality housing materials with farmers seeking new economic activities. With a commitment to environmental sustainability, Apeldoorn aspires to be energy-neutral by 2050, targeting 39% energy neutrality by 2030. The region is actively developing a regional energy strategy to enhance its renewable energy profile. While the region does not currently have a specific bioeconomy strategy, it is recognized as a significant concern, especially regarding the management of municipal solid waste. Apeldoorn's endeavours align with broader EU and national goals to halve the usage of primary raw materials by 2030 and achieve a complete circular economy by 2050.

3.8.2 Workshop planning - general info

General info regarding the BIOLOC workshop in the Netherlands is presented below.

Table 14. General info about the BIOLOC workshop in the Apeldoorn region (the Netherlands)

BIOLOC region	Apeldoorn (the Netherlands)
Workshop dates and time	20/11/2023 13h – 16h
Modality	In-person
Workshop locations	Kitchen garden Havenpark, in Apeldoorn (NL)
Number of attendees	12

The event was organized with the following structure:

1. Welcome
2. Introduction round
3. About the BIOLOC project
4. About each kitchen garden initiative: Havenpark, Da Capo, Sadika
5. Tour through the kitchen garden @ Havenpark
6. How can the municipality help?
7. About crowdfunding & subventions from the municipality
8. Exchange of experiences, questions & tips (mainly for the 3 initiatives to share with each other)

3.8.3 Workshop attendance and photos

The 12 attendees of the BIOLOC workshop were from the municipality of Apeldoorn and three different kitchen garden initiatives (Moestuin Havenpark, Sadika and Stichting Da Capo). Photos of the event are displayed as Figure 13.

Figure 13. Photos of the BIOLOC workshop in the Apeldoorn region of the Netherlands

3.8.4 Main outcomes

Synergies: Clear synergies were identified. By the end of the workshop, the three kitchen gardens initiatives had created a Whatsapp group to easily communicate with each other, help each other with tips, tools, volunteers, materials and seeds… There was a great exchange of tips, questions, and ideas within the groups. Great interest of what the other is doing, and how, and a will to learn from each other. Representatives from the municipality also actively participated with tips and ideas.

Marginalized groups: socially disadvantaged people are part of the kitchen gardens present in the workshop. At Moestuin Havenpark, one volunteer who helps with the compost is a retired person; at Sadika, one migrant woman helps in the community; at Stichting Da Capo, both the founder of the foundation &

volunteers helping in the garden are working closely with migrant women, serving as representatives of this group. Importantly, 2 of the 3 initiatives work with socially disadvantage groups and have this as the core of their organizations. The kitchen garden Moestuin Havenpark has a broader focus: anyone willing to help is welcome to help. They do have a collaboration with the nearby shelter for homeless & reintegrating people. Also retired people (some suffering from loneliness) are free to join and help in the garden, where tasks are adapted to the needs and capabilities of the volunteers. All 3 kitchen gardens initiatives work almost only with volunteers. They do not provide jobs directly within the initiative for the disadvantaged groups, but they act as a portal, and help to ease the integration, transition period, and preparation towards a job within another organization; by providing knowledge, skills (language and others), self-confidence and a support network.

Industrial context: No industrial partner is currently active in the NL BIOLOC hub. The 3 kitchen gardens have as goals to help stimulate biodiversity (through the garden) within the city, as well as better health (non-processed food, growing and cooking with local & organic fruits & vegetables) and achieving social cohesion through working in the garden.

Governmental instruments: The municipality of Apeldoorn can allocate (up to 3 times) a subvention (up to 5000 EUR) to sustain activities or events of a local citizen initiative. Another way to find funding is through crowdfunding and donations from (social) organizations.

Main bio-based value chains: The BIOLOC hub of the Netherlands has as focus the value chains possible from kitchen/community gardens, which offer a range of social, environmental, and economic benefits that contribute to the well-being of individuals and the community as a whole. Some key benefits are community building, social interaction (as a space for people to come together, fostering social interaction and a sense of community), the promotion of teamwork and collaboration, cultural exchange (as gardens often reflect the diversity of a community, offering a space for cultural exchange and understanding among individuals from different backgrounds), health and well-being, physical exercise, nutritional access (as community gardens can enhance access to fresh, locally grown produce, contributing to a healthier diet for participants), environmental benefits such as urban green spaces and biodiversity, educational opportunities (as a hands-on learning environment for people of all ages to develop skills in horticulture, environmental stewardship, and sustainable practices), food security, economic benefits (cost savings, fostering entrepreneurship), local empowerment and skills development. Overall, community gardens are versatile and adaptable, making them valuable assets in a wide range of settings. Their benefits extend beyond the immediate participants to positively impact the broader community and its overall resilience and sustainability.

Main bottlenecks: The kitchen garden initiatives are mostly at risk due to:

- Lack of volunteers (too much work, not enough capacity)
- Having only 1-2 people steering the group (risk is that 1 of both get sick or leave)
- Lack of financial means
- Lack of knowledge & materials
- Not having their own ground/premises (they are dependent of municipality decisions or real-estate decisions)

Action points for the coming period: The first action point defined was the creation of a Whatsapp group for the initiatives to exchange knowledge, give away materials/seeds, occasional help needed from a group of

volunteers. The group was created at the end of the BIOLOC workshop). A next step is to ask volunteers from Moestuin Havenpark vegetable garden if they want to help with the other initiatives. Initiative broker & Crowdfunding contacts were not present during the meeting: Da Capo Foundation & Meeting Place Sadika would like to make a follow-up appointment with both parties for more information on financial support.

3.8.5 Selection of most promising initiatives

The Netherlands BIOLOC Hub focuses on the value chains generated by kitchen/community gardens, emphasising the social, environmental, and economic benefits of these initiatives. These include community building, health, cultural exchange, education and economic empowerment. Disadvantaged social groups, particularly migrant women, are currently involved in these activities and can benefit from their further development.

3.9 Romania – West region

3.9.1 Region description

In the West region of Romania, a robust economic landscape is characterized by a remarkably low unemployment rate of 1.9%. Agriculture and livestock play a substantial role, employing 17% of the workforce. The predominant economic activities include wholesale and retail trade, scientific and technical pursuits, as well as diverse industries such as manufacturing and construction. Agriculture covers an extensive 769,500 hectares, with corn being the key crop, occupying 32% of the agricultural land. Livestock farming is significant, with large farms boasting around 200 cows or 10,000 pigs on average. While the region encompasses 32.7% of forestry territory, it isn't a major contributor to the bioeconomy. Woody biomass from this sector is primarily utilized for energy, construction, and furniture. Livestock production includes cattle, pigs, sheep, goats, and poultry, contributing to a considerable amount of animal manure. This residue is managed through biogas plants and open-space storage used as fertilizer. Agroindustries, constituting 17.8% of employment, involve subsectors related to cereals, wood, and meat, generating organic by-products and residues. The region also houses various bio-based industries, contributing around 1.4% to the employment rate, focusing on organic waste management, composting, and energy crops. In waste management, the West region produces 569,000 tons of waste, mainly from households, with a significant portion being incinerated in cement plants. Additionally, existing bio-based solutions include anaerobic digestion, composting of non-digestible biomass, and vermicomposting, contributing to the region's sustainable and circular practices.

In this region, depopulation is primarily driven by migration, with closed mines and the shuttering of metallurgical, extractive, and steel production industries acting as the main catalysts. While the region's specialization results in a high educational level, there's a noticeable lack of knowledge regarding bioeconomy and bio-based valorisation schemes. Erosion and eutrophication are relatively isolated issues. The primary production activities are expected to be maintained in large industrial facilities, relegating small businesses to a marginal role in the economy. Large processors, facing environmental and financial

constraints, might drive the development of green technologies integrated into a functional and appealing circular bioeconomy. The region has a 2021-2027 strategy focused on increasing renewable energy production and compost usage. However, Romania, and its regions, lack a specific strategy for circular bioeconomy. In terms of energy, the region relies significantly on renewable sources, primarily hydropower, with coal-fired energy also holding importance at the national level (43% renewable usage). Notably, there's no immediate anticipation of a substantial increase in the bio-based energy sector in the short term.

3.9.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Romania is presented below.

Table 15. General info about the BIOLOC workshop in the West Region of Romania

BIOLOC region	West Region (Romania)
Workshop dates and time	09/09/2023, 9.30h – 14.00h
Modality	In-person
Workshop locations	AGROMALIM EXPO@FAIR, Pavilion A etaj, Complex Expo Arad, Calea Aurel Vlaicu, nr 300, Arad, Romania
Number of attendees	45

The event was organized with the following structure:

1. BIOLOC slides presentation

2. The main part of the workshop has been dedicated to stakeholders. The structure of the workshop has been modelled to start with the challenges in management of organics and to continue with solutions described by stakeholders. After hearing the presentation of ADI ECOLAND BIHOR (agency of intra-community development, a local administration in charge with wastes management) and AVE (a company managing wastes in several counties in Romania), the debates have been focused on social issues associated with wastes management: information and education, marginalized groups and involvement in wastes management, efforts to circularize management of organics in local communities, health threats in social groups due to pollution, benefits of compost and digestate for communities from polluted areas.

3.9.3 Workshop attendance and photos

The 45 attendees of the BIOLOC workshop were from different sectors: 2 (government), 28 (academia, R&D), 14 (industry, primary activities), 1 (civil). The organisations represented in the event were related to agricultural and industrial activities, particularly compost/waste managers and biogas operators, as well as local university and governmental agencies. Photos of the event are displayed as Figure 14.

Figure 14. Photos of the BIOLOC workshop in the West region of Romania

3.9.4 Main outcomes

Synergies: Various synergies were identified between the participants. Accordingly, people living in polluted regions are looking for circular bio-based solutions to improve qualities of the soil affected by industries (metallurgy, mining, coal powered power plants) which currently have ceased activities, negatively affecting social life and local economies. These regions became unattractive for young generations, causing high rates of emigration; the soil is contaminated with heavy metals causing health problems in the local population already affected by economic constrains. Solutions can potentially come from bioeconomy activities. For instance, through a proper management of compost, composted manure and digestate from biogas plants (organic fertilizers), stable complexes are formed between metals and organic compounds, immobilizing polluting heavy metals in the soil, and thus decreasing their availability and negative effects. The digestate resulting from anaerobic digestion can be composted, and the resulting compost can even be converted with the help of earthworms to humus. Thus, the circular bioeconomy cycle is closed: the digestate, compost, or humus is redistributed in the soil to restore its health and produce biomass with the help of plants and solar energy. Agencies for intra-community development (ADI) present in each county and waste management companies need to correctly inform local communities regarding the sustainable management of bioresources in a circular bioeconomy, which brings multiple advantages to local communities and individuals by improving health, diversifying the economy, and reducing costs associated with resource and waste management. They could cooperate with biogas operators, composting sites and vermicompost to achieve it.

Marginalized groups: marginalized groups living in polluted areas in West Region Romania were present in the event. Biogas operators and vermicompost businesses showed availability to train students and residents of polluted areas in the topics of composting and biodigestion to convert organic residues into compost, digestate, to be then applied as organic fertilizer and soil improver to reduce toxicity in soil, increase nutritive quality and restore soil biodiversity. Waste management companies are currently working with socially disadvantaged groups on these topics. The two main marginalized groups identified are (A) marginalized groups from polluted areas in West Region Romania (counties of Hunedoara, Caras-Severin) and (B) graduate

students in the field of bioeconomy, experiencing difficulties in finding a working place within the local bioeconomy sector.

Industrial context: Industry in Romania, including the energy sector, are taking measures for decarbonization (primary investment in renewable energy and energy efficiency). The main industrial stakeholders in our project (biogas, compost operators) are carbon negative industries. Waste management companies are currently implementing informative programs for the entire community regarding waste management for a clean environment.

Governmental instruments: There are important funding instruments, mostly from EU, dedicated to bioeconomy topics and social inclusion.

- Investment funds for agriculture (e.g. FEADR), and subsidies for farmers (APIA);
- Circular bioeconomy funds (ministry of environment tools, including funds for anaerobic digestion of animal wastes);
- Just transition funds (including renewable energy – with possibility for bioenergy-biogas-biomethane projects)
- Social inclusion funds: Programul Operational Capacitate Administrativă (POCA): https://oportunitati-ue.gov.ro/program/programul-incluziune-si-demnitate-sociala/

Main bio-based value chains: the value chains identified for the region are depicted inFigure 15. They are broad and interconnected in a self-sustaining, circular biorefinery able to remediate the soil and revert the current pollution issues in the region. In summary, waste and byproducts from biomass can be converted to biogas (that can generate power and heat) through anaerobic digestion, and the remaining digestate can be treated and used as a soil improver / fertilizer to close the loop.

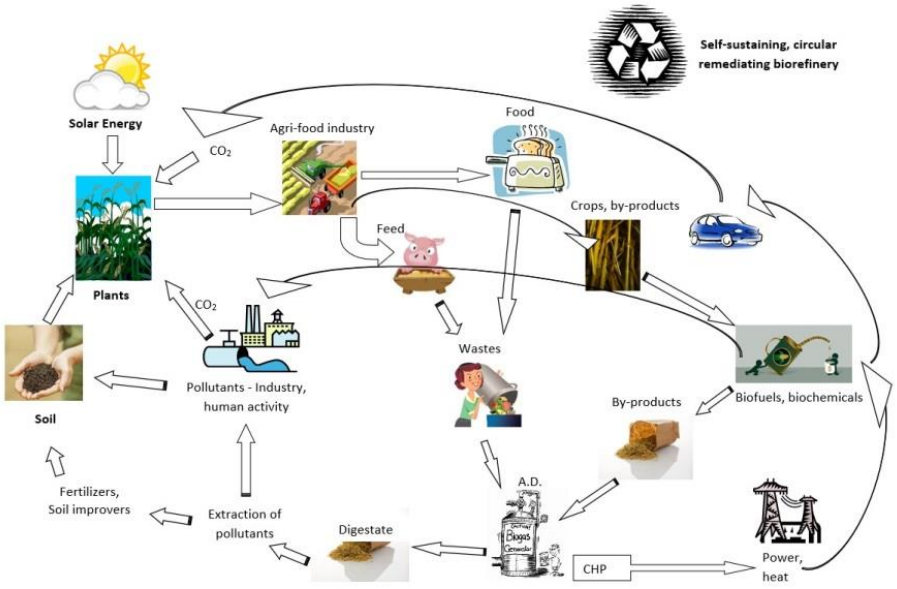

Figure 15. Schematic of a self-sustaining, circular, remediating biorefinery that can be implemented in the West region of Romania.

Main bottlenecks: A notable identified bottleneck in the development of circular bioeconomy are the inherent cost challenges associated with these initiatives. The substantial investment costs and operational expenditures required, particularly evident in endeavours such as biogas plants, often result in the delivery of methane and digestate at higher costs compared to conventional alternatives like natural gas and chemical fertilizers. This economic landscape makes bioeconomy products less competitive in the market, necessitating subsidies for the sector's development. The establishment of a dedicated legal framework becomes imperative to navigate these challenges and foster a more economically viable and sustainable bioeconomy sector.

Action points for the coming period: Visits of marginalized groups from polluted areas, meetings with individuals open for bioeconomy approaches, representatives of public administration and civil society in the area for transfer of knowledge regarding the sustainable management of bioresources in a circular bioeconomy, which brings multiple advantages to local communities and individuals by improving health, creating jobs, increasing incomes, diversifying the economy and reducing costs associated with resource and waste management.

3.9.5 Selection of most promising initiatives

Biogas plants are seen as a potential opportunity for the region. There is availability of waste that could be valorised in the biogas plants, obtaining as outputs biogas and digestate, and the latter could be used for remediation, thus helping to restore and improve the quality of the soils. Additionally, the presence of subsidies and the willingness of biogas operators and vermicompost businesses to develop training programs are essential to include marginalized groups in bioeconomy activities. In line with this context, the marginalized groups targeted were people living in rural areas affected by pollution.

3.10 Slovakia – Nitra region

3.10.1 Region description

The Nitra region in Slovakia, with a population of 676,000 people across an area of 6,344 km^2, is characterized by dense population, with only a few areas having less than 5,000 inhabitants. The unemployment rate stands at 4.8%. The region's pivotal sectors include agriculture, food industry, and various industries such as automotive, construction, and chemistry. Notably, pulp and paper production, plastic materials manufacturing, and grape growing also contribute to the regional economy. In agriculture, which covers 1,862,654 ha, potatoes are a significant crop, yielding approximately 755,355 t/year of residual biomass, though the sector faces challenges due to extreme land ownership fragmentation. Forestry spans 97,000 ha, mainly state-owned, producing 121 kt of biomass residues utilized for heating, furniture, and construction. Livestock, covering 512,000 ha, primarily focuses on cow milk, generating slurry residual streams used as fertilizer. The 3,800 agrifood industries in Slovakia, including brewing, meat, and confectionery, produce various residues like animal skins and bones, often underutilized. Bio-based industries include food and feed industries, commercial biorefineries, and pulp and paper, with farms and food companies as key actors.

Nuclear energy constitutes the primary energy source (86.45%), supplemented by hydropower and solar energy. Regarding Municipal Solid Waste (MSW) recovery, around 150kt/year out of 400 kt/year are currently recovered, leaving room for further development in waste separation and treatment systems for potential valorisation.

In Western Slovakia, where approximately 25% of the population holds an upper secondary education, there's an evident opportunity to encourage higher education levels. The region is marked by cultural diversity, with more than 25 ethnic minorities, predominantly Hungarians. The agricultural sector engages only 3% of the workforce. Environmental concerns include pesticide penetration from agricultural activities, deforestation, and water erosion affecting a significant portion of agricultural soils. Government initiatives aim to address these issues through increased organic fertilization and the implementation of modern irrigation systems. The reduction of employment in the automotive industry has created labour availability, prompting a need for efforts to retrain individuals for opportunities in the agrifood sector. Currently lacking a regional strategy for bioeconomy development, challenges include the automotive industry's substantial economic role, insufficient public support, competition with other sectors, and the limited significance and competitiveness of local agrifood products. To tackle a negative balance between food imports and exports, proposals include boosting domestic food production, implementing a National Food strategy, establishing investment mechanisms, and promoting local food through campaigns and online platforms. The government prioritizes individual business promotion, intending to implement the "Entrepreneurial Discovery Process" and define incentive measures. Authorities also emphasize innovation in agriculture and food production, aiming to stimulate knowledge transfer and financial assistance for innovative activities.

3.10.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Slovakia is presented below.

Table 16. General info about the BIOLOC workshop in the Nitra region of Slovakia

BIOLOC region	Nitra region (Slovakia)
Workshop dates and time	10.11.2023 9:00 – 12:00h
Modality	Online
Workshop locations	Online
Number of attendees	26

The event was organized with the following structure:

1. Slides presentation

2. Presentation of marginalized groups

3. Presentation of the results of SWOT analysis

4. Questions and Discussion

3.10.3 Workshop attendance and photos

The 26 attendees of the BIOLOC workshop were from different sectors: 1 (government), 5 (educational establishment, organization of Ministry of Agriculture), 6 (consultancy), 1 (NGO), 2 (innovation centre), 5 (government institutions), 6 (local governments). In detail, the organisations represented in the event were the Agricultural Knowledge and Innovation Institute, the Ministry of Agriculture, local governments (Nitra, Prešov, Banská Bystrica), National agricultural and food centre, Slovak academy of science, Slovak centre of scientific and technical information and Druživa, o.z. (NGO for social agriculture trying to involve marginalized groups). Screenshots of the online event are displayed as Figure 16.

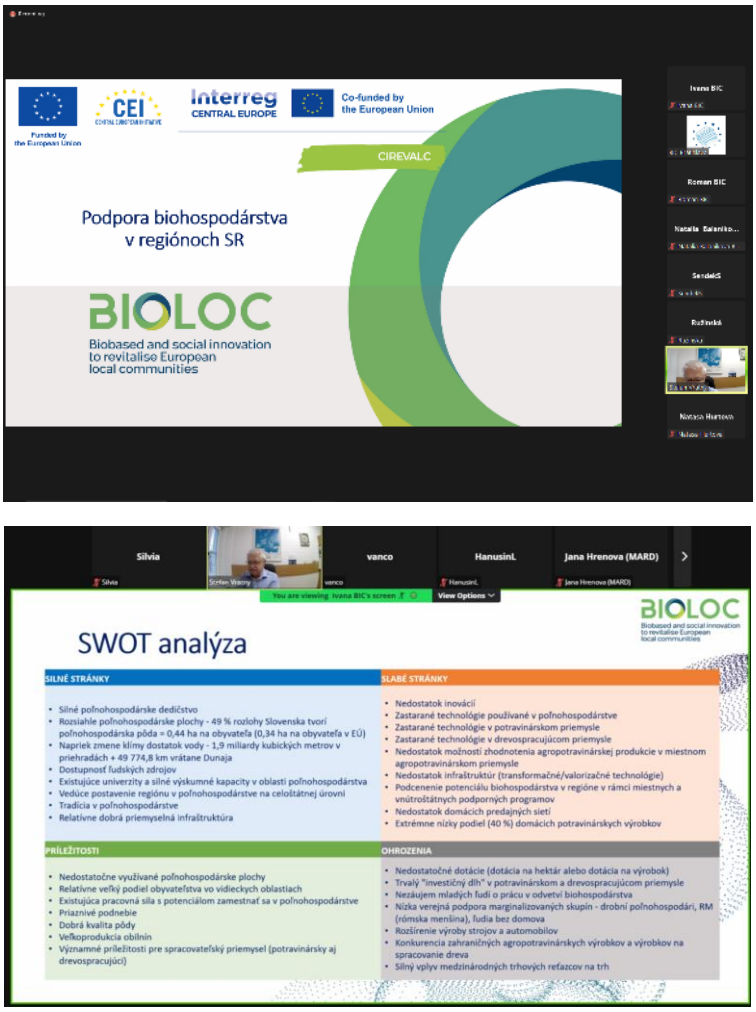

Figure 16. Photos of the BIOLOC workshop in the Nitra region of Slovakia

3.10.4 Main outcomes

Synergies: Synergies were identified in the workshop. The Prešov Local Government and the Druživa NGO have exchanged contacts so that they can cooperate in the future. NPPC has presented its services.

Marginalized groups: Homeless people and romas representatives were present in the workshop. All stakeholders were aware of the need to involve marginalized groups (particularly homeless people and Romans communities, which are the targeted groups in the BIOLOC activities in the region). An example is the "Good Shepherd" NGO, which aims to re-socialise hundreds of homeless people. There are several factors that hinder inclusion beyond the lack of job opportunities, for example the existence of closed communities without sufficient motivation to overcome passivity and poverty, low educational attainment, and poor work habits. For that reason, training and integration activities must be considered in a holistic strategy to foster inclusion.

Industrial context: One drawback of the workshop was the absence of representatives from industries, notably the private sector and manufacturing activities. The non-participation of representatives from these specific industries in the event hindered our ability to gather specific information on their sustainability strategies and decarbonization goals during the workshop.

Governmental instruments: There are some support instruments especially for Romas from the local government, but they are not specifically focused for the development of the bioeconomy.

Main bio-based value chains: The main value chains identified are plant production (direct farming), animal production, food production, and sheep farming (focused on cheese products). The byproducts and residues of said value chains can be further valorised to close the loop while including the socially disadvantaged groups identified.

Main bottlenecks: Several barriers impede participation in the bioeconomy, including low education levels, inadequate work habits, the prevalence of only partial solutions with a dearth of systemic approaches, ingrained mentalities, and a shortage of social development staff. These factors collectively contribute to the challenges faced in fostering engagement with the bioeconomy.

Action points for the coming period: In the forthcoming period, the action points are delineated to address several key aspects. First and foremost is the imperative to raise awareness regarding the predicament of marginalized communities, specifically small farmers, the homeless, and the Romas. This entails a concerted effort to shed light on their unique challenges and advocate for their needs. Additionally, the strategy involves an expansion of collaboration with the government to ensure a more inclusive and comprehensive approach to societal issues. Strengthening ties with non-governmental organizations (NGOs) is another pivotal action point, aiming to leverage their expertise and resources in fostering sustainable solutions and driving positive social change. Through these concerted efforts, the strategy seeks to enact meaningful progress and address the multifaceted challenges faced by vulnerable communities.

3.10.5 Selection of most promising initiatives

Based on the information collected and discussed on the workshop, the potential in this region lies on the primary sector. For instance, setting up new organic farms or the transition of the conventional farms to organic models could be promising. Moreover, the fact that the generated job opportunities do not require specific skills or qualifications facilitates the inclusion of socially marginalized groups. Furthermore, in order to develop new value chains, it would be useful to analyse which bio-based residues are being generated, what is being done with them and which new opportunities could be envisioned. The marginalized groups considered so far are homeless people and the roma community.

3.11 Slovenia

3.11.1 Region description

Slovenia, with a population of 2 million people across its 20,000 km^2 expanse, boasts a low unemployment rate of 3.5%. The country's economic landscape is predominantly shaped by services and industry, with agriculture contributing less than 5%. Within the primary sector, agriculture focuses on cereals, corn, and grass cultivation. Forestland covers 59% of Slovenia's territory, predominantly privately owned, with forestry outpacing agriculture in significance. Livestock farming takes a key role, particularly in the production of cow milk and meat. However, the agricultural sector faces challenges, reflected in low net added value and income, stemming from factors like reduced farm size and numerous non-specialized and subsistence farms. Cooperative entities and associations play pivotal roles, accounting for 6.0% of employment. The robust forestry sector utilizes its 1 million hectares primarily for energy and construction purposes, generating 160,000 t of residual biomass yearly, with recycling and incineration as common end of life methods. Livestock, encompassing cow milk production, represents a dominant sector constituting 4% of employment. Agroindustries, comprising 789 enterprises, are instrumental in meat processing, bakery, and other productions, contributing 1.7% to employment. The energy industry relies heavily on hydropower, with other renewable sources constituting 3.5% of electricity generation. In waste management, 70% originates from households, with a substantial portion recycled through composting and biogas facilities, highlighting Slovenia's commitment to sustainable practices.

The regional specificities of Slovenia encapsulate a diverse range of challenges and opportunities. The presence of traditional national minorities, namely the Italian and Hungarian communities, as well as a distinctive Romanian community, adds cultural richness. The rural economy and agrifood sector require significant support and enhancement, with a focus on overcoming challenges such as skills development, land fragmentation, and vulnerability to climate change. The Slovenian market's smaller size compared to neighbouring EU markets contributes to agricultural product price volatility, emphasizing the need for increased efficiency and the establishment of irrigation systems. Soil contamination from agricultural activities, although decreasing in recent years, remains a concern, as does the depletion of soil organic matter in certain areas. The forestry sector grapples with fragmentation, suboptimal forest road accessibility, and the need for professional management of private forests. Biogas plant oversizing poses environmental challenges, urging a shift towards smaller, more efficient plants aligned with Slovenia's agricultural landscape. While the country holds favourable conditions for organic meat production, these products often

enter conventional markets. Wood is a crucial renewable energy source, constituting 48% of the energy mix, but the wood processing sector faces challenges in terms of low added value and substantial exports of unprocessed roundwood. The lack of technology and productivity gap in primary bioeconomy sectors, coupled with inefficient business models, underscore the need for comprehensive strategies to unlock the untapped potential of Slovenia's bioeconomy.

3.11.2 Workshop planning - general info

General info regarding the BIOLOC workshop in Slovenia is presented below.

Table 17. General info about the BIOLOC workshop in Slovenia (whole country considered)

BIOLOC region	Slovenia (whole country)
Workshop dates and time	12/10/2023 9h – 12h
Modality	In-person
Workshop locations	Chamber of Commerce and Industry of Slovenia, Dimičeva 13, Ljubljana, hall E
Number of attendees	15

The event was organized with the following structure:

1. Presentations: BIOLOC and workshop, CEE2ACT, Bioeconomy in Slovenia

2. Workshop and discussion, divided in three groups: three questions were discussed:

- Financial considerations in the bioeconomy.
- Establishing circular value chains and needed partnerships.
- Inclusion of the youth in the bioeconomy.

3.11.3 Workshop attendance and photos

The 15 attendees of the BIOLOC workshop were from different sectors: 2 (government), 2 (academia, R&D), 5 (industry, primary activities), 2 (civil), 4 (Service and Consultancy company). The organisations represented in the event were related to agricultural and industrial activities (manufacture of chemicals, waste managers), as well as a local university, association of chemical industries and circular economy, and governmental agencies (Ministry of Agriculture, Ministry of Economy). Photos of the event are displayed as Figure 17.

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BIOLOC

Figure 17. Photos of the BIOLOC workshop in Slovenia (whole country considered)

3.11.4 Main outcomes

Synergies: Synergies were identified in the workshop. For instance, the representative of ETRI society is looking for a company providing solutions for handling animal by-products, since they are working with several young, disadvantaged people, which are oriented in this area. The company KOTO, that was also present in the workshop, has been a key player in the domestic food processing industry for over seven decades. They provide high-quality services and sustainable comprehensive solutions for handling animal by-products.

Marginalized groups: The workshop had the participation of marginalized groups, including young people and those facing disadvantages, represented by the ETRI society with two individuals. A consensus emerged among most participants recognizing the potential of young individuals actively seeking employment opportunities as a valuable workforce in the bioeconomy sector. Beyond job creation, there was a proposition to establish "Knowledge Centres," termed the “BIOBUFFER” approach. This model emphasizes collaboration between companies and educational institutions, where dedicated areas facilitate hands-on learning about emerging technologies under the guidance of educational mentors. The envisioned outcome is the training of future employees and the incubation of start-ups focused on by-product utilization and the development of innovative technologies within the local circular bioeconomy. Acknowledging the pivotal role of young farmers in rural areas, it was stressed that the bioeconomy encompasses not only traditional farming, but everyone engaged in land-based production. Integration provides opportunities for collective decision-making, mutual investments, and support, all anchored in sustainability values. A recognized gap in financial literacy among the youth underscores the need for education in both traditional and circular economic models. The imperative is to foster and preserve the creativity of the younger generation, enabling them to make meaningful contributions either individually or as part of larger entities.

Industrial context: Key discussions encompassed the future of biorefineries in Slovenia, optimal biomass flows, challenges faced by traditional sectors, potential avenues of investment, and the importance of effective communication. It was identified a lack of collaboration on investments that link actors in new value chains such as Joint Ventures. Current partnership models, like consortiums between public and private institutions, are unclear and lack transparency. They often stipulate that a public or quasi-public institution

must own equipment or other assets. This requirement not only limits the scale of investments but also diminishes the private sector's motivation. Additionally, the bureaucratic processes are cumbersome, often discouraging participation from the private sector. Slovenian firms exhibit a tendency toward inactivity and short-term thinking, contributing to a reluctance to embrace changes in their business models. In particular, bioeconomy firms in the region are characterized as "old heads," representing industries with a longstanding presence, some spanning almost a century. This historical continuity has led to a prevalence of linear thought processes within the sector, fostering resistance to diversification efforts. Overcoming this resistance involves addressing ingrained patterns of thinking and fostering a mindset conducive to adapting business models to the evolving landscape of the bioeconomy.

Governmental instruments: It was highlighted that Slovenia stands out as one of the few EU countries lacking a comprehensive bioeconomy strategy, with national funding schemes falling short of addressing current challenges and bureaucratic hurdles hindering private sector involvement. To overcome this, a fundamental shift in perception is essential, portraying the bioeconomy not as a financial burden but as a pathway for sustainable business growth. Recent technological strides have rendered bioeconomy investments more commercially viable, urging the promotion of bankable projects through strategic collaborations, engaging investors in discussions, and introducing cascading investment funds. Despite these advancements, Slovenia's national public funding schemes seem to inadequately address current challenges, remaining focused on research with a notably compartmentalized approach across various ministries, including the Ministry of the Economy, Tourism and Sport, the Ministry of Agriculture, Forestry and Food, the Ministry of Environment, and the Ministry of Science and Education. Over the last two years, a mere two demo projects have secured approval, collectively receiving a funding allocation of 4 million EUR.

Main bio-based value chains: Participants in discussions about biorefineries in Slovenia have reached a consensus that large-scale biorefineries, defined as those processing 1 million tons of waste input per year, are unlikely to be established in the country. However, a counterargument suggests that there is potential for smaller scale biorefineries with capacities up to 100,000 tonnes. It is believed that there is room for the development of 2-4 projects of this smaller scale in Slovenia. The debate underscores the considerations and challenges in determining the feasibility and scale of biorefinery projects in the Slovenian context. The discussions also focused on identifying regional biomass hotspots and appropriate technologies to valorise these waste streams. Recognised potential was identified for the following streams:

- Cellulose and lignin waste and by-product streams, especially in the Southeast part of Slovenia, where forests are vast.
- Whey protein from the dairy industry was mentioned as a promising bio-based value chain.
- Spent grains from breweries need to be valorized into high-profit products.

It was mentioned that the significance of economies of scale in the bioeconomy lies in maintaining constant and sufficiently large-scale biomass streams for profitability, with the stipulation that biomass collection should not extend beyond 50km from the biorefinery. Potential Sectors in the Slovenian context were the following:

- Bakery and bread-making industries.
- Liquid biofuels and bioenergy industries.

- Wood value chains. Despite having a well-established and mature market, there is still potential to valorize some waste streams. For example, the company Melamin is looking into it by planning to build a biorefinery with an annual input of up to 100,000 tons of wood waste.
- Alternative proteins, especially meat alternatives, are one of the hottest markets currently.
- Insects are on the rise and have great potential in the European bioeconomy.

Main bottlenecks: The challenges faced in the Slovenian context for the development of a circular and inclusive bioeconomy were discussed in detail during the workshop. First, it was agreed that addressing communication challenges is crucial, particularly in the perception of traditional sectors such as forestry and agriculture as non-innovative. The Hub faces the task of effectively communicating the innovative green technologies that are currently emerging. This involves not only highlighting the technologies themselves but also promoting their integration into traditional sectors through circular processes. Another significant challenge is emphasizing the return on investment (ROI) and overall profitability associated with adopting these eco-friendly technologies. It is essential for companies to recognize the economic viability and potential profits that lie behind the incorporation of sustainable practices, making a compelling case for the adoption of these innovations. For instance, there's a widespread belief that ROI for circular bioeconomy projects extends over 10 years or more. While this may have been true a decade ago, technological advancements have created commercially viable solutions. These technologies have been developed and commercialized over the past decade with substantial EU support and national and regional funds across European countries. Although these technologies will continue to evolve, waiting on the sidelines may hamper the competitiveness of the Slovenian industry, especially as we approach the 2030 deadline for legally mandated reductions in CO_2 emissions and organic waste. Along these lines, investors adhering to ESG-related regulations, require a clearer comprehension of emerging circular bioeconomy value chains, a crucial factor for recognizing green investment opportunities and accurately assessing the ROI. A technical challenge identified is the fragmented distribution of biomass streams around Slovenia. In this sense, a throughout assessment is needed to develop robust, efficient supply chain systems. Regarding the targeted socially disadvantaged group (young farmers), it was highlighted that they play a pivotal role in advancing bioeconomy practices in rural settings but need to be integrated, trained, and supported, as it is imperative that actions are aligned with sustainable development values and goals. A notable challenge identified is the overall lack of financial literacy, prompting a proposal to implement financial education tailored to both linear and circular economic models.

Action points for the coming period: Based on the discussions that took place in the workshop, several actions were defined for the upcoming period. In January 2024, we propose initiating niche workshops with a focused approach on specific biomass flows. The objective is to gather stakeholders and introduce potential circular value chain solutions around these biomass flows. Following these workshops, one-on-one sessions will be conducted to engage in individual discussions with attendees, gauge interest and commitment, and further identify potential partnerships for collaboration. A subsequent stakeholder meeting is planned for April 2024. This meeting, building on initial interest, will facilitate more in-depth discussions and planning sessions involving all stakeholders. Additionally, aiming at a successful multi-actor cooperation, the Slovenian BIOLOC hub will seek technology providers from neighbouring countries to form consortiums.

To further the initiative, business-related actions are also proposed. Firstly, providing business case studies on investments for deploying circular bioeconomy value chains. Secondly, engaging in discussions with banks

that issue green bonds, e.g., SID, NLB, and Intesa Sanpaolo Bank. These discussions will focus on how to promote a pipeline of bankable projects collaboratively. Simultaneously, discussions with investors, e.g., ALFI, Pečečnik, Pipistrel, and SPS, will be initiated to explore ways to promote a pipeline of investable projects collaboratively. Finally, as part of a financial planning, the introduction of a Cascading Investment Fund is proposed. This fund is designed to support planning, feasibility studies, and investment swiftly, aligning with the ambitious sustainability targets set for 2030.

An important proposed solution involves the establishment of knowledge centers, particularly focused on specific technologies in collaboration with a company dedicated to demonstrating practices aligned with social development. Termed BIOBUFFER, this approach hinges on a synergistic relationship between companies and the educational system. Within these companies, dedicated spaces would be provided, facilitating the learning of specific technologies by young individuals. The educational process would be guided by a pedagogical mentor from the associated educational institution. This arrangement ensures that young people gain practical insights into new technologies. The anticipated outcome of such collaboration encompasses not only the education of future workers but also the fostering of professionals and new businesses dedicated to utilizing bio-based by-products and pioneering new technologies.

3.11.5 Selection of most promising initiatives

Biorefineries at smaller scale, agro-alimentary industries and liquid fuels would be options which could help to boost the development of bioeconomy in the region. Furthermore, the valorisation of wastes should be considered, for instance, it would be useful to explore new ways to valorise the wastes of wood industry. There was a strong focus on the development of training programmes involving civil society, local industries and educational institutions, aiming at expanding the knowledge about bioeconomy and highlighting its potential to boost the local economy and positively impact socio-environmental aspects. The marginalized groups targeted so far were young people facing disadvantages, particularly young farmers.

3.12 Spain – Aragón region

3.12.1 Region description

Aragón stands out as one of Spain's most extensively rural regions, encompassing over 95% of its territory, with 97% of municipalities having fewer than 5,000 inhabitants. Approximately 32% of the population resides in rural areas, witnessing a decline due to continuous migration, aging, and environmental challenges such as drought and soil erosion impacting primary activities. The region's key economic activities include the automotive and manufacturing industry, agriculture, and agroindustry in rural areas. Agriculture occupies 37.5% of the territory with cereals as the main crop, while forestry covers 54.7%, contributing to biomass production. Livestock, primarily focused on meat production, features pigs as the most numerous cattle. Agroindustries play a significant role in the region, with meat, milk, skins, and their derivatives being the primary commercialized products. The residues and by-products from agroindustries are increasingly utilized to reduce fossil-based fuel consumption, promoting economic profitability and circularity. Energy

consumption is still dominated by non-renewable sources, primarily natural gas, although efforts toward renewable energies, especially hydrogen projects, are gaining relevance. Approximately 2,800,000 tons of municipal solid waste (MSW) are managed annually, with 49% being organic. However, specific valorisation schemes for these materials remain less documented.

The region of Aragón exhibits distinct characteristics that shape its economic and environmental landscape. A growing number of companies in the region are committing to ambitious decarbonization goals, reflecting a proactive approach towards environmental sustainability. The prevalence of forest fires is a significant concern that needs prevention and management strategies. Addressing soil problems related to erosion and nutrient deficiencies, exacerbated by current drought conditions, requires comprehensive planning and implementation of corrective measures. Overall, climate change poses a threat to agriculture, emphasizing the need for adaptation measures to safeguard this crucial sector and the jobs it creates. Despite these challenges, the region boasts high scientific quality and human capital, contributing to its resilience and potential for innovation. The demographic landscape is marked by an aging society and depopulation in rural areas, demanding targeted interventions for sustainable development. The Social Economy plays a substantial role in Aragon, with 20,000 jobs generated through 5,000 organizations, contributing 6% to the region's GDP and reflecting a robust and impactful sector.

3.12.2 Workshop planning - general info

The general info of the BIOLOC workshop that took place in the Aragón region (Spain) is presented below.

Table 18. General info about the BIOLOC workshop in the Aragón region (Spain)

BIOLOC region	Region Aragón (Spain)
Workshop date and time	01/11/2023 10h – 13h30
Modality	In-person
Workshop location	Sala Polivalente Expo – Av. Ranillas, 1D, primera planta, Zaragoza – Spain
Number of attendees	16

The workshops were carried out in-person for better interaction and engagement from participants. The structure followed was:

1. Welcome and introduction round.
2. Presentation of three key concepts: bioeconomy, bio-based value chains and social innovation.
3. Presentation of the BIOLOC project: general information, objectives, activities.
4. Presentation of the task 5.3 of the BIOLOC project and its main objectives and methodology.

5. Presentation of the SWOT results of the Aragón region and interactive activity using the MENTI platform to rank the identified local strengths, weaknesses, opportunities, and threats per stakeholder group.
6. First collaborative session: identifying technical barriers for the bio-based value chains of highest potential in Aragón region. The value chains proposed are depicted below:

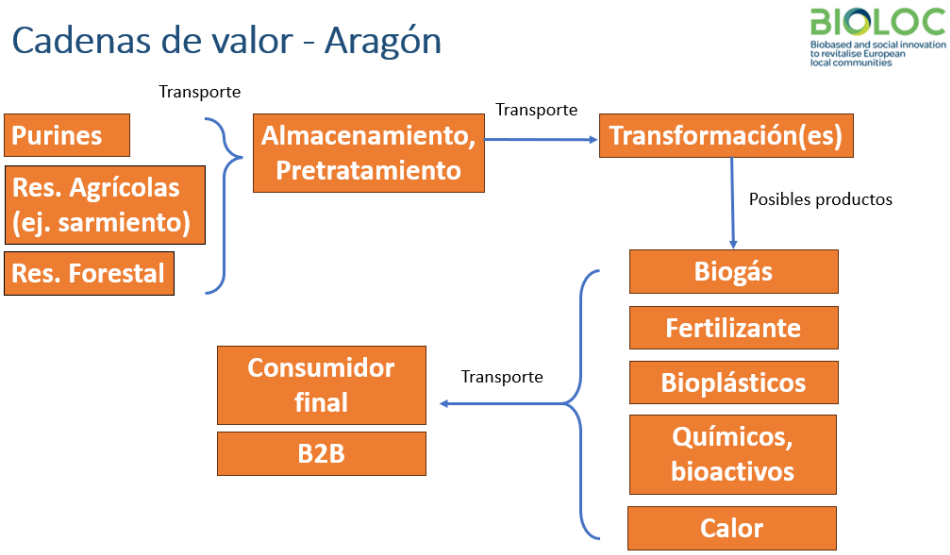
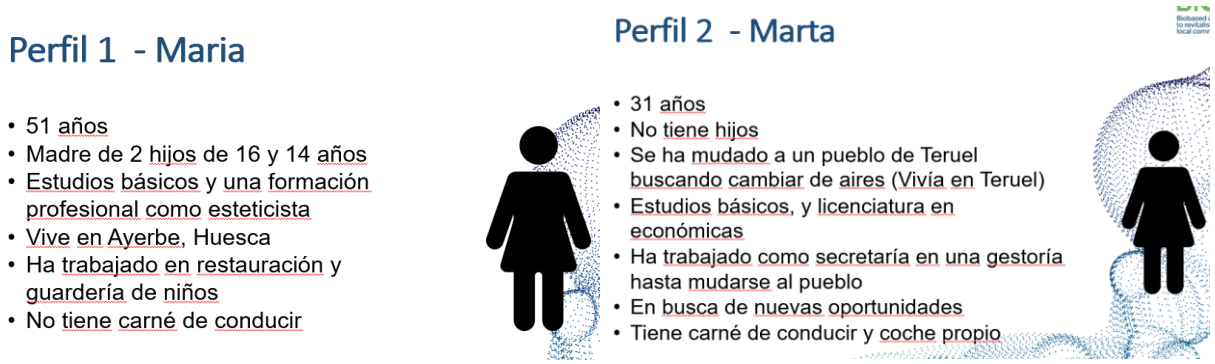


Figure 18. Value chains proposed in the first collaborative section.

7. Second collaborative session: identifying opportunities for five profiles of people that can be considered to belong to marginalized groups that can be found in the region (linked to the value chains from the previous session). The proposed profiles are depicted below:



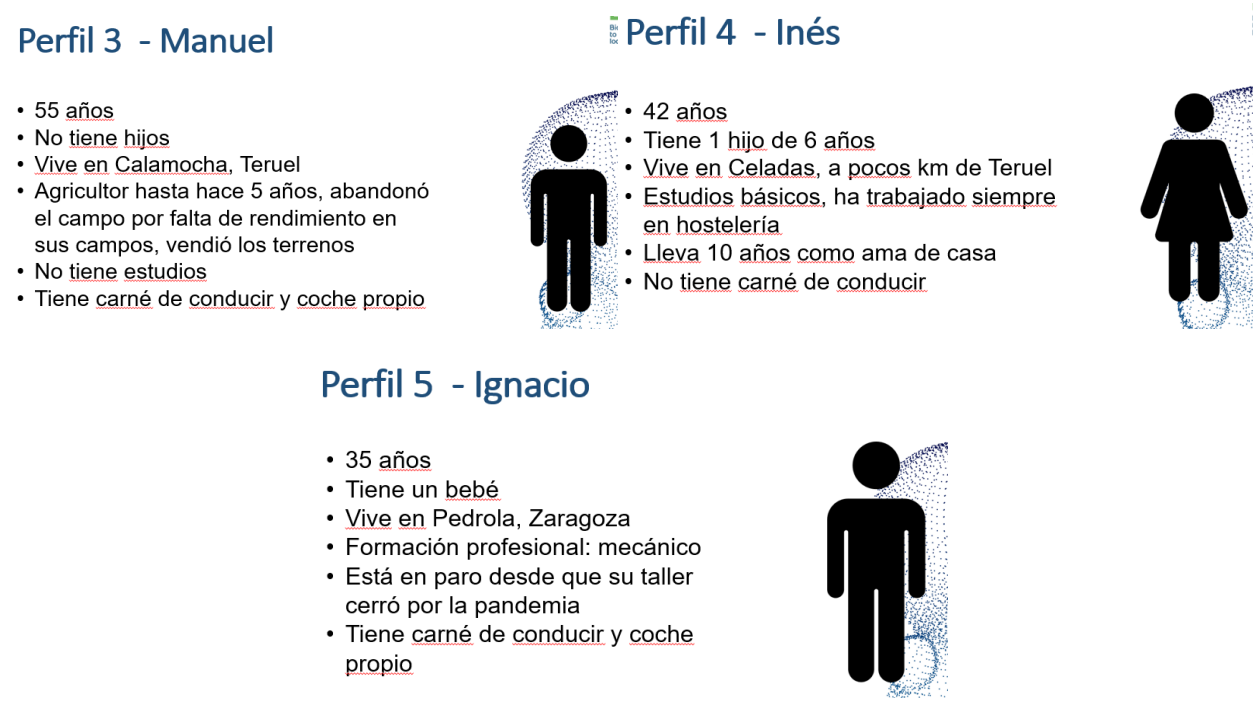


Figure 19. Profiles proposed in the second collaborative section.

8. Conclusions and path forward in the context of BIOLOC
9. Coffee break and networking moment for the participants.

3.12.3 Workshop attendance and photos

The 16 attendees of the first workshop were from different sectors: 3 (government), 7 (academia, R&D), 5 (industry and primary sectors), 3 (civil and representatives of marginalized groups). The organisations represented in the event, besides the DGA and CIRCE, were SODIAR (*Sociedad para el Desarrollo Industrial de Aragón*, a governmental instrument conceived to stimulate business activity), the University of Zaragoza (Unizar), FITA (*Fundación de Innovación y Transferencia Agroalimentaria*), i+Porc (a national cluster of swine producers) and the social entities Valentia Huesca and CEPES (*Confederación Empresarial Española de la Economía Social*). Photos of the event are displayed as Figure 20.

Figure 20. Photos of the BIOLOC workshop in Aragón (Spain)

3.12.4 Main outcomes

Synergies: Various synergies were identified. For instance, representatives of the livestock sector, which is very strong sector in the region, shared the need to find solutions for the residue (particularly the liquid fraction of the manure) generated by its activities. Furthermore, gardening activities carried out by people with intellectual disability generate residual biomass (wood and herbaceous) that can be further valorised. The governmental partner (DGA) works on circularity and sustainability initiatives that can involve further partners, particularly SMEs, into the BIOLOC activities.

Overall, during the discussion on the local bio-based value chains, the need for small, decentralized units dedicated to the pretreatment of secondary raw materials was agreed by all participants. These units would be devoted to simple, thermal and/or mechanical steps such as sorting, grinding, drying, pressing/densifying bio-based residues before further conversion by more advanced steps, and would be located close to where residues are generated (rural locations). The idea is that these pretreated bio-based streams can have lower transportation costs and higher quality, enabling their valorisation and the finding of applications. Said units could generate opportunities for marginalized people from rural areas that suffer with migration and lack of opportunities. Furthermore, many indirect opportunities are envisioned, as the creation of businesses in rural areas come with the need of more infrastructure and services (e.g., cafeterias, restaurants, schools, transport services, maintenance activities) that generate employment. Finally, establishing value chains in rural areas can foster specific training activities to enable marginalized groups to be absorbed also in more qualified positions.

Marginalized groups: Two representatives of marginalized groups were present, namely:

- Valentia Huesca is a non-profit organization, reference in the province of Huesca (Aragón), which offers people with intellectual disabilities and their families all the necessary support to develop a full life.
- CEPES (*Confederación Empresarial Española de Economía Social*) is an organization which brings together various activities under the concept of the Social Economy and is formed by 29 state or autonomic confederations and groups that represent the interests of Cooperatives, Labor Societies, Mutual Societies, Insertion Companies, Special Employment Centers, Fishermen's Guilds and Associations of the Disability Sector, with more than 200 support structures.

The rural populations were largely considered as a good target group given the regional issues of migration to urban areas and the large area of Aragón covered by primary activities. Various possibilities for employment were discussed, from basic services needed in rural areas under development to opportunities within the value chains themselves (transportation, operation) up to more qualified positions depending on the individual profile (such as administrative tasks and more technical). Interestingly, it was shared that, after the COVID pandemic, the flow of people wanting to go back to rural areas increased, but (besides lack of jobs) there are difficulties finding housing in some areas. Furthermore, distances to schools are typically large and public transportation is scarce and takes too long, which is a big issue for people with children. Finally, immigrants and vulnerable poor people seeking opportunities often suffer to adapt as rejection occurs in small villages.

Industrial context: The concept of the BIOLOC project was well received by the representatives of the primary sector (*i+Porc*) and of SODIAR (*Sociedad para el Desarollo Industrial de Aragón*), the latter being a governmental organization interfacing regional industrial developments. A downside of the workshop attendance was the lack of other industry-related representatives, particularly from the private sector and from manufacturing activities, and representatives from the agriculture and forestry sectors. Due to the lack of representatives from said specific industries attending the event, we could not get specific information on sustainability strategy/decarbonisation goals during the workshop. This will be explored as an action point to follow up in the coming BIOLOC activities and when drafting specific value chains and actors to give dedicated support (see last question of this document). More discussions are needed with SODIAR and specific industrial representatives.

Governmental instruments: Clear efforts exist from the local government to develop initiatives related to the social economy. For instance, there is an ongoing governmental plan for the promotion of the social economy in the Aragón region (2022-2025) in which the following points can be highlighted:

- Financial support through the Social Economy funds available through the Government of Aragon and with the collaboration of financial entities.
- Call for incentives for the promotion of cooperatives in rural areas, as an element to combat depopulation.
- Reinforcement of Social Economy projects related to the environment (circular economy, livestock sector, agriculture, craftsmen, forestry activities...).

In detail, there is a social economy fund intended to promote the activity of the Social Economy companies in Aragón, for example, local companies with innovative productive and commercial activities to provide goods and services of social content that are referred to: improve the quality of life of groups at social, labor or health risk, contribute in an innovative way to implement productive activities in rural areas or to develop social collaboration projects between different groups of a marked social character. Furthermore, there is a specific fund to support companies in the circular economy sector in the region, used to finance investment projects carried out by Aragonese entrepreneurs and SMEs linked to the sector.

Main bio-based value chains: The most important one (based both on the region' activities and attendance to the workshop) is related to the livestock sector, which is very strong and generates substantial amounts of residue that can be further valorised into fertilizers and biogas, for example. Other value chains include the valorisation of vegetal residues from vineyards and from gardening activities undertaken by social economy partners. A strong point discussed was the need to implement a system of decentralized, small scale treatment units next to where bio-based residues are generated to lower transportation costs and perform a first transformation into a more homogeneous feedstock to be further converted in larger, centralized treatment units.

Main bottlenecks: The collaborative sessions of the event were organized in two parts. In the first technical part, the following main challenges and suggestions were identified for the proposed value chains in the context of the Aragon region:

1. Residues (manure, agri-residues, forestry residues)

    1.1. Transportation: geographically dispersed and costly, need coordinating actions to reduce costs

1.2. Need to avoid high transportation costs by storing and pre-treating residues close to their origin before transporting them.
1.3. Decentralization = opportunities in rural areas.
1.4. Need to raise awareness about the opportunity for decarbonization represented by the agri-residues.
1.5. Need to raise awareness about the rentability of sustainable actions in their businesses.
1.6. Lack of entrepreneurial profiles in the rural world.
1.7. Need for training and education.
1.8. Lack of economic ability in the primary sector = need for financial support from the government to the value chains.
1.9. High investment costs to pretreat and convert residues.

2. Pretreatment and storage step

2.1. Logistic costs.
2.2. Management of byproducts (particularly for livestock's residues): lack of technology for proper storage and management, no policy to support the developments, stigma.

3. Transformation step

3.1. Risks and overall bad public image of biogas.
3.2. Social issues related to the burning of products to generate heat and energy.
3.3. Complex infrastructure: requires investment, long term amortization.
3.4. Public policies are continuously changing and being revised, discourages investments on the long run.
3.5. Lack of collective, collaborative work to find solutions.
3.6. Lack of entrepreneurs in rural areas.
3.7. Lack of innovation and technology in rural areas, need closeness from universities and technological centres to translate knowledge in actions.
3.8. Production units cannot be very large, but the investment and technical capacity are high.
3.9. Need to develop new processes to lower costs and improve efficiency (need for more applied R&D).
3.10. Lack of industrial units, high processing costs.
3.11. High energy cost in the transformation step.
3.12. In the case of biogas, policy is needed to boost its use as energy source in Spain.

4. Products and final consumer/business

4.1. High production costs = highly priced products.
4.2. Difficult management of the digestate (residue from biogas production).
4.3. Underdeveloped markets (bio-based products), regulatory barriers (chemicals, bioactive ingredients).
4.4. Need to provide more information on the way things are produced (traceability).

4.5. Need to recognize and award initiatives that bring value.
4.6. Need of new business models and strong marketing for the commercialization (bio-based products).
4.7. High sensitivity of the price due to supply chain instability (Bio-based raw materials supply uncertainty).

Action points for the coming period: CIRCE will team up with actors of three regional value chains to provide specific support and together design a roadmap for the development/extension of routes to valorise biological byproducts while including profiles of socially marginalized groups in said activities. Follow-up meetings are planned in mid-January 2024, supported by the DGA.

3.12.5 Selection of most promising initiatives

The most promising initiatives identified so far in the context of Aragón involve the valorisation of residues from the livestock value chain (e.g., manure) and the valorisation of biomass residues from gardening and agricultural activities performed by social economy partners. The socially disadvantaged groups targeted are rural populations (particularly women) and people with intellectual disabilities. In the upcoming period, interviews and dedicated meetings with selected partners will further shape these initiatives having a strong focus their circularity and inclusiveness.

4. Conclusions

BIOLOC is dedicated to assisting twelve European regions in the exploration and cultivation of local potentials through sustainable, innovative, and participatory approaches, steering them towards a green transition. With a specific focus on fostering a Circular Bioeconomy (CBE), the project aims to develop communities and propel their shift toward resource-efficient, circular, and bio-based production and consumption systems with a strong focus in the inclusion of marginalized groups. The BIOLOC regions in EU present widely different contexts in terms of industrial landscape, level of CBE development, primary activities and potential new bio-based value chains, funding instruments and socially disadvantaged groups. Therefore, parallel activities are ongoing taking into consideration the particularities and potential of each region.

This deliverable D5.3 'Bio-based initiative labs' described the planning, methodology and implementation of quadruple-helix stakeholder workshops in all BIOLOC regions. These workshops had as main objectives to promote the discussion on circular bioeconomy and social inclusion topics tailored to each specific context, thus collaboratively identifying the most promising bio-based value chains, marginalized groups that can benefit from them, and the main challenges and actions needed to ultimately bring positive impacts and trade-offs for the communities and environment. For each region, an overall description is provided, followed by general information on the workshop planning and implementation and the outcomes divided per topics: synergies, marginalized groups, industrial context, governmental instruments, main bio-based value chains, main bottlenecks, and action points for the coming period.

As expected, the outcomes of the workshops show different levels of development, CBE deployment and social innovation in the regions, and varying engagement from stakeholder groups, with lower industry

engagement and difficulties to reach marginalized groups in some cases, for example. Overall, local governments and representatives of primary activities (livestock farming, agriculture) were very participative, and great synergies with socially disadvantaged groups were identified, as well as an interest to include said groups. The need for training on bioeconomy and novel business models was highlighted in most regions, as well as the need for infrastructure and integration activities in the cases of groups from a different cultural background and/or living in isolated areas with poor services. Furthermore, proper communication was deemed key to showcase not only the social and environmental aspects of CBE, but also the economic benefits that it can bring to the regions, generating jobs, decarbonizing local industries, and creating new income sources to the population (from farmers to people working in all kinds of services, logistics, pre-treatment and conversion steps, commercialization of new products, etc). Various challenges were identified and include high investment costs of new technologies, lack of knowledge about circular business models and CBE, regulatory barriers and complex supply chains due to biomass heterogeneity and seasonality, decentralized locations and high transportation costs, as well as risks derived from climate change.

Together with the previous and ongoing activities from the WP2, WP3, WP4 and WP5 work packages of the BIOLOC project, the workshops here reported (part of the task T5.3.) serve as a stepping stone for the deployment of inclusive CBE activities in the twelve selected regions in EU. Besides promoting discussions and the exchange of different perspectives (civil society, government, industry, primary sector, academia and R&D), these workshops were important to collaboratively identify the bio-based value chains of highest potential in each region, as well as the socially disadvantaged groups that can benefit from these, how they can benefit, and what needs to be addressed in next steps.

5. References

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Annexes

I. Pre-workshop reflection board with set of key questions per stakeholder group

Reflecting on the local bioeconomy:
Key questions per stakeholder group

BIOLOC
Biobased and social innovation to revitalise European local communities

Primary agriculture, Agroindustry, Manufacturing industry	Government
1) Which roles do you see for your organization in the transition to a bioeconomy? Is there any initiative in place to: • Increase the sustainability of your process(es)? • Promote social inclusion? 2) If "no" to the question above, what is lacking to move in this direction? Is it part of your near future strategy?	1) Does your organization have any funding instruments and/or support network, incentives related to: • Transition to a bioeconomy – which one(s)? • Social inclusion – which one(s)? 2) If "no" to the question above, what is lacking to move in this direction? Is it part of your near future strategy?
Academia, R&D centers	**Civil society, representative of disadvantaged groups**
1) Can you share best practices in the context of local biobased value chains? 2) Can you share best practices in the context of social innovation?	1) Are there any social inclusion initiatives in place? Do they involve biobased value chains? 2) What are the main challenges for the group' social inclusion? 3) Besides job creation, are there other pressing aspects to tackle to ensure social inclusion? Ex. access to public services, housing and transportation, language barriers…

To all: Which promising local biobased value chains can be identified based in your expertise?
Which challenges and opportunities do you see for social inclusion in this value chains?

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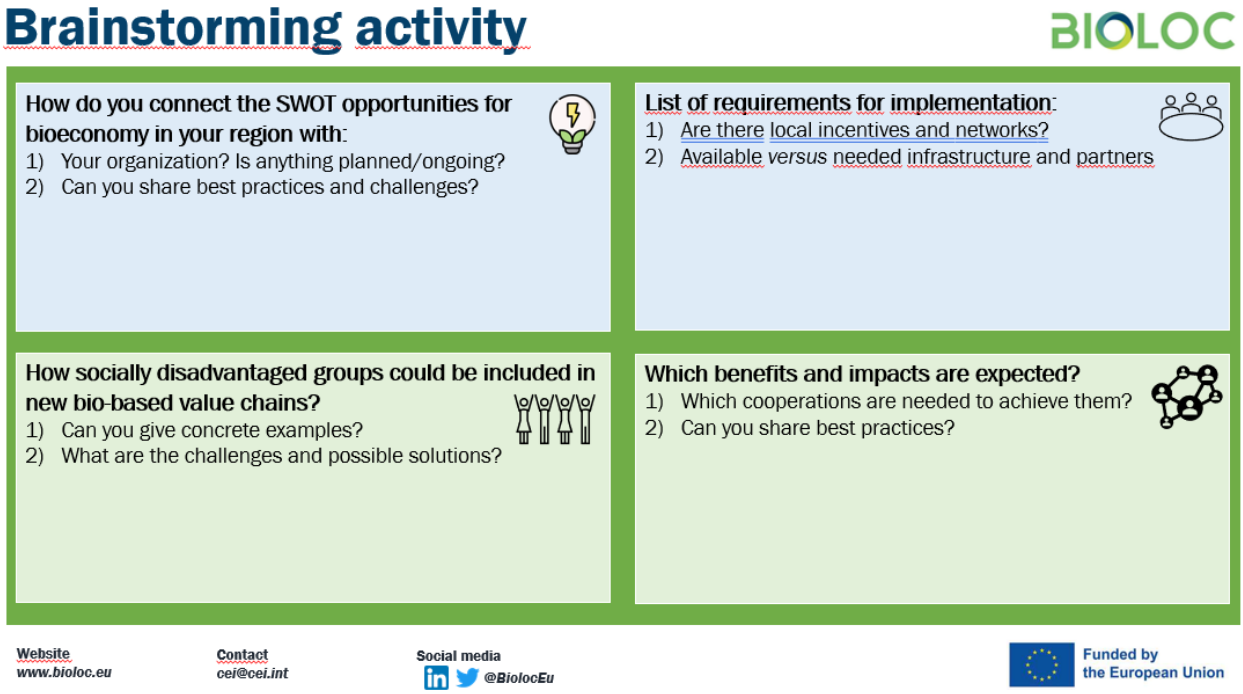
II. Whiteboard example



III. Attendance list

Attendance list

Nombre y apellido	Organización	E-mail / teléfono	GDPR[1] (SI/NO)	Firma

[1] *I declare that I have read the privacy policy notice (EU Regulation 2016/679 - GDPR). I declare I consent to the publication of photos and videos where present and to the processing of personal data in accordance with EU Regulation 2016/679 (GDPR)*

http://www.bioloc.eu

IV. Post-workshop template

BIOLOC region	Region X (Country)
Workshop date and time	XX/XX/2023 XXh – XXh
Modality	Online or in-person?
Workshop location	(If in person)
Number of attendees	X
Attendees per stakeholder group	X (government), X (academia, R&D), X (industry, primary activities), X (civil)
Organizations present and their sectors	X (primary agriculture), X (industry, manufacturer of Y), University X, Association X… etc
Please share photos of the event here (or screenshots if it was online)	Place photos/screenshots
Description of activities carried out during workshop	1. Slides presentation 2. Activity X 3. Discussion Y).Etc..
Was a representative of any marginalized group(s) present? Which one(s)?	Yes, marginalized groups X, Y, Z
Were synergies identified between the participating organizations?	..Yes, organization X is looking for solutions regarding Y and could cooperate with Z and W to achieve it.
Was there interest from the participating organizations to	2.Yes, XXX If “no”, please explain why

include socially disadvantaged groups?	
Does the local/national government have any funding instruments and/or support network related to *i)* bioeconomy and *ii)* social inclusion? If yes, which one(s)?	3.Yes, XXX 4.If "no", is this envisioned in the near future?
Do the industrial partners have in place any sustainability strategy (eg. decarbonization goals) and social initiatives?	5.Yes, XXX If "no", is this envisioned in the near future?
<u>Based on the discussions and feedback from attendees':</u> were any specific bio-based value chains identified?	Yes, XXX If "no", please explain why
<u>Based on the discussions and feedback from attendees':</u> were any specific marginalized groups (that can benefit from this value chain) identified?	Yes, XXX If "no", please explain why
Besides inclusion via job creation, are there other important aspects raised by the disadvantaged group to ensure their inclusion?	Examples can be: lack of public services (education, healthcare), language barriers (in case of immigrants), needs for training, basic needs such as housing and transportation means..
Can you list general challenges/bottlenecks identified?	XXX
Can you list the action points defined for the upcoming period?	XXX

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V. Certificate of participation template