



Report of the SCALE-UP Cross-Regional Assessment Workshop

December 2022

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This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101060264.

ACKNOWLEDGMENT & DISCLAIMER

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1 Introduction

On the 22nd and 23rd of November 2022, the SCALE-UP consortium held a cross-regional assessment workshop. The objective of the event was to collect practical knowledge and update the consortium's overview of the current needs and priorities of the project's six focal SCALE-UP regions as regards the deployment of bio-based solutions. Through a series of thematic inputs and virtual break-out groups with the participation of regional stakeholders, the workshop aimed to:

- pinpoint pressing needs and priorities in terms of bioeconomy rollout;
- map the available skills and capabilities in the regions;
- identify opportunities to link with previous implementations, strategies or roadmaps; and
- broadly identify foreseeable barriers and opportunities for deployment.

The programme of the workshop is provided in the Annex to this report. In total, 43 people participated in the workshop, including 30 people from the consortium and 13 stakeholders from the SCALE-UP regions, the latter representing research institutes, universities, policymakers, and companies. Of these 13, 2 stakeholders were from the French Atlantic Arc, 2 from Andalusia, 2 from Strumica, 2 from Mazovia, 3 from Upper Austria and 1 from North Sweden. A list of participants is provided in the Annex.

2 Minutes of the workshop

2.1 First day: Overview of the current situation and opportunities for deployment of bio-based solutions in the six SCALE-UP regions.

Tour de Table & introduction to the workshop

The workshop started with a 'tour de table' to give a short introduction to the participants. Holger Gerdes and Zoritz Kiresiewa from Ecologic Institute gave an introduction to the SCALE-UP project and its objectives. Martijn Vis (BTG) gave a brief introduction to the goals of the workshop.

In the first session, the six SCALE-UP regional partners gave a short presentation that described their region and the state of the bioeconomy in their regions. The regional partners were asked to focus on their chosen value chains for the project, the available skills and capabilities in the region, opportunities and links with previous implementations, strategies or roadmaps and the foreseeable barriers to deployment.

Northern Sweden

Magnus Matisons from BioFuel Region (BFR) gave a presentation about the region of Northern Sweden. The chosen value chains are sawdust, bark and logging residues. The potential upgrading to bioplastics, biochemicals, and biofuels was explained. There are high capabilities in the region due to a long tradition of forest management. Northern Sweden has opportunities that include good links to work such as the national initiative Fossil-free Sweden, and many other strategies. Foreseeable barriers include EU legislation (e.g. classification of primary and secondary biomass). *More information can be found on the slides (See attached: 3. Presentation North Sweden (BFR)).*

Mazovia

Katarzyna Kowalska from the UNIMOS foundation gave a presentation about the region of Mazovia, Poland. She gave a quick overview of the stakeholder database. Three locations within Mazovia were highlighted, the Radom region (apple and pepper production region), the city of Radom (for manufacturing), and Warsaw, where UNIMOS is located. Poland is the largest apple producer in the EU and the fourth largest in the world, and half of the national production of apples is in Mazovia. They chose to focus on apple pomace and prunings within the SCALE-UP project. The effect of the Russian embargo and the resulting need for new sales channels were explained. The term Industry 4.0 was explained, as it includes different industry provider solutions that could support circularity for agri-food products and waste. *More information can be found on the slides (See attached: 4. Presentation Mazovia (UNIMOS)).*

French Atlantic Arc¹

Sophie Rabeau-Epsztein from the Association of the Chambers of Agriculture of the Atlantic Area (AC3A) gave a presentation on the Pays de la Loire region, and more broadly on the French Atlantic Arc region¹ because this scale is more relevant for the work on the chosen value chain. Hemp is historically grown in France, but production was halted in the 1950's. This year, hemp production was at 22 thousand hectares. In 2021, 20 thousand hectares were used for hemp production, of which 4000 hectares were in the French Atlantic area, mainly in Pays de la Loire (3000ha) and Normandy (500ha).

¹ The French Atlantic Arc consists of the following regions: Normandy, Brittany, Pays de la Loire and Nouvelle-Aquitaine.

Hemp can be grown without irrigation, it can improve soil health and can be produced with zero waste, as every part of the hemp plant can be used. The time of harvesting for hemp can vary, as it depends on the valorisation. Prices for hemp were given. Hemp often has a negative image due to its link to cannabis. Awareness, industrial capacity and the regulatory framework need to be improved. *More information can be found on the slides (See attached: 5. Presentation French Atlantic Arc (AC3A)).*

Upper Austria

Kristina Pammer from Business Upper Austria (TMG) presented the region of Upper Austria. They have identified 95 stakeholders relevant to the food industry. The chosen value chains are bakery products, dairy and dairy products, oil and oil press cakes, and brewery products. The bakery products are interesting as it has the highest amount of avoidable food waste in Upper Austria. The bakery products' food waste is mainly used in biomass streams for biogas plants. Assurance of quality for food waste for rework can be a problem. The dairy industry has the highest amount of food waste in general. Dairy waste is used for biofuel, biogas and fermentation, but there are other ideas for side streams such as whey powder. TMG has ongoing projects for the utilization of oil press cakes, in which they are working with regionally available oils in Upper Austria. For example, oil press cakes could be used as biodegradable packaging. For brewery products (more specifically draff), it can be used in biogas plants, but there are also new ideas such as that it can be used as fibres in the paper industry. However, there are problems with fast spoilage and high water content. *More information can be found on the slides (See attached: 6. Presentation Upper Austria (TMG)).*

Strumica

Emilija Mihajloska from the International Center for Sustainable Development of Energy, Water and Environment Systems, the Macedonian section (SDEWES-Skopje) presented the region of Strumica, North Macedonia. The first value chain chosen for the SCALE-UP project is mycelium-based packaging and insulation materials. It can be grown on agricultural residues, combined with mycelium (which is a fungus that acts as a glue). There are subsidy schemes and supporting strategies for the production of mycelium in place. The second value chain is compost production, with a focus on biodegradable waste. Every year, 22.000 tonnes of compost end up in the landfill. There is a sufficient amount of feedstock for small-scale bio-based products, the region has a beneficial climate and soil, emerging technological and industrial zones, and a well-developed network of stakeholders. The region has established academic ground and business development. *More information can be found on the slides (See attached: 7. Presentation Strumica (SDEWES-Skopje)).*

Andalusia

Vanessa Quintano Ramos from the Technological Corporation of Andalusia (CTA) presented Andalusia, Spain. Andalusia is the most populated area of Spain, of which 37% of the population lives in rural areas. Andalusia is the second European region in agricultural production, with 300.000 farms and 23% of agrifood employment in Spain. Andalusia is the world's leading producing region of olive oil, as well as a major producer of fruits and vegetables.

Opportunities are chemical production sites, the development of biological agriculture, an increasing interest in sustainable investments, and research that could solve key bottlenecks in the creation of new value chains. There are also several strategies and roadmaps available. *More information can be found on the slides (See attached: 8. Presentation Andalusia (CTA)).*

First regional breakout session

After the presentations of the regional partners, the first breakout session started. The regional partners and their stakeholders entered their own breakout sessions, where they discussed the region's opportunities, capabilities, policies, foreseeable barriers, and pressing needs. They focussed on the following questions:

Questions regional breakout session 1 (day one)

1. What are the main opportunities for scaling up the bio-based economy in your region? Do you find the already presented value chains important? Other value chains or generic opportunities?
2. What are the current regional and national policies , strategies, roadmaps, incentives, subsidy schemes that support the bio-based value chains?
3. What type of skills and capabilities are needed to develop the bio-based value chain by 2030? Are these types and capabilities available in the region? What type of skills and capabilities need to be (further) developed?
4. What are the main foreseeable barriers or pressing needs to the deployment of the bio-based value chain by 2030?

The participants could brainstorm and write their ideas on online whiteboards, called conceptboards. The conceptboards can be found through the following links and the final concept boards are included as an attachment (13. *InteractiveBreakoutSession 1&2_Conceptboards*).

Region	Link to whiteboard
North Sweden (SE)	https://app.conceptboard.com/board/bxe3-ki7z-kzxo-uen1-8dka
Mazovia (PL)	https://app.conceptboard.com/board/bqyb-bc9p-tyip-k067-opao
French Atlantic Arc (FR)	https://app.conceptboard.com/board/mqha-ut46-aqqz-ftbb-sysb
Upper Austria (AT)	https://app.conceptboard.com/board/58tb-ycgy-dxzz-khgu-nitn
Strumica (MK)	https://app.conceptboard.com/board/ckfb-tha7-p334-z3nu-124e
Andalusia (ES)	https://app.conceptboard.com/board/77ax-xbnk-5sgr-gmke-tasx

Wrap-up

The first day of the workshop was concluded with a quick wrap-up, where each region presented some of the main outcomes of their breakout sessions.

2.2 Second day: Needs and priorities of bioeconomy rollout & support by SCALE-UP

Summary of day 1

The second day of the workshop started with a summary of day 1. In this presentation, the overlaps between the SCALE-UP regions, as well as some specific examples were given. *You can find more information on the slides (See attached: 9. Summary SCALE-UP workshop day 1).*

Regional breakout session 2

After this, interactive breakout sessions of the regions occurred, this time focussing on solutions and trajectories. The second regional breakout session focussed on the following questions:

Questions regional breakout session 2 (day two)

5. What are possible solutions to overcome these barriers?
6. Could you already describe trajectories for the rollout of the bio-based value chains?

Again, the breakout sessions used the online whiteboards 'conceptboards', using the same link as on the first day of the workshop.

Training programme workstreams presentation and breakout session

After the breakout session, Luise Dauwa (TMG) presented the training programme workstreams (WP3) and their breakout sessions. The workshop participants were split into three teams, where every group discussed 2 or 3 different workstreams, together covering all 7 workstreams. The table below shows the distribution of participants and the discussed workstreams, as well as the links to the conceptboards. *A copy of the conceptboards can also be found in the attachment (See: 14. BreakoutSession_Workstreams_Conceptboards)*

Team	Participants	Workstreams	Link to conceptboard
A	French Atlantic Arc, Ecologic Institute, Strumica	5. Developing and implementing practices of "social innovation" in the context of rural bioeconomies. 6. Effective and innovative governance of regional bio-based systems (incl. public support schemes).	https://app.conceptboard.com/board/n2hm-pgx-ztzo-91ue-f8s6
B	North Sweden, BTG, WIP	2. Integrating primary producers into bio-based value chains: challenges, opportunities and effective mobilisation strategies. 3. Digitalisation in the bioeconomy: potentials for rural actors.	https://app.conceptboard.com/board/oo7f-mnqi-zc84-q46u-13nq
C	Andalusia, Upper Austria, Mazovia	1. Improved nutrient recycling in the circular bioeconomy: cross-sectoral potentials. 4. Efficient regional infrastructures and biomass logistics. 7. Strategies to address social, ecological and economic trade-offs in regional bioeconomy development.	https://app.conceptboard.com/board/2q3q-7etx-hbnm-bs97-ez1c

For each workstream, the participants brainstormed and worked on the following questions:

- State of the art of the workstream topic in each of the participant's regions.
- Existing knowledge gaps within the workstream topic in the participant's region.
- Ideas on how to close the aforementioned knowledge gaps or improve the state of the art.

After the breakout sessions discussing the workstreams, the workshop continued with the discussions of regional biomass availabilities, nutrient balances, ecological boundaries, and scientific and technological information. *The slides used for these discussions can be found in the attachment (See 11. Discussion biomass availabilities and nutrient balances & 12. Discussion ecological boundaries).*

Biomass availability and nutrient recycling

Martijn Vis (BTG) gave a presentation about biomass availability and asked the regional partners how it can be included for the regions. Magnus Matisons (BFR) agreed that it is important to distinguish clearly between the biomass potential types (e.g. technical and economical potentials) and offered to share the regions their experiences with of measuring biomass availability. Sophie Rabeau-Epszstein (A3CA) mentioned the creation of a biomass observatory. Emilija Mihajloska (SDEWES-Skopje) mentioned a need for desk research to find the most suitable feedstock and the quantities of agricultural waste. Magnus Matisons mentioned the need to be conservative in these estimates, and to take into account current use.

Martijn Vis (BTG) explained the topic of nutrient recycling and gave examples of nutrient recycling cases in the Netherlands. Kristina Pammer & Luise Dauwa (TMG) mentioned another EU project "Safe Smart Food" where apples were used in nutrient recycling, as well as the importance of proteins.

Ecological boundaries

Gerardo Anzaldua from Ecologic Institute gave an introduction to the notion of ecological boundaries in regional bioeconomy planning. After a quick poll in the chat, we saw that most participants believe the bioeconomy not to be intrinsically sustainable. Gerardo Anzaldua stated that sustainability is not an intrinsic characteristic of the bioeconomy, but that the bioeconomy has great potential to achieve policy goals related to sustainability. Life Cycle Assessment (LCA) methods and their restrictions at a regional level were mentioned. Gerardo Anzaldua explained the sustainability screening plan for SCALE-UP, which was also used for the 'BE-Rural' project. The main elements in the screening in BE-Rural were water, soil, and biodiversity. Eva Friedmann (BFR) mentioned the importance of considering carbon storage in the assessment.

Scientific and technological information

Martijn Vis (BTG) gave a short introduction to scientific and technological information, which aims at supporting bio-based solutions in the SCALE-UP regions. Six regional information packages will be created, with a first version ready by June 2023 and a final version by February 2024.

Wrap-up

To wrap up the workshop, every regional partner was asked to highlight one solution/trajectory for the rollout of bio-based value chains from the morning's breakout session. The group from North Sweden saw the potential for cross-regional learning and matchmaking for combining value chains. Participants from Mazovia saw potential in cross-regional learning from apple production in other regions. The participants from the French Atlantic Arc found that by offering more information, the uncertainty about farmers' incomes could be solved and saw the potential of cross-regional partnerships. The group from Upper Austria thought about the technology road mapping process for the project and integrating the Austrian bioeconomy action plan into the project. The participants from Strumica discussed the capacity building and financial mechanisms and how to explain them. They also stressed the importance of desk research in order to find the most suitable agricultural feedstock and partnerships with key stakeholders at a local level. The group from Andalusia discussed the disorganized financial schemes, and a systemic overview as a solution, as well as better organization and a plan to fit the schemes better to the companies' needs.

3 Outcomes and cross-regional findings

3.1 Outcomes per region

This section summarises for each region the outcomes and findings of the two-day workshop. Further details can be found in the regional presentations, concept boards, and the questionnaires that were filled in prior to the workshop.

North Sweden

Participants in this breakout group found that there are major opportunities linked to residual streams from both the forestry industry and forest management. North Sweden has large amounts of these side streams available, as well as a highly developed knowledge infrastructure. The region sees EU policies as possible barriers, such as potential changes in the Renewable Energy Directive, policies which do not fit the forestry industry and major differences between national and EU regulations. Other barriers include a conservative industry, the valley of death, expensive infrastructure, the procurement process, transport costs, the need for economies of scale and bulk production, and the low prices of fossil alternatives. To overcome these barriers, North Sweden stressed the importance of proper policies, increasing the production scale, and having cross-industry discussions. Possible trajectories for the rollout of forestry side streams include bio-hubs, parallel solutions to growing and scaling up, mapping the needs and availabilities in other regions, and discussing with stakeholders in North Sweden and assessing their initial plans and ideas.

Mazovia

Participants from the region of Mazovia saw major opportunities in the fast development of high-tech solutions, the support of the regional government, the EU Farm-to-Fork Strategy, changing diets and consumer preferences, and the support of organizations and schools. Mazovia already has great capabilities because of its heritage of apple production in the region, and its great supporting network, clusters, trade groups and business accelerators. Some of the most important policies are the EU's operative programmes, the strategy for sustainable development and the regional intelligent specialization (RIS3). Foreseeable barriers to the bioeconomy rollout are language and communication issues, a low level of awareness of the bioeconomy, the availability of the workforce, the timing of the project, connectivity of rural areas and a need for guidance and implementation. Mazovia stressed the importance of finding additional funding, the need to build capacity and awareness, having an available biomass availability database and finding facilitators to promote bio-based solutions. Potential solutions to these barriers are research into the development of healthy snacks and biomass availability, a funding radar, a pilot demo apple farm and an awareness campaign. Mazovia will use its strong network to find researchers to help develop healthy apple products and design paths for the potential use of apple pruning and pomace and to organize open innovation challenges to facilitate matchmaking meetings.

French Atlantic Arc

The participants from the French Atlantic Arc found that there are great opportunities for the reduction of phytosanitary products, to grow hemp in areas with water pollution problems, to use of hemp in rotational systems, to produce in "no-treatment zones", carbon credit development, raising demand and the creation of jobs locally. Pays de la Loire and Atlantic France in general have a long tradition of growing hemp, giving knowledge and skills in the region. The region also has a great existing R&D sector and has valorisation options in a wide range of markets. Some of the policies that were seen as most important are the RE 2020, the CAP, other agricultural economic compensation, Egalim 2, water

quality regulations and relocation of the textile sector. The largest barriers towards bioeconomy rollout in the region were found to be the large investment and technical skills required, the political inertia, potential competition with textile hemp and with other crops, and the fragility of certain actors. The pressing needs of the region are support for farmers' income and investments, new market opportunities, a democratized use of hemp, increased awareness of hemp, a clear hierarchy of uses, a methodology for carbon credits, and strengthened cooperation in the sector. Possible solutions to these barriers were identified and include visible solutions for support and financing, a distributed added value over the value chain, increased information about hemp, technical support and innovative harvesting methods. Possible trajectories linked to this are the development of solutions and advice to farmers, engagement with public authorities, working with local councils, training for farm advisors, working collectively and enhancing multi-actor cooperation.

Strumica

The participants from Strumica saw that there are major opportunities for the promotion and introduction of bio-based products on a local level, environmental benefits, the contribution to regional development, and new innovative solutions and businesses, which can lead to job creation. Strumica already has strong capabilities in the form of skilled farmers, feedstock availability, as well as a highly developed business environment, and stakeholder and cooperation networks. The most important that were identified are the national agricultural strategy, the bioeconomy development roadmap for Strumica, a smart specialization strategy and the IPARD programme. As for foreseeable barriers, North Macedonia is not an EU country and thereby has limited access to EU funds. Furthermore, there is no dedicated bioeconomy strategy, a lack of interest from farmers and businesses, a lack of innovative technology and products and the issue of a 'brain drain'. Strumica sees knowledge transfers, subsidy schemes, an improved policy framework, local strategic planning and a biomass resource database as some of the region's most pressing needs. Other solutions to the identified barriers include a bioeconomy strategy, supporting young entrepreneurs, increased networking and brainstorming, and the creation of a regional centre that offers bioeconomy-related support. Possible trajectories include desk research that analyses the most suitable agricultural feedstocks and the establishment of cooperation and communication among the key stakeholders.

Upper Austria

The participants from Upper Austria found major opportunities in the use of side streams from the food industry and the use of food waste, especially in the bakery sector because of the high amounts of food wasted. Upper Austria especially focussed on some of the current barriers and found a need for more research and development, awareness building, closer cooperation, and suitable prices for green products. The most important policies were identified as the bioeconomy strategy and action plan, and CO2 certificates. However, Upper Austria also mentioned the need for cooperation between ministries, accessible funding schemes and their inclusion of sustainability, and for the inclusion of the action plan in the agricultural strategy. The main foreseeable barriers to the bioeconomy rollout in the region include strong regulation and overregulation, a decreased trust in science and a communication barrier. The region sees awareness building, improved skills, transparency of the food chain, and regulation adoption as its main pressing needs. The solutions to the main barriers include concrete examples, new marketing strategies, a shift towards more honest communication, cooperation within the value chain and with external facilitators, technology road mapping and using public institutions to raise awareness about the bioeconomy. Possible trajectories include the revision of the bioeconomy strategies and integration of the bioeconomy action plan, as well as increased cooperation between relevant players.

Andalusia

The participants joining from Andalusia discussed several opportunities, including recycling products, the demand for olive by-products, the region's exports and value chain opportunities. Andalusia has an already well-established network, which includes the IFAPA institute, several research groups and business alliances, resulting in a high capacity for collaboration. Andalusia stated the three levels of regulations, and several regulatory issues, including the ignorance of public administration and a fast-advancing industry, where the regulations cannot keep up. The foreseeable barriers include high investment costs, the lack of access towards public funding, long waiting times, and bureaucratic issues, including the difficulties of larger companies to get public funding. Andalusia's pressing needs included a need for financing and the ability and practicality of adjusting project times. Possible solutions to these barriers were identified as a review of regulations and arranging the legislation, equity financing and attracting investors. Possible trajectories include the creation of alliances, an Andalusian cluster and expansion using existing industry strategies.

3.2 Main findings workstream breakout sessions

Common knowledge gaps that were discussed throughout the groups were:

- The lack of an EU-wide network for knowledge transfer on existing solutions in bio-based systems
- Lack of knowledge regarding bioeconomy, e.g. what is possible with side streams, which markets the primary producers could serve with their biomass side streams, which legislations are relevant and how to implement those into production
- Lack of unity and communication between policy makers, institutions and private sectors – one reason identified was a possible “language barrier” regarding the specific vernacular of the sectors

Workstream 1 – Improved nutrient recycling in the circular bioeconomy: cross-sectoral potentials

Examples for the **state of the art** in nutrient recycling and circular bioeconomy were mainly the usage of food side streams (use of oil residues as lubricant in technical applications or extraction of protein from food waste for animal feed).

The major **knowledge gaps** that the participants discussed were mainly a lack of knowledge throughout the biomass value chains, examples being a lack of knowledge on the potential use of side streams and a lack of innovative ideas of what is technologically possible. Furthermore, a lack of knowledge about funding options and policies and miscommunication between producers and research institutions were also mentioned.

Some **ideas** in order to close these gaps that were identified were better cooperation between key players (producers, academia, waste associations, ...), and an easily accessible knowledge base (e.g. a website) for producers to get individual guidance for their products and help with regulations.

Workstream 2 – Integrating primary producers into bio-based value chains: Challenges, opportunities and effective mobilisation strategies

The **state of the art** for integrating primary producers into bio-based value chains mentioned were mainly different associations.

Challenges and **knowledge gaps** that were identified were on one side a lack of knowledge of primary producers about the legislation, which markets there are and which they could serve with their products and how they can access those markets. On the other hand, the challenge of how to get new information to primary producers was mentioned.

In order to close the aforementioned knowledge gaps some **ideas** were to implement more workshops, seminars and training on regional levels about financing, maximizing profit and business management for bio-based solutions to generate a better understanding of the topic „bioeconomy“ for primary producers. Further examples were improving/expanding funding programmes and providing more technological-economic information packages on a regional level.

Workstream 3 – Digitalisation in the bioeconomy: potentials for rural actors

The **state of the art** of digitalisation varied throughout the participants regions, some examples that were given are drone technology in the agrifood sector and digital production systems for greenhouses as well as digital engineering courses at local universities.

One major **challenge** that was mentioned as a barrier for digitalisation for rural actors was the lack of the needed infrastructure (good internet, necessary technology too expensive, training programmes for digital tools). The concern of rural actors about data safety, privacy and use of data was also discussed.

Generating better understanding of digitalisation with example businesses or information campaigns as well as the application of track-and-trace for bio-based products were some **ideas** that were discussed to close potential knowledge gaps of rural actors.

Workstream 4 – Efficient regional infrastructures and biomass logistics

The participants identified several **knowledge gaps** that need to be addressed for efficient regional infrastructures and biomass logistics, for example the lack of the needed workforce, not enough knowledge about where specific infrastructure is needed and a lack of knowledge about the different sectors/research areas for improving biomass processes. Additionally, the topic of a lack of the right equipment for proper biomass handling (e.g., cooling of biomass during transport) or to decrease biomass volume for improved logistics were points that the participants discussed as potential knowledge gaps.

In order to **close** the aforementioned **knowledge gaps**, the improvement of existing infrastructures (e.g., with better funding options for rural area development) and pushing the cooperation between industrial operators, business operators and research institutions were some examples that the participants elaborated.

Workstream 5 – Developing and implementing practices of ‚social innovation‘ in the context of rural bioeconomies

Examples of ‚social innovation‘ practices that were mentioned during the workshop were different associations related to individual biomasses (e.g. forest owner association), regional workshops and initiatives (e.g. food sharing platforms).

A major **knowledge gap** that was discussed in the group was a missing common understanding and definition of „bioeconomy“ and „social innovation“. Additionally, the engagement of civil society in terms of bioeconomy is not strong in some regions and one barrier that was identified was on how to address the needs in a wider region and not only on an individual level.

It was discussed, that the challenge of the lack of common understanding of bioeconomy and ‚social innovation‘ could be addressed via written guides from local policymakers, improved media coverage and targeted campaigns/round tables as well as introducing best-practice examples to rural actors, e.g. via facilitators or taskforce groups.

Workstream 6 – Effective and innovative governance of regional bio-based systems (incl. public support schemes)

During the breakout session, the participants mentioned different funding programmes (e.g., funding for the development of zero-phyto crops), specific certificates for bio-based systems (e.g., energy certificates) and smart specialization strategies as **state-of-the-art** in the governance of regional bio-based systems.

Knowledge gaps that were identified for effective governance were a lack of unity within regulations and policies (EU and regional level), a communication barrier between policymakers within the regions and the need for education and skill development for regional stakeholders.

The workshop participants discussed the idea of implementing one organization for bioeconomy and related topics within the EU to enhance the dialogue between relevant parties (policy makers, academia, private businesses, ...). It was discussed that this could be a **potential outcome of the SCALE-UP project**. Further **ideas** were to promote funding options for the education of producers in rural areas or to implement bioeconomy breakfasts (webinars).

Workstream 7 – Strategies to address social, ecological and economic trade-offs in regional bioeconomy development

The identified **state of the art** was that bioeconomy is pushed (regional level as well as national level) without recognizing potential conflicts that may arise (e.g., the lack of resources in one application field, when the resource is used in circular economy instead).

Knowledge gaps that the participants discussed were the lack of support for projects that focus on recycling biomass (especially on a household level) or the missing urge to find solutions for potential future challenges if bioeconomy is pushed.

One **idea** that was mentioned to find solutions for the potential challenges was what-if analyses combined with small-scale testing facilities to address potential trade-offs. Another point that was discussed was that a consensus/common understanding of bioeconomy and respective topics need to be defined, to avoid future miscommunication. One idea that was discussed and that could be a potential result of the SCALE-UP project is the creation of one or more institutions that evaluate bioeconomy-projects and educates experts/stakeholders based on their specific needs.

3.3 Cross-regional findings

The presentations of the six SCALE-UP regional platforms, as well as their two dedicated breakout sessions, provided insight into their main opportunities, capacities, policies, foreseeable barriers and pressing needs regarding the deployment of bio-based solutions. From the provided information, several overlaps between the regions could be identified, as many of the SCALE-UP regions experienced the same barriers and needs.

As for **opportunities**, many of the regions saw prospects on the same topics. The overlaps in opportunities include:

- The introduction of bio-based products on a local level, and rising demand for these products locally.
- Technological development within the bioeconomy as well as new innovative solutions, both of which can also provide job opportunities.
- The potential use of side streams appeared to be a great opportunity in multiple regions.

The same could be said for the SCALE-UP regions' available skills and **capabilities**, as multiple regions found that:

- In the region there is already a high level of collaboration. This collaboration can include clusters of businesses, business alliances, trade groups, as well as research centres and groups.
- Some of the regions found that they already have a great knowledge infrastructure, this can be in the form of a high level of education and/or research.
- Multiple regions found that the production of their chosen types of biomass was traditional to the region, meaning that there is already a high level of knowledge and skills about its value chain.

As for the **policies**, most of the SCALE-UP regional partners mentioned their national and regional bioeconomy strategies. As well as important roadmaps, funding schemes and some of the difficulties that they have experienced with certain policies.

As for the foreseeable **barriers**, common difficulties were the following:

- Multiple regional partners found that there was a language barrier, which could hinder cross-regional communication in the frame of the SCALE-UP project.
- Some of the regions found that there was a low awareness of the bioeconomy and a lack of interest in the bio-based industries.
- While some of the regions mentioned the creation of job opportunities, other regions found that there was a shortage of labour, which could hinder the bioeconomy rollout in the region.
- Other barriers could be the high investment costs and the need for technical skills.
- A lacking access to funding could also be a potential barrier in the future deployment.
- Finally, multiple regions showed concern about the bureaucratic issues and overregulation in their region.

Lastly, multiple regions identified similar pressing **needs**, namely:

- The need for more access to funding, financing and subsidy schemes.
- A need for increased awareness, of governments, farmers and businesses.
- To increase capacities, which could be done through knowledge transfers, such as workshops, training and seminars.
- To have an up-to-date database describing the region's biomass resources.
- For the regulatory framework to improve or become more favourable towards the bio-based industries.

3.4 Next steps

The cross-regional assessment workshop has been a fruitful kick-off of the cross-regional activities within the SCALE-UP project. The results of the workshop will be used as input for several tasks within the SCALE-UP project. These tasks form the next steps in the process of supporting the bioeconomy rollout in the six regions and the broader community of practice.

The insight gained into the types of biomass the SCALE-UP regional platforms will focus on is valuable input to the further development of the approach to assessing regional biomass availabilities (Task 2.3). The first insight in the nutrient recycling options within the regions, obtained during the workshop including the idea to also include organic nutrients forms important input for the regional assessment of nutrient recycling options (Task 2.3). Furthermore, initial feedback has been received on the approach to assessing ecological boundaries within the SCALE-UP project (Task 2.3). The discussions and the online concept boards on the work streams form a useful starting point for the development of the cross-regional knowledge exchange and capacity-building activities within SCALE-UP (Task 3.1 and 3.2). Moreover, an initial identification of regionally suitable bio-based solution was made, which will be further taken up in SCALE-UP Task 4.1. Finally, opportunities were created for more informal cross-regional knowledge exchanges.

4 Attachments to the report:

1. Intro slides ECO SCALE-UP Workshop
2. Organization SCALE-UP workshop
3. Presentation North Sweden (BFR)
4. Presentation Mazovia (UNIMOS)
5. Presentation French Atlantic Arc (AC3A)
6. Presentation Upper Austria (TMG)
7. Presentation Strumica (SDEWES-Skopje)
8. Presentation Andalusia (CTA)
9. Summary SCALE-UP workshop day 1
10. Breakout sessions workstreams SCALE-UP training program
11. Discussion biomass availabilities and nutrient balances
12. Discussion ecological boundaries

5 Annex 1: List of participants

	Participants	Affiliation	Country
1	José María Fernández	AgroSevilla	Spain
2	Ana Vigil	CIDAF	Spain
3	Carmen Ronchel Barreno	Technological Corporation of Andalusia	Spain
4	Laura Coello Sanchez	Technological Corporation of Andalusia	Spain
5	Marta Macías Aragonés	Technological Corporation of Andalusia	Spain
6	Rafael Castillo Barrero	Technological Corporation of Andalusia	Spain
7	Vanessa Quintano Ramos	Technological Corporation of Andalusia	Spain
8	Agnieszka Zdanowicz	Centrum Kooperacji Recyklingu	Poland
9	Anna Bialik	Unimos Foundation	Poland
10	Katarzyna Kowalska	Unimos Foundation	Poland
11	Tomasz Bober	Unimos Foundation	Poland
12	Sławomir Pyciński	Unimos Foundation	Poland
13	Barbro Kalla	BioFuel Region	Sweden
14	Eva Fridman	BioFuel Region	Sweden
15	Magnus Matisons	BioFuel Region	Sweden
16	Helena Näsström	RISE Research Institutes of Sweden	Sweden
17	Jean-Luc la Fargue	Association of the Chambers of Agriculture of the Atlantic Area	France
18	Sylvie Guillo	Association of the Chambers of Agriculture of the Atlantic Area	France
19	Nina Bailet	Association of the Chambers of Agriculture of the Atlantic Area	France
20	Sophie Rabeau-Epsztein	Association of the Chambers of Agriculture of the Atlantic Area	France
21	Joël Lagneau	InterChanvre	France
22	Julien Ligneau	Association of the Chambers of Agriculture of the Atlantic Area	France

23	Alain Bourmaud	Université Bretagne Sud	France
24	Vladimir Gjorgievski	SDEWES-Skopje	North Macedonia
25	Emilija Mihajloska	SDEWES-Skopje	North Macedonia
26	Natasa Markovska	SDEWES-Skopje	North Macedonia
27	Aleksandar Chebotarev	MEPSO A.D.	North Macedonia
28	Panche Bedzovski	Municipality of Strumica	North Macedonia
29	Hochreiter Heidrun	Food Cluster - Business Upper Austria	Austria
30	Luise Dauwa	Food Cluster - Business Upper Austria	Austria
31	Kristina Pammer	Food Cluster - Business Upper Austria	Austria
32	Katharina Perfahl	Food Cluster - Business Upper Austria	Austria
33	Bettina Schwarzingner	Johannes Kepler University Linz	Austria
34	Bettina Zieher	University of Applied Sciences Upper Austria	Austria
35	Katrin Mathmann	University of Applied Sciences Upper Austria	Austria
36	Jurjen Spekreijse	Biomass Technology Group	The Netherlands
37	Marisa Groenestege	Biomass Technology Group	The Netherlands
38	Martijn Vis	Biomass Technology Group	The Netherlands
39	Gerardo Anzaldúa	Ecologic Institute	Germany
40	Holger Gerdes	Ecologic Institute	Germany
41	Jack Tarpey	Ecologic Institute	Germany
42	Zoritz Kiresiewa	Ecologic Institute	Germany
43	Chuan Ma	WIP Renewable Energies	Germany

6 Annex 2: Workshop Programme

SCALE-UP Cross-regional assessment workshop

22nd and 23rd of November 2022

9.30 – 12.30, Online

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PROGRAMME

Joining the cross-regional assessment workshop is a great opportunity to get acquainted with the SCALE-UP project, to assess the bioeconomy needs and priorities of your region, and to make the SCALE-UP project most beneficial to the bioeconomy rollout of your region.

Day 1: Overview of the current situation and opportunities for deployment of bio-based solutions in the six regions.

9.30 – 9.45	Tour de Table
9.45 – 10.00	Introduction of the project and goals of this meeting
<i>Presentations of the six regions on skills, capabilities, possible opportunities and barriers.</i>	
10.00 – 10.10	Presentation Northern Sweden (<i>BioFuel Region</i>)
10.10 – 10.20	Presentation Mazovia (<i>UNIMOS Foundation</i>)
10.20 – 10.35	Break
10.35 – 10.45	Presentation Pays de la Loire (<i>Association of Chambers of Agriculture in the Atlantic Arc</i>)
10.45 – 10.55	Presentation Upper Austria (<i>Food Cluster – Business Upper Austria</i>)
10.55 – 11.10	Break
11.10 – 11.20	Presentation Strumica (<i>International Centre for Sustainable Development of Energy, Water and Environment Systems- Macedonian section</i>)
11.20 – 11.30	Presentation Andalusia (<i>Technological Corporation of Andalusia</i>)
11.30 – 12.00	Interactive Breakout Session per region: pressing needs, capabilities, policies, foreseeable barriers.
12.00 – 12.15	Wrap up



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PROGRAMME

Day 2: Needs and priorities of bioeconomy rollout & support by SCALE-UP.

9.30 – 9.45	Summary of day one: overview of the regions and their differences and overlaps.
9.45 – 10.30	Interactive Breakout Session per region: trajectories to bioeconomy rollout, with prioritisation of opportunities, pressing needs and barriers.
<i>Discussion of aligning work for knowledge of bio-based solutions and mutual learning & capacity building, to the needs and priorities of the regions.</i>	
10.30 – 10.40	Introduction of the SCALE-UP training programme <i>(Food Cluster- Business Upper Austria)</i>
10.40 – 11.10	Two interactive breakout sessions on the seven work streams of the SCALE-UP training programme.
11.10 – 11.25	Break
11.25 – 11.45	Discussion regional biomass availabilities and nutrient balances <i>(Biomass Technology Group)</i>
11.45 – 11.55	Discussion ecological boundaries <i>(Ecologic Institute)</i>
11.55 – 12.05	Scientific and technological information <i>(Biomass Technology Group)</i>
12.05 – 12.15	Conclusion and wrap up

SCALE-UP is a European project aiming to identify and scale-up innovative and sustainable bio-based value chains in selected regions (North Sweden, Mazovia, Pays de la Loire, Upper Austria, Strumica, Andalusia) and a broader community of regional bio-based initiatives.



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101060264.

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