



SCALE UP

community-driven
bioeconomy development

Training Programme: Content, structure, and implementation guidelines

June 2023

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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.

Document information

Project name:	SCALE-UP
Project title:	Concepts, tools, and applications for community-driven bioeconomy development in European rural areas
Project number:	101060264
Start date:	1 st September 2022
Duration:	36 months
Report:	D3.1: Training Programme
Work Package:	WP3: Mutual Learning & Capacity-building
Work Package leader:	TMG
Task:	Task 3.2: Cross-regional knowledge exchange and capacity-building
Task leader:	TMG
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Internal peer review:	Kralla B., Matisons M. (BFR)
Planned delivery date:	M9
Actual delivery date:	M10
Reporting period:	RP1

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EXECUTIVE SUMMARY

This report provides an overview of the contents and structure of the training programme created under the framework of the SCALE-UP project, aiming to promote and execute cross-sectoral and cross-regional capacity-building and knowledge exchange among stakeholders to increase interdisciplinary discussions and find innovative solutions that meet the specific needs of the project regions. It further provides a guideline for the project partners to facilitate the implementation of the virtual capacity-building events.

A structured needs analysis was conducted through an online survey to identify the training needs of the stakeholders in the project regions: Andalusia (ES), the French Atlantic Arc (FR), Mazovia (PL), Northern Sweden (SE), Strumica (MK) and Upper Austria (AT). In addition, the survey was sent to the members of the SCALE-UP Community of Practice (CoP) to identify similarities and variances between the regional and CoP needs and to further collect best practice examples of bio-based solutions in the bioeconomy. The questionnaire included seven thematic work streams (WS) that cover multiple aspects of bioeconomy and have been identified prior to the start of the project activity. Additionally, several key-topics were defined in each work stream. The seven work streams cover different ways to improve nutrient recycling with cross-sectoral approaches (WS1), how to integrate primary producers into bio-based value chains (WS2), forms of digitalisation in the bioeconomy (WS3), efficient regional infrastructures and biomass logistics (WS4), types of 'social innovation' in the context of rural bioeconomies and how to develop and implement them (WS5), the effective governance of regional bio-based systems (WS6) and different strategies to address social, ecological and economic trade-offs of regional bioeconomy development. The survey participants were asked to rate their knowledge as well as their interest/training need in these key-topics. With the information gained from the survey, the region-specific knowledge and interest about bioeconomy topics were evaluated, and key knowledge holders were identified.

In total 98 stakeholders from all six project regions filled in the questionnaire. Additionally, six CoP members also rated their knowledge and interest for the training topics. The cross-regional comparison of the survey results showed that the participants have a high interest especially in efficient regional infrastructures and biomass logistics, ways to integrate primary producers into the bio-based value chains and nutrient recycling in circular bioeconomies. Furthermore, understanding, developing, and improving business models for bio-based solutions as well as different aspects of legislation, regulation and policies in bio-based work fields were two focus topics that were pointed out as particularly relevant throughout most of the work streams and by each project region.

With a combination of cross-regional knowledge exchange in forms of live-presentations and individual workshops with different idea processing methods to address the needs of each region, the participants of the training programme shall broaden their existing knowledge in bioeconomy topics and should be able to transfer the theoretical input to their respective applications. Furthermore, a discussion round with experts in different fields of the work stream shall provide a platform for specific questions from the attendees and opens further possibilities to get the knowledge needed for the evolvement of the participants ideas for bio-based solutions. The training program consists of at least 3 virtual capacity-building events per thematic work stream, spanning from September 2023 to December 2024. In addition to the virtual events, it includes regional information packages distributed through the project's website, as well as site visits and an international study tour in three project regions, providing real-life best practice examples and fostering cross-regional and cross-sectoral exchange.

Lastly, an implementation guideline, which includes information for the project partners to use for successfully planning the structures of their respective work stream trainings and conducting the capacity-building activities with the regional stakeholders was created. Main subjects of the implementation guideline are how and when to prepare documents, invitations, and further materials that are needed for the training, different types of moderation techniques and methods for idea generation and evaluation as well as a section on technical frameworks.

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Abbreviations

AI	Artificial Intelligence
CoP	Community of Practice
ICT	Information and Communication Technologies
IoT	Internet of Things
LCA	Life-Cycle-Assessment
P.i.	Participants interested
SME	Small and Medium-sized Enterprises
WS	Work Stream

1 Introduction

The SCALE-UP project facilitates knowledge exchange and capacity-building for sustainable rural development by assisting regional stakeholders (private businesses, governments and policymakers, civil society organisations, and researchers) in identifying and developing innovative bioeconomy-based business models. This report provides detailed information on the content, structure, and implementation guidelines for the project's capacity training programme, including the objectives, learning outcomes, methodologies, and timelines for each thematic work stream.

The primary objective of the training programme is to promote cross-sectoral and cross-regional capacity-building and knowledge exchange among stakeholders in the bio-based sector. The ultimate goal is to foster innovative and inclusive rural development pathways. By building the capacity of relevant actors in the regions, the training programme will contribute to the project's overall aim to share best practices and lessons learned. It is a critical component of the project's efforts to support sustainable bio-based value chains and promote the bioeconomy in European rural regions. The programme is designed to guide its implementation and ensure alignment with the needs and priorities of key stakeholder groups. The capacity training programme was developed based on a structured needs analysis that identified key knowledge holders and stakeholders with capacity needs. The analysis was conducted among stakeholders in the six SCALE-UP focal regions. The programme comprises seven thematic work streams that cover topics relevant to the bio-based sector, including improved nutrient recycling, integration of primary producers into value chains, digitalization, efficient infrastructures and logistics, social innovation, governance, and strategies for addressing trade-offs.

The programme will be implemented through virtual capacity-building events, site visits, and an international study tour, with at least three training sessions organized for each thematic work stream. Knowledge holders will be involved in sharing experiences and good practices that can be taken up in other regions. The training sessions will be planned, facilitated, and synthesized by project partners with relevant thematic expertise. The evaluation and synthesis of knowledge exchange and capacity-building activities will be conducted at the end of the programme, summarizing the lessons learned and preparing them for uptake by the regional platforms. The results will serve as a key input to the development of sustainability plans for the regional platforms.

The report is structured in three main sections, in which each section thematises different aspects of the training programme. The first section gives an overview of the overall structure and time frame of the SCALE-UP training. Furthermore, the potential structure of the individual training sessions is included.

The second part presents the outcomes of the needs analysis questionnaire. The evaluation of the responses shows the interests and existing knowledge of each region, and a cross-regional comparison highlights similarities and differences of the needs of each region. Based on the outcomes, focus topics for the potential contents of the training programme are pointed out. In addition, additional activities that are part of the training programme are elaborated.

The last section of the report is intended for internal use and is particularly useful for the implementation of the project partners' training sessions. It covers a step-by-step guide on when and what to prepare for the capacity-building events, different methods and tools that can be used to conduct the trainings as well as a section on the evaluation of the capacity-building events.

Concluding, the report finishes with an outlook on how the outcomes of the activities described in this report will be implemented in future project activities and how the results will be used to ensure the sustainability of the project results.

2 Structure and Time Frame of the Training Programme

The training programme is primarily designed to build the capacity of regional actors to identify and promote innovative bio-based solutions and contribute to the discussion on inclusive pathways for rural development. To achieve this objective of the training programme, knowledge sharing and mutual learning between the regions, seven work streams have been identified as main areas of interest in the bioeconomy. Following sub-chapters give an overview of the structure of the training programme, including the seven thematic work streams and additional activities that will be conducted besides the capacity-building events. Furthermore, the time frame with the specific dates of each capacity-building session for each work stream is included. Lastly, a detailed plan on the potential structure of the capacity-building sessions is elaborated.

2.1 Structure of the SCALE-UP Training Programme

The SCALE-UP training programme includes different activities for participants to deepen their understanding of bioeconomy and related topics. It is based on the specific needs of each region, which have been identified with a structured needs analysis survey, conducted within the frame of the training programme. Following major activities define the framework of the training programme:

- Needs analysis survey
- Capacity-building activities
- International study tour and site visits
- Best practice examples

The core activity is the capacity-building events, that will be held online, and which contents are determined by the outcomes of the needs analysis. The evaluation of the needs analysis and potential topics of the capacity-building events are included in Chapter 3. The needs analysis questionnaire as well as the capacity-building events are built on seven thematic work streams covering different aspects of bioeconomy, that have been identified prior to the project. For each work stream, three virtual capacity-building events will be organised in which knowledge holders from the project regions share experiences and best practice examples that can be taken up by other regions.

In addition to the capacity-building activities, an international study tour, two site visits in the project regions and a collection of best practice examples round off the training, giving participants real-life examples of how bioeconomy can be implemented. Figure 1 and Figure 2 show an overview of the seven work streams including several sub-topics that were included in the survey as well as the activities that are planned in addition to the virtual trainings.

Figure 1: Structure of the training programme with the seven thematic work streams, international study tour and site visits, Part 1

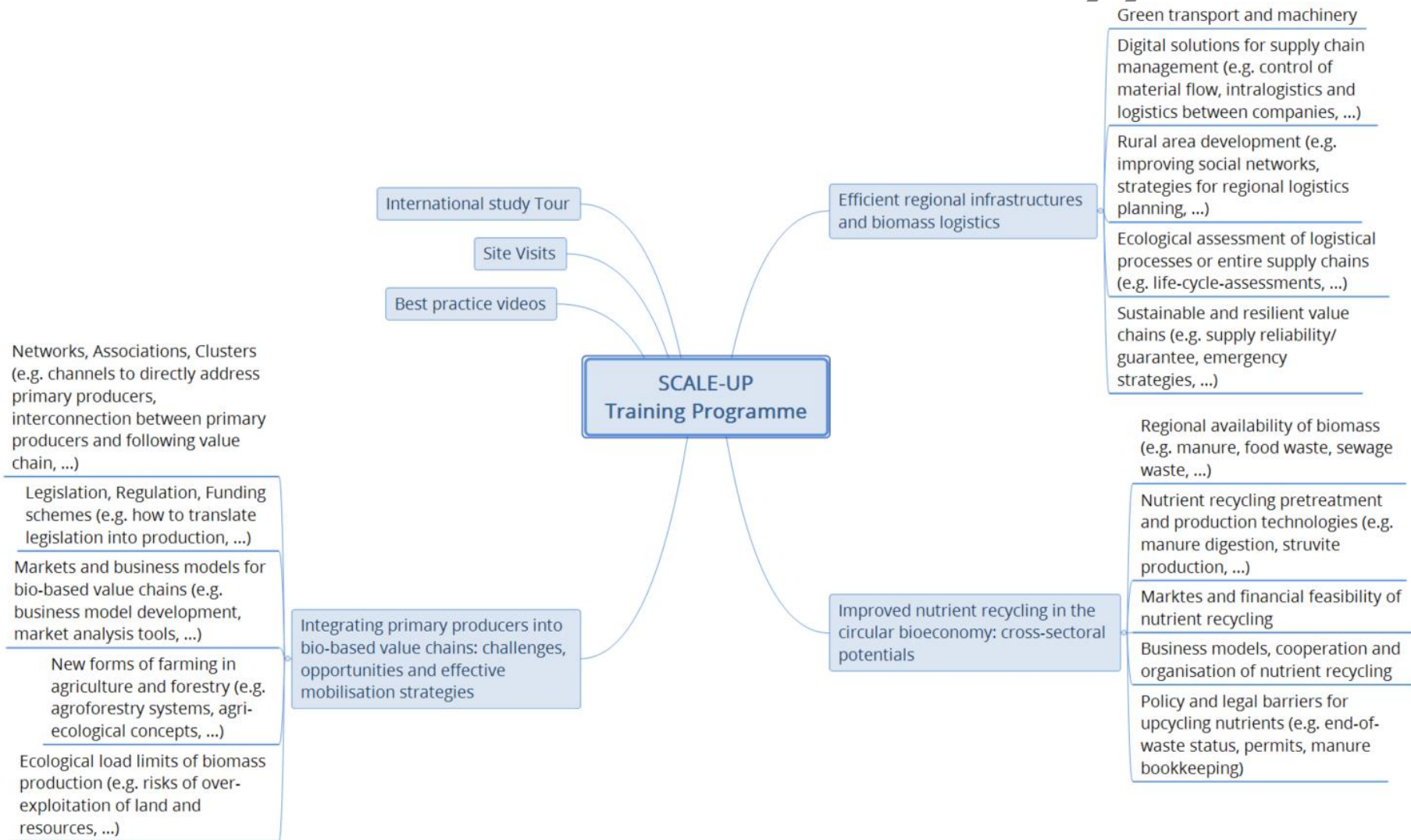
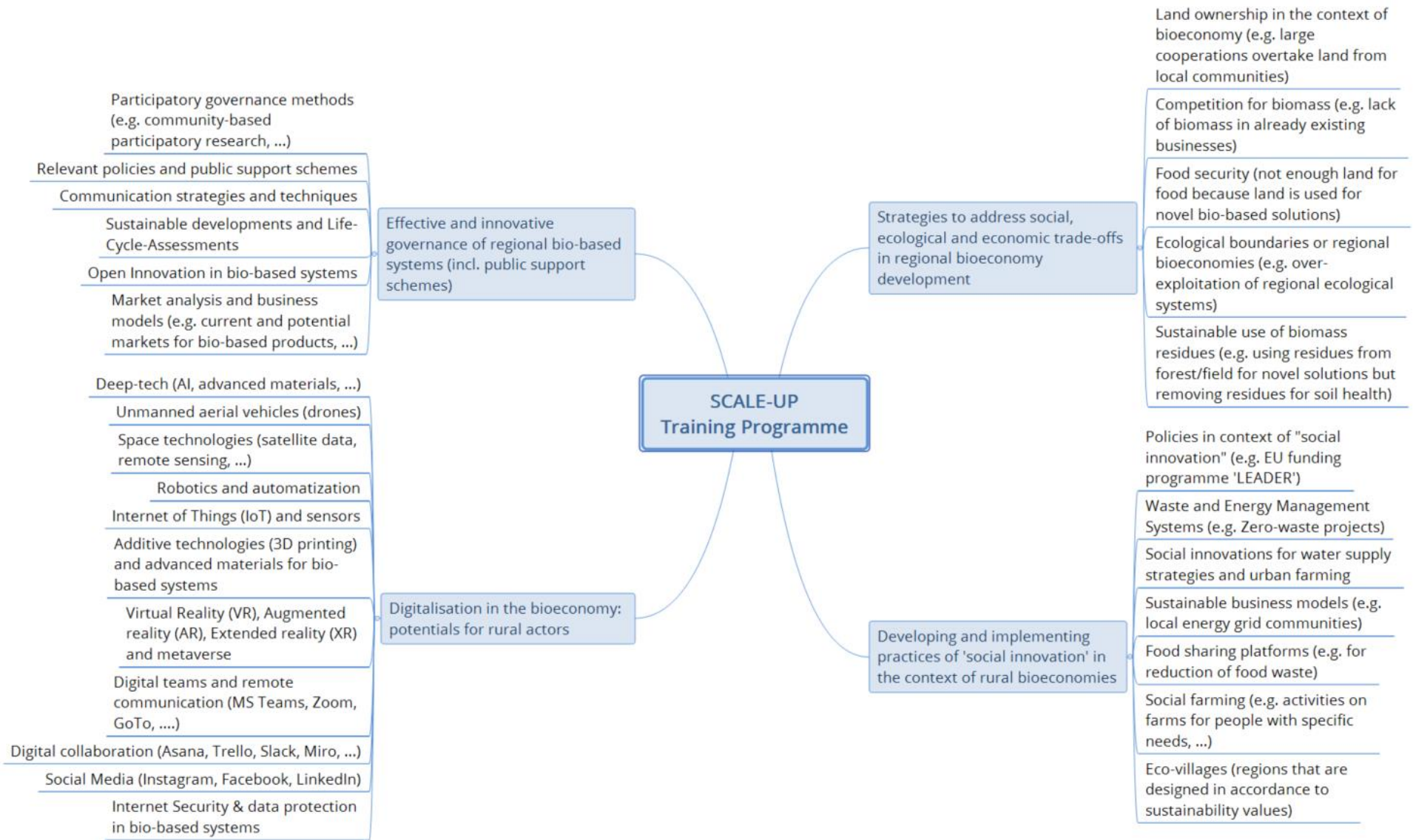


Figure 2: Structure of the training programme with the seven thematic work streams, international study tour and site visits, Part 2



2.2 Time frame of the SCALE-UP Training Programme

At least three virtual capacity-building events will be organised as part of each thematic work stream. The training programme starts in September 2023 and lasts until December 2024, a time frame about 16 months with at least 21 training sessions. A trial training was conducted in June 2023, in which the procedure, structure and set-up of the training sessions were rehearsed with the project partners. In addition, all technical tools (translation tool, breakout sessions, white boards, creative methods etc.) will be tested. Table 1 shows the planned dates of the training programme.

Table 1: Planned time frame for the training programme

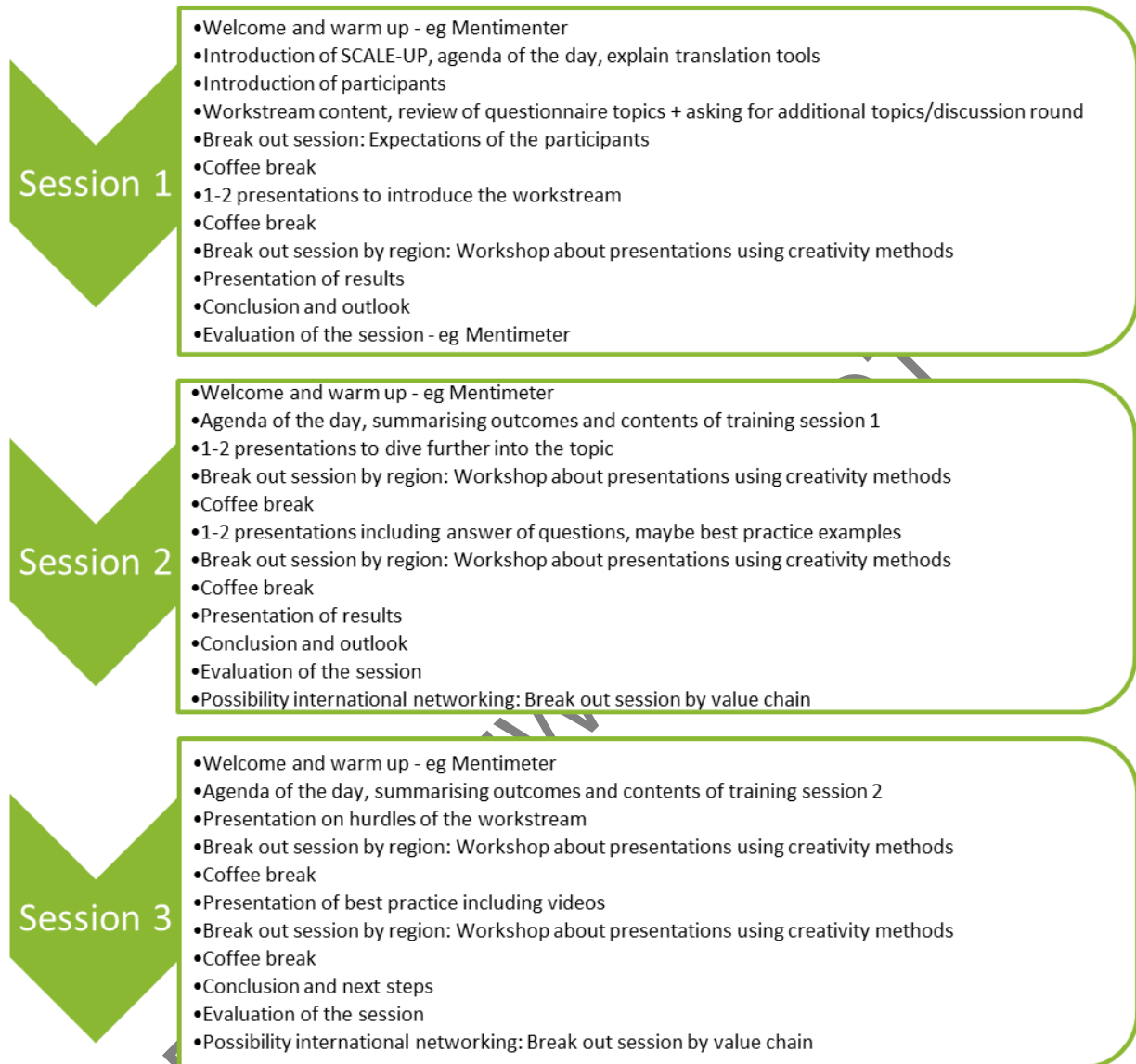
Work stream	Date	Facilitator
Trial Training	27.06.2023	TMG, all project partner
Work stream 4: Efficient regional infrastructures and biomass logistics.	07.09.2023 26.09.2023 19.10.2023	AC3A, BFR
Work stream 2: Integrating primary producers into bio-based value chains: challenges, opportunities, and effective mobilisation strategies.	09.11.2023 21.11.2023 07.12.2023	AC3A, SDEWES
Work stream 3: Digitalisation in the bioeconomy: potentials for rural actors.	16.01.2024 06.02.2024 27.02.2024	TMG, UNI
Work stream 1: Improved nutrient recycling in the circular bioeconomy: challenges, opportunities, and effective mobilisation strategies.	12.03.2024 04.04.2024 23.04.2024	BTG, SDEWES
Work stream 5: Developing and implementing practices of “social innovations” in the context of rural bioeconomies.	14.05.2024 04.06.2024 25.06.2024	UNI, TMG
Work stream 6: Effective and innovative governance of regional bio-based systems (incl. public support schemes).	05.09.2024 26.09.2024 17.10.2024	CTA, WIP
Work stream 7: Strategies to address social, ecological, and economic trade-offs in regional bioeconomy development.	31.10.2024 21.11.2024 12.12.2024	WIP, ECO

In order to enable capacity-building and knowledge transfer across sectors and regions, the trainings will take place online. This will allow stakeholders from all project regions to work together on the identified topics and knowledge holders from the regions to present their innovations cross-regionally.

The first training session of each work stream will introduce and provide an overview of the topic. In the following sessions, the interests and needs identified in the survey will be addressed and knowledge holders will be invited and immersed in discussions on these very areas. In this way, the participants will delve deeper into the topics which were previously requested by the stakeholders. Project partners with relevant thematic expertise will plan, facilitate, and synthesize the events.

The specific contents and formats of the training programme will be determined by the outcomes of the needs analysis and chosen by each work stream facilitator individually. Figure 3 shows the draft of the structure for the sessions within one work stream.

Figure 3: Structure of the capacity-building activities within each work stream



Each session starts with a short warm-up to activate the participants and to enable a collective start. After that, the agenda of the day will be presented. In the first session, there will be an overview of the project SCALE-UP and information about the content of the respective work stream. In addition, in the first session, the expectations of the participants will be asked and there will be a small round of introductions of all participants. Each session will be followed by several presentations by stakeholders. These have emerged as knowledge holders during the surveys and will thus cover the knowledge needs of the participants. After the presentations, participants will be divided into breakout sessions (separated by region) to discuss and exchange ideas about the presentations. The breakout sessions can also be used by the regions to address country-specific topics that have emerged in the survey or are well suited to this group based on the knowledge of the project partners.

The survey not only asked about the content and knowledge of the training, but also which training method the participants would prefer. Lectures and presentations to build knowledge were chosen as the preferred method, followed by group work in breakout sessions.

As requested, the trainings will alternate lectures on the current state of knowledge and the presentation of best practice examples from the regions with breakout sessions where there is room for discussion. Depending on the training session, 1 to 2 presentations will be given in the introductory session and 2 to 4 presentations will be given in each of the following in-depth training sessions by knowledge holders to disseminate knowledge and present best practice examples in the plenary.

The potential contents of the sessions, thus the topics of the presentations, were identified in the needs analysis and are explained in more detail for each work stream in the following chapters. In addition, the interests, demands and wishes of the participants are asked in the first session and incorporated into the following training sessions. The alternation of frontal lectures with translation and discussions with creative moderation techniques is intended to impart a lot of knowledge, keep the participants' interest high and encourage active participation.

For some work streams and in some regions a hybrid version with live and online sessions is envisaged. In order to take advantage of the higher interaction of on-site events and to guarantee a more active discussion and a higher workshop character of the participants of a region, for some regional partners invite the participants to meet on-site. The plenary presentations are listened together on a screen and then discussed directly in a workshop.

At the end of each session there is a short unit to evaluate the session. This serves to continuously improve our training program. Afterwards, there is the possibility for interested participants to stay longer and exchange ideas internationally.

3 Evaluation of Potential Training Content: Needs Analysis Questionnaire

The previous chapter included the core activities conducted within the SCALE-UP training programme as well as the time frame of the capacity-building activities. One major part of the training and also the basis to determine the focus of the capacity-building events within each work stream is the needs analysis questionnaire conducted in the first period of this project. The following chapter will cover in the first section the preparatory phase of the questionnaire and how the stakeholders of the different regions were mobilised. The second part includes a detailed evaluation of the results of the needs analysis with regional outcomes and a cross-regional comparison with similarities between the needs of the project regions. The evaluation also includes focus topics for each work stream, that are potential contents for the training programme as well as recommendations on how the needs could be met and how identified challenges could be tackled. The last part of this chapter includes information on the collection of best practice examples as well as the international study tour and site visits, that will be conducted within the frame of the training.

In the stakeholder survey, the interests and needs in the different work streams were asked for. In all regions, precise information was provided on the contents of the training programme, the methods how the knowledge should be conveyed, and which hurdles need to be overcome, so that a tailor-made training programme can be created for the project regions. People who are already well versed in the topic were identified and can be used as lecturers. There was a list of experts generated for each work stream from the project regions who can be contacted by the facilitator to provide important input for the training programme.

3.1 Preparatory phase

In order to assess the needs, interest and knowledge of each region in the work streams of the training programme an online survey was prepared which included rating questions to seven different thematic work streams and relevant sub-topics (see Figures 1 and 2, p. 10-11) that have been defined by the project partners and should guide the participants through the topics. By providing and gathering precise information on the needs, the methods how the knowledge should be conveyed in the training programme, and which hurdles need to be overcome, the potential contents for the tailor-made training programme can be created. The template of the needs analysis questionnaire is available on request from the authors.

The survey was conducted online with the programme “LimeSurvey”. The regional partners sent out the questionnaire to the stakeholders identified in the stakeholder mapping conducted in previous project activities. It was sent to over 450 stakeholders from following stakeholder groups:

- Primary producers, landowner
- Large-scale enterprises
- SME/Start-Ups
- Governments and policymakers
- Civil society
- Academia, Research, Education
- Financial sector
- Other (including Clusters, Associations, Business Support Organizations)

With the outcomes of the questionnaire, key knowledge holders and the contents for the training programme were determined. In addition to the interest/know-how rating the stakeholders were asked to include best practice examples of organisations/products/networks, that are relevant to the topics within each work stream. The best practice examples of all regions are collected and clustered in a mind map for each work stream with their respective region. This information will be used in the training programme as a basis for stakeholders to get introduced to innovative examples from all project regions and to encourage cross-regional exchanges amongst the training programme participants.

Participation of additional Community of Practice regions:

The CoP is the collaboration between the six project regions and 12 additional regions with their respective representatives. The CoP is designed to boost the exploitation of innovative technological and non-technological bioeconomy approaches by sharing best practices, skills and methods used in the frame of the bioeconomy in the respective regions.

Additionally, to the project regions, regions of the associated Community of Practice (CoP) were also invited to contribute to the training programme with an additional questionnaire. Six representatives of six different regions of the CoP filled in the questionnaire and shared their interest and knowledge in the topics of the project work streams as well as related best practice examples. The participating CoP regions are Denmark, the Netherlands, Germany, Portugal, Slovenia, and Croatia.

3.2 Mobilisation strategy

There were different ways to engage stakeholders from all stakeholder groups to finish the questionnaire and participate in training programme, site visits and international study tour. Depending on the type of contact project partner has with their stakeholders, different contacting methods were applied. The project partners were free to choose how they contact their stakeholders. Following methods were available options to choose from:

- Contacting the stakeholders per Mail
- Conducting a workshop to explain SCALE-UP and the questionnaire
- One on one appointments/talks and phone calls
- Involvement of the regional platform and steering committee
- Using social media to distribute the questionnaire

3.3 Outcomes of the Needs Analysis Questionnaire

The potential content of the training programme is based on the results of the evaluation of the needs analysis that was conducted within the frame of the project activities. The following results summarise the overall outcomes of the needs analysis on a cross-regional and regional level and give an indication what the training sessions for the work streams focus on. Derived from these needs, the content for the training programme is established by each project partner that leads the training activities for the respective work stream. The detailed outcomes of each individual region are included in the regional information packages that are part of the project activities in T2.4. An overview of the work streams and their respective sub-themes covered in the questionnaire as well as in the training programme are included in Figures 1 and 2 on page 10-11.

Overall, the knowledge and interest of the seven thematic work streams that are related to the bio-economy roll-out, specifically in rural areas, varies throughout the project's focal regions. This reflects the variation in participating stakeholder groups of each region. Nonetheless, the individual interest given in the sub-topics was high. Table 2 shows the average number of participants that rated the work stream with very high interest (very high = 5).

Table 2: Average number of participants of each work stream who rated their interest as very high (very high = 5 out of 5).

Nr. of WS	Work stream name	Average number of high interest participants
1	Improved nutrient recycling in the circular bioeconomy	27,8
2	Integrating primary producers into bio-based value chains	28,6
3	Digitalisation in the bioeconomy	18,6
4	Efficient regional infrastructure and biomass logistics	29,6
5	Practices of "social innovation" in rural bioeconomies	21,7
6	Governance of regional bio-based systems	26,5
7	Strategies to address social, ecological, and economic trade-offs in regional bioeconomy development	19,6

The results in table 2 show, that the participants of the survey have the highest interest in work stream 4 "*Efficient regional infrastructure and biomass logistics*", followed by work stream 2 "*Integrating primary producers into bio-based value chains*". Derived from the survey results it seems, that the interest in digitalisation topics and more politically themed topics, such as "*Strategies to address social, ecological and economic trade-offs in regional bioeconomy development*" is not as high as in topics that are related directly to the handling of biomasses.

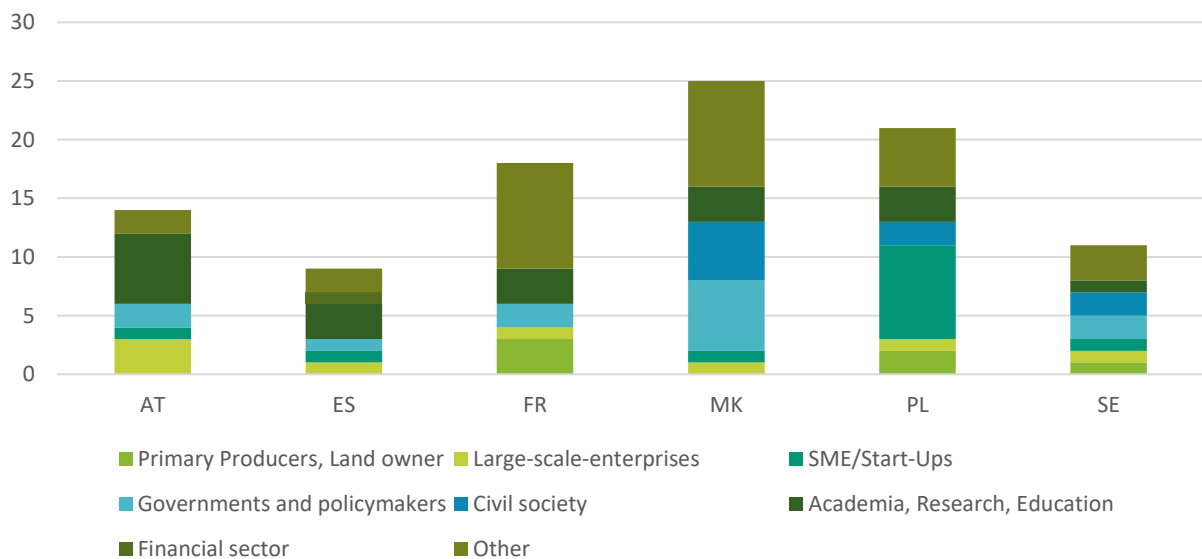
The following sub-chapters include the cross-regional as well as region-specific evaluation of the questionnaire results for each work stream. In addition, correlations of participating stakeholder groups, identified challenges and the interests of each region are included as well. Each sub-chapter contains a short description at the beginning to introduce the thematic work stream and why it is included in the training programme.

3.3.1 Cross-regional and regional participant information and identified hurdles of the bioeconomy roll-out in rural areas

In total 98 stakeholders from all project regions participated in the needs-analysis survey. All stakeholder groups were represented, whereas “Academia, Research and Education” and the sector “Other” had most representatives. The stated stakeholder groups within “Other” were mainly clusters and business associations. With one participant from Andalusia (ES), the financial sector was the least represented stakeholder group.

Since the stakeholder group for “Finance” had little representation compared to other groups, the aim for the training programme is that the project partners invite personal contacts from their clusters that have the needed expertise to share their experience and knowledge about funding options and financing of demo projects. In this way it is ensured that the identified hurdles regarding finance are addressed, nonetheless. The following graph (Figure 4) gives an overview of the number of participants per region and which stakeholder groups participated in each region.

Figure 4: Number of participants per stakeholder group in each project region.

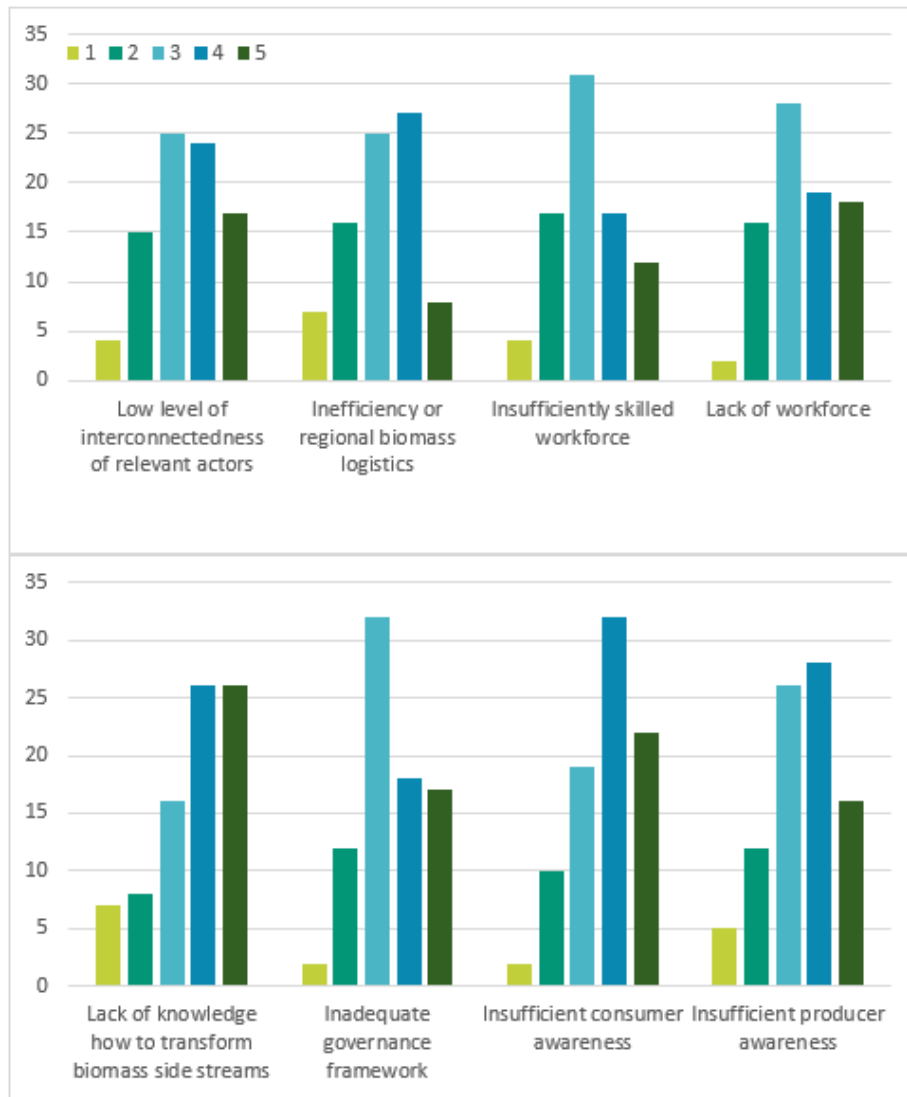


The following cross-regional comparisons of each work stream in the training programme take the similarities in the needs and knowledge cross-regionally as well as the individual needs and knowledge of each region separately into account. The conclusions within the regional evaluations will also reflect on how the needs and knowledge connect to the type of stakeholders that participated for each region. Creating a connexion between the stakeholder groups and the survey outcomes might provide a more detailed insight into the region-specific challenges of the bioeconomy roll-out.

Cross-regional identified hurdles when rolling out bioeconomy topics in rural areas

In addition to the questions to each work stream, the participants were asked at the beginning of the questionnaire to rate different challenges that stakeholders are faced with when rolling out bioeconomy topics. The participants should rate given challenges on a scale from 1-5 in accordance with the relevance in their region (1 = not relevant in the region, 5 = very relevant in the region). Figure 5 shows the rating of all participants of each hurdle.

Figure 5: Identified hurdles of bioeconomy development in rural areas of Andalusia (ES), French Atlantic Arc (FR), Mazovia (PL), Northern Sweden (SE), Strumica (MK) and Upper Austria (AT).



By identifying the relevance of these hurdles, the contents of the training programme for each region can be adapted to meet the needs of the participants even further. In total, the hurdle rated with the highest relevance cross-regional was the lack of knowledge on how to transform biomass side streams into other products/applications.

Furthermore, an insufficiency of consumer and producer awareness regarding bioeconomy as well as insufficient regional biomass logistics were seen as relevant. The selection of topics in each work stream that are included in the training programme should coincide with the identified hurdles. A transition between the hurdles and the sub-topics of the work streams is included in each work stream evaluation in the respective chapter of this document.

Region-specific participation information and identified hurdles of the bioeconomy roll-out in rural areas

The following section contains general participant information of each region as well as the individually identified hurdles of the bioeconomy roll-out in their region.

Andalusia (ES)

In the Andalusia region, a total of 9 participants filled in the questionnaire. These 9 participants are mostly from academia, research, and education. The rest of the participants come from the following fields large companies, SMEs, governments and policy makers and the financial sector.

In addition, the Andalusian participants identified following obstacles as relevant in their region:

- Low level of interconnectedness of relevant actors.
- Lack of knowledge on how to transform secondary biomass flows.
- 78% of our participants agree that these two hurdles stated above are essential or extremely important.
- Insufficient consumer awareness. It is very important or significant to 67% of Andalusian participants.

Other identified hurdles in Andalusia were:

- Lack of machinery or technology that enhances and improves or facilitates the achievement, application, management, etc. of the product to be recovered and/or the final product obtained.
- Uncertainty in the adoption of innovations.
- Lack of communication and transfer channels between research and value chain actors.
- Difficulty in transforming innovations into business models (approaching the market).
- Availability of financial resources: bioeconomy companies in the region are often of low to medium size, with lower financial resources which are typically required to develop innovative, circular initiatives within the production processes.
- As for the insufficient awareness of producers in the region, this has to be seen in a wider context, where producers do not show innovative attitudes due to more conservative management.

French Atlantic Arc (FR)

In the French Atlantic Arc region, 18 stakeholders participated in the survey. More than half were with an agricultural background (chamber of agriculture, farmer), and the other were mainly from education & research bodies, local governments, or regional bioeconomy clusters. In addition to the survey, feedbacks provided by the stakeholders involved in other project activities (WP2 cross-regional assessment workshop and WP5 kick-off meeting of the regional platform), as well as the understanding of the regional context and value chain gained from the diverse contacts with the stakeholders made since the project start, were mobilised to draft the conclusions in this report.

As for relevant hurdles that are in the way of bioeconomy development in the French Atlantic region, the participants have identified a low level of interconnectedness of relevant actors along bio-based value chains due to a lack of facilities, as well as insufficient consumer awareness as the biggest challenges. Moreover, it was mentioned, that there are no incentives for actors of these value-chains to switch to bio-based production and therefore the rentability due to high investment and operating costs is too low.

Mazovia (PL)

In Mazovia region, 21 stakeholders filled in the needs analysis survey. The stakeholder groups represented are primary producers and landowners (9.5 %), large-scale enterprises (4.8 %), SMEs and Start-Ups (38.1 %), civil society (9.5 %), academia, research and education (14.2 %) as well as other stakeholder groups (23,8 %) including clusters, associations and business support organisations. Governments and policymakers as well as the financial sector were not represented.

The highest rated hurdles of the bioeconomy roll-out of bioeconomy in the region were:

- “Lack of knowledge how to transform biomass side streams” – more than half of respondents said it is very important and ¼ said it is important.
- The second identified hurdle is the lack of awareness, both on producer and consumer side (“Insufficient consumer awareness, Insufficient producer awareness”), with 2/3 of the respondents stating a high to very high relevance.
- “Low level of interconnectedness of relevant actors” was chosen as an important and very important by half of participants.
- “Inefficiency or regional biomass logistics” was similar: half of participants said that it is important and very important, but at the same time almost 1/3 said it is not important.
- “Inadequate governance framework” was identified as less relevant.
- “Lack of workforce” almost 30 % of respondents stated that it is very not important, less than half says it is important and very important.
- “Insufficiently skilled workforce” was chosen as not important by 29 % of participants, and only 41 % said it is important and very important.

Other identified hurdles in the Mazovia region were:

- Lack of transparent information about funding opportunities for bioeconomy activities
- Complicated procedures for applying for funds.
- Lack of facilitators for cooperation on bioeconomy development.
- Gap of the directly connected public funds.
- Low sustainability of biomass.
- Barrier to investment financing.
- External funding for bioeconomy-related activities.
- Outlining the benefits of bioeconomy development for different social groups, at the level of the high school, middle-aged generation and retirees.

Northern Sweden (SE)

In the region of Northern Sweden (SE), 11 participants from all stakeholder groups except the financial sector were represented. The results from the questionnaire give an indication of the existing know-how and interests in the Northern Sweden region.

The main hurdles identified in the four northernmost regions in Sweden are a lack of skilled workforce as well as insufficient consumer awareness. Furthermore, following challenges are important to be addressed within the training programme:

- Lack of long-term policy instruments and the EU’s desire to regulate forestry in detail.
- The EU’s approach to managing forests and their residual streams.
- Lack of knowledge of the conditions for the forest bioeconomy in Sweden
- The bioeconomy is an academic concept. Many actors are engaged in the bioeconomy without being aware of it, which is why awareness building is important.

- The lack of interest among young people to study science and technology will eventually be an obstacle to the bioeconomy.
- Poor profitability is a threat to primary production.
- The biggest obstacle that can be seen is that bio-based products often compete with fossil fuels. Often these are cheaper to produce, partly because of a lack of technological development, partly because they simply become more expensive to produce. Nano-cellulose, for example, has taken/takes a long time to realize into products because the variation in the material from the trees is so great. There has been the same problem when making pellets from logging residues which have a more complex and troublesome nature to deal with than chips from stem wood, which makes it more expensive. Thus, regulations and policies to phase out fossil fuels are needed.
- Economic incentives, political will, lack of understanding of what the bioeconomy can look like as a widespread and well-functioning system at a holistic level where it also can dominate over rapid consumption and unsustainable solutions. As well as insufficient efforts in today's society for a transition at global, national and local level - interest and understanding must be increased, bioeconomy choices must be simplified in various ways for producers and consumers. We need to treat it as a crisis and offer other options quickly, so the time frame is also a challenge. Bioeconomy needs to become more attractive for both producers and consumers. If the alternatives are perceived as expensive, complicated and have low visibility, development is too slow. It is also problematic if different sustainability solutions are pitted against each other instead of coexisting and developing in parallel.

Strumica (MK)

The overall number of participants in Strumica region (MK) is 25, with every stakeholder group represented except primary producers and landowners as well as the financial sector.

For the identification of relevant hurdles in Strumica, most hurdles suggested were evaluated with a rating of three from the total responses. An emphasis was laid on the lack of knowledge how to transform biomass side streams as well as the insufficient producer awareness that prevail as more relevant than the rest.

Furthermore, some of the other identified hurdles on regional level were related to the need of enhanced stimulation for innovation solutions and appropriate financial support. Nonetheless, a serious challenge is the insufficient relevant data for biomass quality and quantity by varieties, which is prerequisite for further and advanced assessment in the bio-based value chains.

Upper Austria (AT)

In Upper Austria, 14 stakeholders completed the needs assessment questionnaire. The represented stakeholder groups were:

- Large-scale-enterprises
- SMEs/Start-Ups
- Governments and policymakers
- Academia/Research/Education and
- Other (Cluster, Association)

About one third of all participants were from the stakeholder group "Academia, Research and Education", which is the highest represented group, followed by "Large-scale-enterprises". Primary producers, landowners, representatives of civil society and the financial sector did not participate in the questionnaire.

For the identification of the biggest hurdles of bioeconomy development in Upper Austria, the stakeholders voted “*Inefficiency or regional biomass logistics*” and “*Insufficient consumer awareness*” as large barriers. Furthermore, the stakeholders in Upper Austria see the lack of knowledge on how biomass side streams could be transformed into a product with higher or equal value.

Additional hurdles that were mentioned by Upper Austrian participants are:

- High costs for new technologies that the actors in the value chain are not yet ready to invest.
- A lack of or very limited efficient support of external sustainability consultants.
- Unclear or missing regulations for the cascading use of biomass/residual materials along the value chain.

3.3.2 Work stream 1: Improved nutrient recycling in the circular bioeconomy: challenges, opportunities, and effective mobilisation strategies

The current production of fertilizer requires large amounts of fossil fuels (mineral gas), especially for nitrogen compounds. There is a large phosphate shortage coming in the near future and phosphate is an important nutrient for agricultural crops. There are several ways to tackle these problems. The most important one is by using bio-based alternatives for fertilizers. Yet, some of the main barriers that stand in the way are:

- lack of awareness of the nutrient problem among policy makers
- lack of information of nutrient resources and potential solutions among stakeholders
- knowledge gaps between the relevant sectors of the bio-based value chains
- Communication gap between policy makers and local companies (policy language vs. practical language)
- Poor business cases, especially for small-scale applications, and lack of access to financial support

The training in work stream 1 provide the information needed to overcome aforementioned challenges. Table 3 shows the respective sub-themes of work stream as well as the rating of knowledge and interest of all participants. A rating of 1 indicates very little knowledge/interest, whereas a rating of 5 indicates very high know-how/interest.

Table 3: Cross-regional rating of the sub-topics in work stream 1 “Improved nutrient recycling” in the circular bioeconomy” on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 1	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Regional availability of biomass	8	17	27	13	10	3	8	16	18	28
Nutrient recycling pretreatment and production technologies	9	19	27	10	5	3	5	12	21	24
Markets and financial feasibility of nutrient recycling	16	24	18	9	3	5	4	7	22	27
Business models, cooperation, and organisation of nutrient recycling	15	17	21	9	4	4	4	7	20	29
Policy and legal barriers for upcycling nutrients	20	18	24	6	6	3	4	10	24	31

The overall interest in the topics of work stream 1 is high throughout all regions (overview in table 3). The highest rated sub-topic is “*Policy and legal barriers for upcycling nutrients*”. Since policies and legal barriers are highly specific for each region, one approach to enhance the knowledge in this field is to include a keynote speaker for EU policies. Additionally, experience reports of successfully overcoming legal barriers and subsequent regional discussions how those approaches could be implemented on a regional basis would be beneficial to all participants.

Similar outcomes were evaluated for the sub-topics “*Business models, cooperation and organisation of nutrient recycling*” and “*regional availability of biomass*”. Stakeholders from the **North Atlantic Arc (FR)**, **Andalusia (ES)**, **Mazovia (PL)** and from the **CoP** could contribute with best practice examples from their regions.

As for “*Markets and financial feasibility of nutrient recycling*”, the know-how throughout the regions was self-rated as low, especially in comparison to the high interest. There were a few stakeholders within the regions as well as a participant from the CoP that have more experience within this field. One way to cover the need for knowledge building in this sub-topic is to invite targeted stakeholders to share best practice examples, funding opportunities or calculation of cost with a particular attention to profitability of nutrient recycling.

“*Nutrient recycling pretreatment and production technologies*” was rated with the lowest interest of all sub-topics in work stream 1. Stakeholders from **Andalusia (ES)** and **Upper Austria (AT)** were particularly interested in this sub-topic and rated their knowledge as comparably high. In order to cover the specific needs of these regions, a cross-regional break-out session with both regions included would have the highest benefit for knowledge exchange. In addition, both regions focus on the value chain „food“ with biomasses from olive oil production in Andalusia and food waste in Upper Austria.

Besides the rating of knowledge and interest, the survey participants were asked to rate their interest in training of nutrient recycling for specific biomasses and nutrients within those biomasses. Table 4 shows the given biomass options that the participants could choose from.

Table 4: Overview of number of participants interested (P.i.) in specific biomass and nutrients.

Biomass	P.i.	Nutrient
Agricultural residues	35	Olive grove biomass (olive pits, pomace); Plant residues; Fibre plants
Forestry residues	20	Olive pruning residues
Manure	18	-
Sewage sludge	24	Use for insulation and energy
Food waste	37	food losses and food waste; food waste management in the future; Valorisation options; household food waste; Food waste from the HoReCa (catering) industry

Four out of six regions (**AT, ES, FR, PL**) had the highest interest in a training targeted on nutrients from agricultural residues and food waste. This matches with the biomasses each region is focused on. For agricultural residues following nutrients were stated as particularly interesting: Olive grove biomass, Plant residues and Fibre plants. In regard to nutrients from food waste, an additional interest in the topics of food waste management and valorisation of household food waste was given. For **Strumica (MK)** and **Northern Sweden (SE)** a training for nutrients from forestry residues is of high interest. For the training, breakout sessions with cross-regional discussions regarding the targeted biomasses would bring the highest gain for the individual regions.

For this work stream 23 stakeholders indicated that they would share their experiences. For each region at least one or more key knowledge holders were identified, which facilitates the knowledge exchange. To get the highest benefit from the capacity-building activities, at least one or more key knowledge holders should be part of the regional breakout sessions.

In general, the knowledge rating in this work stream was rather medium-low and from the analysis of the survey not all sub-topics could be addressed accordingly with the identified key knowledge holders. Regardless, a few project partners of the SCALE-UP project and as well as a few CoP have a high level of experience and knowledge in different fields of nutrient recycling, as well as overcoming legal barriers for biomass use and could therefore contribute with their own experiences to the training programme.

Rating of identified hurdles of efficient recycling of nutrients from biomass

Additionally, the stakeholders were asked to rate different hurdles of efficient nutrient recycling (table 5) on a scale from 1-9, in which 9 is identified as a major hurdle. The individual ratings of each region are included in the regional information packages provided in the SCALE-UP project activities.

Table 5: Rating of relevance of hurdles for efficient nutrient recycling on scale of 1-9 of all participants.

Identified hurdles of efficient nutrient recycling	1	2	3	4	5	6	7	8	9
Availability of suitable biomass (side) streams	10	3	4	3	2	4	1	5	13
Availability of suitable pretreatment and recycling technologies	3	4	7	9	4	6	6	6	2
Financial feasibility of nutrient recycling	17	7	7	7	7	4	5	2	1
Lack of knowledge on nutrient recycling	12	8	6	5	5	4	5	5	2
Lack of policy framework on nutrient recycling	8	12	5	8	2	7	3	4	0
Legal barriers	7	6	13	7	8	3	4	1	4
Lack of targets on nutrient recycling	3	6	5	7	6	3	5	5	5
Lack of insufficient financial support	8	11	4	8	11	3	6	1	0
Lack of businesses interested in developing nutrient recycling methods	2	9	11	0	7	7	1	6	7

From the summed up individual results of the regions the biggest hurdle that has been identified is the *availability of suitable biomass streams*, from which the nutrients can be extracted. Within one of the training sessions, potential solutions or remedial actions could be worked out in cross-regional brainstorming activities to gain the most beneficial output for all participants. Another big hurdle that was identified is the *lack of businesses interested in developing nutrient recycling methods*. To address this challenge, a potential training activity could include experience reports from participants of different stakeholder groups with a subsequent breakout session to develop a small action plan on how to show businesses the advantages of nutrient recycling.

Individual rating of interests and knowledge of each SCALE-UP region and identification of region-specific hurdles of efficient nutrient recycling from biomass:

The following sections include the major outcomes of the regional knowledge/interest ratings, interest in a specific nutrient recycling from different biomasses as well as the main hurdles that have been identified within the regions. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the community of practice survey is provided at the end.

Andalusia (ES)

For work stream 3 “Improved nutrient recycling in the circular bioeconomy: challenges, opportunities and effective mobilisation strategies” in Andalusia, all topics have a “high” or “very high” interest. The topics “Policy and legal barriers for upcycling nutrients” and “Nutrient recycling pre-treatment and production technologies” stand out, where most of the votes are concentrated on the highest rating only some of the participants related to academia, research, education showed slightly less interest and less know-how on this topic. The overall knowledge of the participants is intermediate, representing 33% in all topics with a score of 3 on the scale. The most knowledgeable companies are those related to the agricultural sector of the value chain. These topics have a high level of interest for all participants and an intermediate level of knowledge.

It is interesting to note that in the case of "Policy and legal barriers to nutrient recycling", know-how is intermediate-low. Similarly, it is also interesting to study the topic " Business models, cooperation and organization of nutrient recycling", which has a similar profile of interest and knowledge as the previous topics.

In the question asked about the interest of training in nutrient recycling, all participants are interested in food waste, specifically food losses and food waste; food waste management in the future, as well as agricultural residues with a focus on olive grove biomass, e.g., olive pits, pomace.

French Atlantic Arc (FR)

For the Work stream 3, French stakeholders shown a strong interest in all the proposed sub-themes, as almost all respondents rated their interest with a score of three or more. Stakeholders with an agricultural background raised training needs particularly on the sub-themes “markets and financial feasibility”, “business models, cooperation” and “policy and legal barriers”. Regarding the nutrient recycling, although all options are relevant to the regional context, agricultural residues and food waste options were particularly popular among the respondents.

Stakeholders could contribute with their knowledge in this work stream mainly on topics related to biomass availability and valorisation technologies, and by presenting best practices for cooperation models for nutrient recycling, such as biorefinery concept or on-farm composting of municipal green waste, that were mentioned in the survey.

Mazovia (PL)

Know-how:

- Not particularly high in any field

Interest:

- Business models, cooperation and organization of nutrient recycling
- Policy and legal barriers for upcycling nutrients
- Nutrient Recycling: high interest in food waste recycling – for example in HoReCa and agriculture residues

Northern Sweden (SE)

The focus in the project region in Northern Sweden is for one on reusing nutrients from logging residues and residues of biogas production. The Swedish project partners have experience in producing biogas from household waste, sewage and how to recycle nutrients from the residues of biogas production. The knowledge exchange on biomass ash recycling to forests will be one of the topics investigated in the capacity-building activities of the training programme.

Strumica (MK)

It is evident that there is lower know-how than needs for more information and capacity-building in this regard. That corresponds to the reasonable rate for knowledge and awareness about the regional availability of biomass and nutrient recycling and production technologies.

The main interests of the Macedonian stakeholders are in nutrient recycling of agricultural and forestry residues. Food waste is also considered to be a valuable side stream that could be valorised otherwise after its initial purpose, rather than on landfill without any sorting process. Based on the responses the sewage sludge and manure should be further explored, but with less emphasises at first where the stakeholders could gain more experience about the agricultural waste streams.

Upper Austria (AT)

In total, the interest of Upper Austrian participants in the topics of nutrient recycling in the circular bioeconomy was medium, with no particular interest in one specific sub-topic. On the other hand, the interest in a training for recycling nutrients from specific biomass gained high interest from Upper Austrian stakeholders. Nutrient recycling from agricultural residues, sewage sludge and food waste were the biomasses with the highest interest, which is in coherence with the participating stakeholder groups in Upper Austria, as they are mainly from food-related industries. In addition to the proposed topics, the Upper Austrian participants show interest in calculating and understanding the mechanics of carbon footprints and life-cycle-analyses.

Knowledge-wise the participants rated their overall know-how in the specific sub-topics as low-medium, apart from "*regional availability of biomass*", with a medium-high knowledge. The University of applied sciences in Upper Austria has several courses that cover the topic of nutrient recycling pretreatment and production technologies and is therefore regarded as a key knowledge holder for this work stream.

Main hurdles for the efficient recycling of nutrients from biomass in Upper Austria were identified. The hurdles with the highest rated relevance in Upper Austria are:

- Availability of suitable biomass (side) streams
- Lack of businesses interested in developing nutrient recycling methods
- Availability of a suitable pretreatment for the biomass

Community of Practice (CoP)

The participants of the project CoP showed medium-high interest in the topic of improved nutrient recycling. Nutrient recycling pretreatment and production technologies had the highest rating in interest with a similar high rating in knowledge. Overall, the CoP can contribute meaningfully with their best practice examples as well as the experiences from their own organisations. The CoP from the Netherlands (NL) and from Zealand (DK) have particular knowledge that the project regions would benefit from. In exchange, can the CoP join the capacity-building activities of the regions and learn from the regional experiences.

3.3.3 Work stream 2: Integrating primary producers into bio-based value chains: challenges, opportunities, and effective mobilisation strategies.

In the bioeconomy, primary producers are often left behind in the value chain, despite being the foundation for successful production of bio-based products and processes. This is due to a lack of information and education on relevant topics, as well as a lack of consistent networking and sharing of best practices. The integration of primary producers is crucial for the success of the bioeconomy, and addressing these issues is necessary to ensure their participation and success in the value chain. With the SCALE-UP training programme, solutions to tackle these issues shall be worked on. The sub-topics of work stream 2 (overview in table 6) include topics related to integrating primary producers into bio-based value chains.

Table 6: Cross-regional rating of the know-how and interest in the sub-topics of work stream 2 “Integrating primary producers into bio-based value chains” on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 2	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Networks, Associations, Clusters	6	10	27	25	13	3	8	16	26	26
Legislation, Regulation, Funding schemes	13	20	24	12	11	3	6	12	31	25
Markets and business models for bio-based value chains	4	28	25	15	9	1	7	17	22	33
New forms of farming in agriculture and forestry	10	17	24	15	13	4	4	19	25	28
Ecological load limits of biomass production	10	18	21	16	14	4	7	19	16	31

Overall, the integration of primary producers into bio-based value chains is relevant in all regions, represented in the high interest in all the given sub-topics. The average number of participants that rated the sub-topics of work stream 2 with very high (5) is 28.6 participants. This is the second highest interest in a work stream after work stream 4 (Efficient regional infrastructure and biomass logistics).

The sub-topic with the highest interest rating is “*Markets and business models for bio-based value chains*”, in which four of the six SCALE-UP regions and most of the CoP regard it as highly relevant. In order to cover the needs of the participants to increase knowledge in regard to *markets and business models*, a cross-regional session including presentations on business development and market analyses methods as well as regional breakout-sessions would cover the information flow on one hand and also gives the participant the opportunity to transfer the gained knowledge into a practical example and ask questions that are relevant for their individual biomass/value chain. Furthermore, the results of these breakout sessions can be transferred to other work streams, as the topic of bio-based business models is covered in the context of other trainings as well. Regions with knowledge holders in this topic are **Andalusia (ES)**, **Upper Austria (AT)** and one of the **CoP**. A knowledge transfer in this sub-topic will be highly beneficial to all regions, as the overall existing knowledge is comparably low.

Another topic that garnered high interest is “*Networks, Associations, Clusters*”, which was specifically mentioned by four regions. In contrast to “*Markets, Associations, Clusters*” the existing knowledge in this field is medium-high throughout all regions. Since networks, associations and also clusters are usually region-specific, trainings in regional breakout sessions will have the highest output. In addition to the interest/knowledge rating, the survey participants were asked to list different networking groups and communication centres for primary producers. These lists will be incorporated in the regional information packages as well as in the regional breakout sessions of the training programme.

Similar to other work streams, the sub-topic of “*legislation, regulation and funding schemes*” is also rated with high interest. Considering that legislations, regulations, and funding schemes are usually individual in each region, a cross-regional approach would make sense if EU-policies are covered by a key-note speaker or if experiences on how regulatory challenges were overcome are shared.

In case of funding schemes, one **Upper Austrian** participant stated that they have knowledge in “*Funding and support*” and could be a knowledge holder for the knowledge exchange.

The sub-topics “*New forms of farming in agriculture and forestry*” and “*Ecological load limits of biomass production*” both had high rates of interest in all regions and medium knowledge. With best practice examples of new forms of farming, the needs of the participants could be covered. For “*ecological load limits*” presentations from stakeholders from academia or research regarding scientific information of different biomasses and subsequent regional discussions about opportunities how those limits can be pushed would cover different needs of all participants. There were several key knowledge holders identified in different regions, in which participants in **Andalusia (ES)** have high knowledge regarding “*Ecological load limits*”.

One topic that was mentioned by a Polish participant as particular interesting in context of integrating primary producers are principles of circular economy in agriculture.

Besides the given topics, French participants have further knowledge in following topics:

- awareness-raising on the use of bio-based materials
- how to achieve contractualisation between producers and processing/downstream actors
- how to integrate primary producers in the creation of new markets
- economic approach of the issues and impacts of bio-based solutions at farm level

Since a large part of the **French participants** are working in a field in direct contact with primary producers, the stakeholders identify as potential key knowledge holders. In addition, aforementioned topics can be integrated in the trainings of the sub-topics of work stream 2 (table 6).

Cross-regional rating of identified hurdles of integrating primary producers into bio-based value chains

In addition to the knowledge/interest rating, the stakeholders were asked to rate different challenges of integrating primary producers on a scale from 1-5, in which 5 counts as a big hurdle. The cross-regional rating is shown in table 7. The individual ratings of each region are included in the regional information packages provided in the SCALE-UP project activities.

Table 7: Cross-regional rating of the hurdles of integrating primary producers into bio-based value chains on a scale of 1-5.

Challenges of integrating primary producers	1	2	3	4	5
Lack of awareness towards bio-based solutions for primary producers	6	4	26	28	20
Not enough coordination between primary producers	3	11	23	22	23
Primary producers are not interested in bio-based solutions	7	17	28	17	10
Lack of enabling framework	2	3	26	28	15

Concluding from the cross-regional evaluation of identified hurdles, the participants rated the *lack of awareness towards bio-based solutions for primary producers* as well as the *lack of coordination between primary producers* as high hurdles. Additionally, the *lack of an enabling framework* received a comparably high rating as well. In order to find solutions to the identified hurdles, the training programme includes a section in which the participants discuss existing networking groups/communication centres for primary producers in their region as well as potential methods on how to implement such communication structures in their regions. Within the questionnaire, examples of already existing stakeholder groups and communication centres were asked and will be included as a best practice list for each region in the training sessions of work stream 2 as well as in the regional information packages.

Individual rating of interests and knowledge in work stream 2 of each SCALE-UP region and identification of region-specific challenges of integrating primary producers

The following sections include the major outcomes of each regional knowledge/interest ratings. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the community of practice for work stream 2 is provided at the end of the section.

Andalusia (ES)

For work stream 2 “Integrating primary producers into bio-based value chains: challenges, opportunities and effective mobilisation strategies” in Andalusia, all the topics presented are interesting for the Andalusian participants, however, the most important ones are: Networks, Partnerships, Clusters and Markets and business models for bio-based value chains; with a very high level of interest.

In terms of know-how, participants mainly present knowledge on *Networks, Partnerships, Clusters* and, more generally, on *Ecological Load Limits of biomass production*.

From the evaluation, following needs were detected in the issues raised:

- Legislation, Regulation, Financing schemes as it presents, in general, a high level of interest and the knowledge is intermediate-low among the participants.
- Markets and business models for bio-based value chains, which presents the highest percentage of interest among Andalusian participants and knowledge is intermediate.

French Atlantic Arc (FR)

In Work stream 2, participants shown training needs mainly on the sub-themes “Legislation” and “Markets and business models”. Although two third of the participants consider themselves rather knowledgeable in the other sub-themes, a large majority of participants indicated a strong interest in all proposed topics. Other topics suggested by some of the participants were “Biomass transformation process” and “Creation of value chains including primary actors/processors in connection with investors and users”.

French stakeholders could contribute with their knowledge on awareness-raising on the use of bio-based materials (in the building sector); how to achieve contractualisation between producers and processing/downstream actors; how to integrate primary producers in the creation of new markets; and on the economic approach of the issues and impacts of bio-based solutions at farm level.

Mazovia (PL)

Highest interest:

- New forms of farming in agriculture and forestry
- Networks, Associations, Clusters

Highest knowledge:

- Networks, Associations, Clusters
- New forms of farming in agriculture and forestry

Additional topics:

- KNOW-HOW: advanced material and Industry 4.0 in agriculture
- INTEREST: Circular Economy in agriculture

Northern Sweden (SE)

Bioeconomy is very well developed in Northern Sweden and primary producers (forest owners) are already very well organised and integrated into the bio-based value chains. Stakeholders in the region have good know-how of networking and cluster activities and also show interest to further develop these skills. Furthermore, the stakeholders express a high interest to learn more about legislation, regulation, and financing schemes and one representative of an association for primary producer has commented that “politicians and society need to stand up for the bioeconomy and its future potential, not just put more restrictions”. Another hurdle for involving primary producers pointed out is, that “the support schemes that we work with the most do not allow cooperation with primary producers”. Besides finding ways on how to deal with aforementioned hurdles, there is also a growing interest in new forms of farming and forestry in Northern Sweden.

Strumica (MK)

The greatest know-how that the stakeholders expressed is in the networks and association pillar, and in the legislation and regulation, which is foreseeable as many of the respondents are part of regional governments. On the needs side, the highest responses are equally distributed throughout all suggested pillars, with a preference of the new forms of farming in agriculture and forestry.

Upper Austria (AT)

The stakeholders of Upper Austria showed high interest in *Networks, Associations and Clusters* for primary producers, which *markets and business models for bio-based value chains* are accessible for the primary producers as well as the *ecological load limits of biomass production*. *New forms of farming in agriculture* as well as “*Legislation, Regulation and Funding schemes*” were rated as interesting as well but with less votes as aforementioned topics.

The interests also coincide with the knowledge, since the stakeholders showed high knowledge in networks, associations, and clusters as well. In general, the survey participants of Upper Austria rated their knowledge on the other sub-themes of work stream 2 as medium to low. In addition to the given topics, participants from the stakeholder group “Academia, Research and Education” stated that they have knowledge in the topics “*Funding and support*” as well as “*co-design of process chains of different actors in a value network*”. Both topics are of high interest in other regions and a knowledge exchange of the respective stakeholders within the training programme session of work stream 2 (e.g., in an online world café) is beneficial to all participants. In accordance with other interests in other work streams, an additional interest of Upper Austria stakeholders in work stream 2 was stated in information on “*EU and national funding programmes*”.

Community of Practice (CoP)

The interests of the participants of the CoP coincide with the ones from the project regions, in which the topic of “*Markets and business models for bio-based value chains*” as well as “*Legislation, Regulation and Funding schemes*” has the highest rating of interest. Throughout the CoP, the know-how on the sub-topics is medium, except for “*Markets and business models for bio-based value chains*”, which had a higher knowledge rating. With their contribution to the aforementioned sub-theme and the training programme, for instance with a key-note presentation or participation in cross-regional workshop activities, the needs and interests of the CoP as well as the regions could be met.

3.3.4 Work stream 3: Digitalisation in the bioeconomy: potentials for rural actors

As a present and future tool for complementing ground truth data, digital solutions - including information and communication technologies (ICT), deep-tech and Industry 4.0 solution - may drive and speed up the development of bioeconomy, especially in the field of transformation of waste streams, residues and biomass into valuable resources, materials, and energy. Although they offer new growth paths, still, many private, public, and non-governmental entities find it difficult to keep up with rapid digital development, knowing which technologies to invest in and how to adopt and deploy them. Real-time monitoring stations, sensors, Internet of Things (IoT), smart grids, GPS tracking systems, and blockchain are only some examples of solutions that can be helpful in rural zones to manage operations in a more efficient way, to reduce costs, to improve products and/or services or to strengthen the quality and efficiency of the circularity of resources.

The trainings in work stream 3 “Digitalisation in the bioeconomy: potentials for rural actors” will include several methods to train the participants on how to get the most out of digitalisation investments and which options there are for bio-based solutions. Table 8 gives an overview of the cross-regional interest and knowledge rating of the sub-topics of work stream 3.

Table 8: Cross-regional rating of the know-how and interest in the sub-topics of work stream 3 “Digitalisation in the bioeconomy” on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 3	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Deep-tech (AI, Biotechnology, ...)	29	22	13	5	4	4	8	19	18	25
Unmanned aerial vehicles	26	21	17	2	4	8	12	17	16	18
Space technologies	32	16	11	5	3	15	6	14	19	14
Robotics and automatization	26	17	19	7	3	9	6	14	21	22
Internet of things (IoT) and sensors	20	17	23	5	3	4	7	14	23	19
Additive technologies (3D printing) and advanced materials	24	13	17	1	6	8	8	10	17	19
Virtual reality, Augmented reality, Extended reality, metaverse	28	17	12	3	3	9	9	13	17	18
Digital teams and remote communication	5	14	16	24	11	12	12	15	8	20
Digital collaboration	18	17	14	8	4	8	9	11	20	15
Social Media	4	10	27	20	7	13	13	14	10	16
Internet security & data protection in bio-based systems	18	17	19	9	4	6	9	12	17	24

In general, the interest in *Digitalisation in the bioeconomy* is lower compared to other work streams. Nonetheless, the interest in the sub-topics, especially in contrast to the existing knowledge is still high. “Space technologies, Internet of Things (IoT) and Digital collaboration were rated with a little less interest than the other sub-topics.

Following sub-topics were rated as the most interesting ones for mostly all regions:

- Internet of things
- Parts of deep-tech
- Internet Security & data protection in bio-based systems

In order to provide capacity-building activities with higher quality, the training sessions for work stream will focus on aforementioned topics with invitations of targeted experts in these fields. Through this, the knowledge can be built more in depth and the participants might have a better understanding for digitalisation.

The topics in regard to digitalisation are very diverse in their application, which is why either a clustering of topics or a selection of prominent topics would be more feasible and meaningful for the outcomes of the training programme. Since the know-how within the regions is rather low, the approach of the training is to focus especially on cross-regional approaches with presentations and Q&A sessions with key knowledge holders. In this way, the participants can focus on obtaining knowledge, rather than applying it in regional breakout sessions. In terms of existing know-how, the region with the highest number of potential key knowledge holders is **Mazovia (PL)**.

Cross-regional rating of identified hurdles of digitalisation in the bioeconomy

In addition to the knowledge/interest rating in table 8, the participants were asked to select the biggest hurdles of implementing and improving digitalisation in the bioeconomy roll-out. The identification of these hurdles shall help to identify further needs of the regions that shall be met in the training programme. The individual ratings of each region are included in the respective regional information packages. Table 9 shows the identified hurdles and the number how often the barrier was selected. The participants could choose more than one hurdle as relevant.

Table 9: Identification of the biggest hurdles of digitalisation in the bioeconomy.

Biggest hurdles of digitalisation in bioeconomy	Σ selected
Missing infrastructure (e.g., internet network)	38
Unwillingness to implement new solutions	42
Rentability of digital solutions	25
Lack of skilled personnel	39
Unclear regulations for data safety/privacy/...	20
Difficulties finding right technology suppliers	25
Fear of loss of control over information	32
Technological language too difficult	37
Lack of common ground for exchange between ICT and bio-based industry	29

The cross-regional evaluation of the hurdles of digitalisation in the bioeconomy (Table 9) shows, that the biggest hurdle of digitalisation in the bioeconomy is an *unwillingness of actors in bio-based value chains to implement new solutions*. Furthermore, the *lack of skilled personnel* to work with and on digital solutions as well as the *lack of the overall infrastructure* was selected as great challenges as well. The challenge of finding and educating personnel in the regard of digitalisation goes hand in hand with the identified barrier, that the *language used is too difficult*. Within the SCALE-UP training programme a session might include a presentation about financing options for digital solutions, as it could help with implementing the needed infrastructure on the one hand and might counteract the unwillingness to implement such solutions with providing profitable examples on the other.

Individual rating of interests and knowledge in work stream 3 of each SCALE-UP region and identification of region-specific hurdles of digitalisation in the bioeconomy

The following sections include the major outcomes of each regional knowledge/interest rating for work stream 3. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the Community of Practice for work stream 3 is provided at the end of the section.

Andalusia (ES)

In the case of work stream 4 “Digitalisation in the bioeconomy: potentials for rural actors” in the Andalusia region, interest in the topics is very polarised. In general terms, it could be said that companies related to the agricultural sector of the value chain and some of the participants related to academia, research, education are the least interested in most of the topics (they have 33% of the votes with a score of 1 out of 5), however one of these participants has proposed a topic that would be of interest to them “automation of industrial processes, temperature control, humidity... etc.”. On the other hand, Spanish public administration and SMEs/Start-Ups are interested in the proposed topics, mainly the following ones: Deep-tech (AI, Biotechnology, ...) or Internet of things (IoT) and sensor.

About the know-how of the Andalusian regional participants, all of them represent a low level of knowledge for this topic. Most of the votes are below 3 on a scale of 5, moreover, for the topic “Virtual reality, Augmented reality, Extended reality, metaverse” the knowledge is very low (44% of votes 1/5). The biggest barriers to digitisation in the bioeconomy are “lack of skilled personnel” and “Difficulties finding right technology suppliers”, with 5 votes each.

French Atlantic Arc (FR)

Whereas the participating stakeholder’s selves-evaluated their knowledge quite poorly on the diverse sub-themes of the Work stream 4, compared to the other work streams, the digitalisation topic seems to attract less the stakeholders, has the number of replies and the average interest in lower. The highest rates were given to the sub-themes “Digital teams” and “Digital collaboration”.

Regarding the hurdles, stakeholders highlighted particularly the missing infrastructure, the unwillingness to implement new solutions and the difficulty of the technical language. One participant pointed at that mere access to the internet was a hurdle in itself in rural and remote areas, which could explain why the stakeholders seem less enthusiastic about this topic. Some stakeholders raised the environmental cost of the development of digital solutions and suggested that a “low-tech” approach would better suit rural and remote areas context.

Mazovia (PL)

Interest:

- Internet of things (IoT) and sensors
- Internet security & data protection in bio-based systems

Know-How:

- Robotics and automatization
- Digital teams and remote communication
- Social Media
- Internet security & data protection in bio-based systems

Hurdles:

- The most often hurdle chosen by respondents was “Technological language too difficult”, the following two: “Fear of loss of control over information” and “Lack of skilled personnel”.
- The least popular answer were “Unclear regulations for data safety/privacy/” and “Difficulties finding right technology suppliers”.

Northern Sweden (SE)

Digitalization is well developed within the forest bioeconomy. The stakeholders have declared an interest in deep-tech, robotics and automatization, and Internet of things. Furthermore, the topics of Internet Security & Data Protection in bio-based systems is also of interest. Some best practice examples that can be shared from the Northern Sweden region in digitalisation include the National Forestry Survey, the project “Smart Twins for Forest Environment” from Visual Sweden and the IoT laboratory at Linnaeus University.

Strumica (MK)

Digitalisation in the bioeconomy is a hot topic that intersects with various domains; thus it assists in mass popularization and promotion of bioeconomy and bio-based products. Although most of the stakeholders rated their current knowledge with rate from 1 to 3, still they are eager to improve their digital skill and modernize their habits, or just simplify their work.

Additionally, the questionnaire helped in identification of five biggest barriers that restrict the enhanced digitalization of the bioeconomy in Strumica:

- Unwillingness to implement new solutions,
- Lack of skilled personnel,
- Missing infrastructure (e.g., internet network),
- Lack of common ground for exchange between ICT and bio-based industry,
- Technological language is too difficult.

Upper Austria (AT)

Similar to other regions, the interest in digitalisation topics of Upper Austrian participants was comparably low, also the self-evaluation of the know-how. Selected stakeholders in Upper Austria showed interest in “Deep-Tech (AI, Biotechnology, ...), Robotics and automatization, Internet of things (IoT) and sensors as well as Internet security & data protection in bio-based systems. One participant commented that the field of deep-tech is very broad and that it would need more clarification for the training programme which branch of deep-tech will be included. This also determines the know-how with which the stakeholders can contribute, since knowledge on AI is existent but not for instance on quantum mechanics used for specific electronics. In terms of knowledge other stakeholders rated their knowledge as medium-high in Additive technologies (3D printing) and advanced materials. Digital teams and remote communication as well as use of social media.

In the survey, the participants were asked to rate some hurdles of digitalisation in the bioeconomy with relevance to their region. In Upper Austria following hurdles were rated as particular relevant:

- Difficulties in finding right technology suppliers
- Fear of loss of control over information
- Rentability of digital solutions

Additionally, the participants mentioned “a similar understanding of what digitalisation is along the value chain, as stakeholder groups have different views on what digitalisation is. Example: for some it is digitalisation if they can use an online form instead of a printed one, for others digitalisation means the communication of a drone with a tractor”. Furthermore, a lack of IT skills for employees was also identified as a hurdle.

Community of Practice (CoP)

In comparison to the regions, the CoP rated their knowledge in the sub-topics of work stream 3 mainly as medium with a few topics rated as medium-high. However, the interest of the CoP in these topics is not as high as the regions. The sub-topic with the highest interest rate is “Space technology”, with a rating medium-high interest from three CoP representatives.

3.3.5 Work stream 4: Efficient regional infrastructures and biomass logistics

To be sustainable, bioeconomy needs to apply the principles of the circular economy, by extending the life cycle of the biomass resources and promoting a cascading use of these resources. Bioeconomy also aims at contributing to the neutral carbon emission goals by substituting for fossil-based materials and energy, and by re-localising value chains in the regions. Therefore, sustainable bioeconomy systems strongly depend on efficient regional infrastructures and biomass logistics, which are still lacking to fully achieve bioeconomy potential. The following barriers are identified:

- lack of interconnection between actors in the value chain to optimise biomass streams, enhance recycling, mutualise infrastructures, transport and energy
- lack of locally available infrastructures to process biomass (biorefinery, ...)
- lack of knowledge on available solutions (example “low-tech” solutions in the context of rural areas), best practices and cooperation models that support efficient biomass management
- lack of awareness of available funding and incentive schemes

The SCALE-UP training programme shall help the actors of bio-based value chains within the project regions to tackle aforementioned barriers. Table 10 gives an overview of the sub-topics of work stream 4 that the participants should rate their knowledge and interest in and which are the basis of the training programme contents.

Table 10: Cross-regional rating of the know-how and interest in the sub-topics of work stream 4 “Efficient regional infrastructures and biomass logistics” on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 4	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Green transport and machinery	14	27	25	9	9	6	11	14	25	28
Digital solutions for supply chain management	18	17	24	13	6	7	6	11	19	32
Rural area development	17	19	22	15	9	5	9	15	22	26
Ecological assessment of logistical process/supply chains	11	19	32	10	6	4	6	16	19	34
Sustainable and resilient value chains	12	21	22	15	5	5	2	14	25	28
Green transport and machinery	14	27	25	9	9	6	11	14	25	28

In general, all SCALE-UP regions showed high interest in the sub-topics of work stream 4. It is the work stream with the highest number of participants that rated their interest with 5 with an average of 29.6 participants. “Ecological assessment of logistical supply chain” has the highest number of interested stakeholders, followed by “Digital solutions for supply chain management”. While the interest in infrastructures and logistics is present in all regions, digital solutions are particularly interesting for Upper Austrian and Polish stakeholders as well as the participants from the SCALE-UP Community of Practice (CoP). In Andalusia and France, the topic of “rural area development” is relevant as well as for French stakeholders, taken from the context of the questions raised by the French participants. Upper Austrian participants showed high interest in rural area development as well and some participants stated medium-high knowledge in this field. Mazovian stakeholders also evaluated their knowledge in rural area development as comparably high. In addition, their region as well as a majority of the CoP are highly interested in the topic of “sustainable and resilient value chains”. For this topic, the knowledge is intermediate throughout all regions, similar to the topic of “Green transport and machinery”, which is important to stakeholders from Northern Sweden and Strumica in North-Macedonia.

A cross-regional discussion to enhance knowledge exchange in the sub-topics above would be highly beneficial for all regions, as each region could contribute their experiences and knowledge to a sub-topic which is of high interest to other regions. A joint discussion of individual regions could also meet the needs of the individual participants. For a cross-regional topic “Ecological assessment of logistical supply chains” is highly recommendable, as all the regions have a high interest in it and intermediate to low knowledge. An open panel discussion with best practice examples and open question rounds could stimulate the regions to exchange experiences and learn from each other.

In total there were 18 key knowledge holders identified, that stated that they would share their experiences and knowledge in different topics of efficient infrastructure and biomass logistics. The region with the highest number of key knowledge holders is **Strumica (MK)** with 9 potential presenters. The **North Atlantic Arc (FR)** also identified 4 key knowledge holders who could contribute to the training programme and knowledge exchange. Additionally, five of six of the CoP-members could contribute with their individual knowledge as well as best practice examples from all over Europe to this work stream and the training programme, especially in the aforementioned fields of interest. The regions would highly benefit from their input to deepen their knowledge in the field of efficient infrastructure and biomass logistics.

Individual rating of interests and knowledge in work stream 4 of each SCALE-UP region

The following sections include the major outcomes of each regional knowledge/interest rating for work stream 4. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the Community of Practice for work stream 4 is provided at the end of the section.

Andalusia (ES)

In the regional analysis for work stream 4 “Efficient regional infrastructures and biomass logistics”, participants from Andalusia have shown interest mainly in the following topics: “*Ecological assessment of logistical process/supply chains*” and “*Rural area development*”.

In terms of know-how, participants present mainly intermediate knowledge on “*Digital solutions for supply chain management*” and “*Ecological assessment of logistical process/supply chains*”, but in general, knowledge is low on most topics, especially for academics or research.

French Atlantic Arc (FR)

The participating stakeholders self-evaluated their knowledge quite poorly on the diverse sub-themes of the Work stream 4 and shown a strong interest in the various subthemes (except for the digital solutions which had a lower score).

The issue of the scale is particularly important for the stakeholder in the bio-based building value chain: indeed, many bio-based solutions do exist, but the question is how to “scale-them up”. Faced with the multiplicity of initiatives carried out by small-scale actors, and the bio-based innovations available locally in the territories, the question of the massification of these solutions, the increase in the supply available in the territories and a more systematic use of bio-based materials in the new constructions and renovations of tomorrow remains.

One participant asked: how can dispersed productions be grouped together on a territory for effective and efficient logistics in rural areas? Which leads to the training need expressed by another stakeholder: how to make territorial networking, how to succeed in multiplying initiatives that work to network the territory on the right scale and succeed in proposing locally available solutions?

The stakeholders could contribute with their knowledge on this work stream by presenting good practices on how to organise logistics at small scales around hemp (local, short-circuits : i.e. Chanvre Mellois) ; how to organise collection of biowaste at a larger scale (regional) ; by presenting the pros and cons of the different methods for biomass transport (look at dry and compact solutions or look at what is the easiest to produce for the farmer...).

Mazovia (PL)

The highest interest may be noticed in trainings on:

- Sustainable and resilient value chains
- Digital solutions for supply chain management

Know-How:

- Highest in Rural area development
- Knowledge in general medium to low

Northern Sweden (SE)

There is a high knowledge and interest in green transports and machinery in the region. An individual interest that has been stated is in how to mobilise forestry biomass that is not utilised. Some additional knowledge that comes from first-hand experience of the Swedish project partners is the EU-policy regarding biomass use and potential ways on how to overcome challenges with legislation.

Strumica (MK)

Efficient regional infrastructure and biomass logistics is a work stream where most of the stakeholders gave middle rates for all pillars in the know-how. Hence, they are willing to broaden their knowledge and keep up with the state-of-the-art topics related to regional infrastructure and biomass logistics as that is vital for successful biomass exchange between the primary producers on one hand, and processing industries, end-users, or any relevant stakeholders on the other hand. The highest interest in this work stream was shown in “*Green transport and machinery*”.

Upper Austria (AT)

The high interest in logistics shows the relevance for the stakeholder groups that are represented in this work stream, since the majority is from SME/large-scale companies, a supermarket chain as well as food technology related research.

Additional topics that were rated with high interest are digital solutions for supply chain management as well as the ecological assessment of logistical process/supply chains. Furthermore, a participant stated additional interest in rural area development. A combination of digital solutions, supply chains and rural area development in the regional breakout sessions would be highly interesting and beneficial for Upper Austrian stakeholders.

In terms of the existing knowledge, Upper Austrian stakeholders have good knowledge in rural area development and medium knowledge in green transport and machinery as well as ecological assessment of logistical process/supply chains.

Community of Practice (CoP)

The Community of Practice (CoP) showed, similar to the project regions a high interest in the ecological assessment of logistical process/supply chains. Additionally, digital solutions and sustainable and resilient value chains were considered as relevant. The CoP can contribute to the trainings with their knowledge in the ecological assessment as well as in rural area development.

3.3.6 Work stream 5: Developing and implementing practices of “social innovations” in the context of rural bioeconomies.

In order to replace fossil resources with biogenic materials and produce in a synergistic way energy, food and bio-based solutions, there is a need to rethink and "do things differently" on a large scale. There is a growing awareness in large parts of society that our "imperial way of life" is not compatible with sustainable and peaceful coexistence in the long run. However, a truly profound structural change towards a sustainable society will only succeed through the interplay of courageous "top-down decisions" and social "bottom-up developments".

With the help of social innovations, we must collectively change and further develop economic processes, build new governance models, consumption patterns, value systems and lifestyles. The challenge is twofold: social innovations for the bioeconomy transition must first be developed, and second, they need the acceptance of the population to be implemented. Social innovations are often community-driven, depending on regional contexts. Individual initiatives, SMEs and innovative communities can take on a pioneering role with potential solutions for society at large.

The sub-topics of work stream 5 “Developing and implementing practices of ‘social innovations’ in the context of rural bioeconomies” in table 11 cover different aspects of developing and implementing social innovations. The participants of the needs analysis survey evaluated their interest and knowledge in said sub-topics to meet their needs on one hand and to facilitate knowledge exchange on the other.

Table 11: Cross-regional rating of the know-how and interest in the sub-topics of work stream 5 “Developing and implementing practices of ‘social innovations’ in the context of rural bioeconomies “ on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 5	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Policies in context of social innovation	16	16	22	12	5	6	10	20	19	23
Waste and energy management systems	12	18	23	17	4	2	9	17	20	23
Social innovations for water supply strategies & urban farming	16	25	12	14	4	1	7	21	23	19
Sustainable business models	12	18	23	15	5	2	6	12	29	22
Food sharing platforms	8	22	20	14	5	2	9	14	16	28
Social Farming	17	21	19	11	3	5	7	17	23	18
Eco-Villages	18	23	18	6	3	6	9	14	19	19

The topic of social innovations compared to other work streams had a lower average number of participants with high interest rating (Average = 21.7 participants). Nonetheless, the sub-topics themselves again have a high rating of interest with medium-low rating of knowledge. Particularly the participants from the French Atlantic Arc (FR) and Strumica (MK) have high interest in ‘social innovations’. All regions have identified at least two or more key knowledge holders that can facilitate the knowledge exchange.

The sub-topics with the highest rating of interest are “*Food sharing platforms*” as well as sustainable business models. For the latter, four of the six SCALE-UP regions, have prioritised this topic to other sub-topics. For both aforementioned topics **Mazovia (PL)** and **Upper Austria (AT)** have rated their knowledge in said topics as comparably high. Furthermore, a few of the **Community of Practice (CoP)** have stated a medium-high knowledge in food sharing platforms and can contribute to the trainings with best practice examples.

In order to increase the knowledge about *food sharing platforms*, best practice presentations with a subsequent Q&A session will have the highest benefit. Depending on if the participants would like to know about already existing platforms in their regions or get ideas which platforms other countries are using and could be implemented in their area, the presentations could be either held in regional breakout sessions or within the whole plenum. As for the capacity-building activities for *sustainable business models*, regional breakout sessions with active workshops with business model development methods and subsequent plenum-discussions regarding potential benefits and risks of the models are a way to increase the knowledge of the participants sustainably. Additionally, the breakout sessions for the sustainable business models could be combined in a bottom-up approach with other trainings since it is featured in other work streams. Additionally, the experiences from the applicants of the Call of Interest conducted in the other project activities can top off the capacity-building activities in this sub-topic.

Other sub-topics in the context of 'social innovations' that have a high interest rating are "eco-villages" and "social farming". Especially French, Macedonian, and Polish participants gave a high rating in interest in contrast to low knowledge. There is no region that has stated high knowledge in either of these topics, therefore live presentations that cover different aspects of the topic as well as some selected best practice examples is a good start to familiarise the participants with the matter. By including an open plenum Q&A session with selected experts, individual needs can be covered, and the knowledge exchange facilitated.

For other sub-topics, regional breakout sessions are recommended, as the interest of the regions for said topics is varying. While Upper Austrian and Spanish participants show high interest as well as medium knowledge in *waste and energy management systems*, French and Macedonian participants rate *social innovations for water supply strategies & urban farming* as particularly relevant. Andalusia (ES) stated medium-high knowledge in the latter sub-topic. Therefore, a cross-regional capacity-building activity by pairing the individual regions might have the highest benefit to the individual participants. For *Policies in context of social innovation* Andalusian participants as well as a few of the CoP have high interest in this. Since regional policies are too individual for a plenum discussion, a possibility to meet the interest of the Andalusian participants and the CoP, is to include a presentation on general EU-policies from a key-note speaker.

In addition to the given sub-topics, participants from the French Atlantic Arc (FR) stated a need in the training on how to support changing behaviour and production methods, how to (financially) implement the social innovations – especially when current habits are often less expensive. With an awareness building workshop for all regions, where participants can identify their hurdles and other regions deliver solutions, the needs can be met. In order to determine if those topics are relevant to the other regions as well, the topic can be introduced in the first training session and the interest of the participants evaluated. If the interest is high, the capacity-building of these topics can be included in the subsequent training sessions.

Individual rating of interests and knowledge in work stream 5 of each SCALE-UP region

The following sections include the major outcomes of each regional knowledge/interest rating for work stream 5. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the Community of Practice for work stream 5 is provided at the end of the section.

Andalusia (ES)

In the regional analysis of work stream 6 "Developing and implementing practices of "social innovations" in the context of rural bioeconomies" in Andalusia, all participants are very interested in several topics, among them the following could be highlighted: "Waste and energy management systems" (all votes are between a high and very high classification, 4/5 and 5/5) and "Sustainable business models", (67% of the participants' votes represent a high and very high ranking, 4/5 and 5/5 of the total Andalusian regional participants).

About the know-how of the Andalusian participants, they have a high knowledge in "Waste and energy management systems", "Policies in context of social innovation" and "Social innovations for water supply strategies & urban farming".

The know-how of companies related to the agricultural sector of the value chain is lower than that of the other participants. It is worth noting the generally low knowledge of participants on “Food sharing platforms” and “Eco-Villages”.

French Atlantic Arc (FR)

Important knowledge gaps appear on the sub-themes “*Social innovations for water supply strategies & urban farming*” and “*Eco-villages*”, and the interest of the participating stakeholders is high in all the proposed sub-themes, the “*Social farming*” sub-theme getting the highest rate. Additional training needs have been raised by some of the participants on the topic of behaviour change: support in changing behaviour and production methods; how people can implement (financially) these innovations compared to their current habits (often less expensive).

Mazovia (PL)

Interest:

- Sustainable business models
- Food sharing platforms
- Eco-Villages

Know-How:

- Waste and energy management systems
- Sustainable business models
- Food sharing platforms

Northern Sweden (SE)

Stakeholders have low know-how and show low interest in this topic.

Strumica (MK)

The situation is similar as for the rest of the sub-sectors, where most the stakeholders do not have the highest know-how on the social innovation issues, yet they are particularly interested in the eco-villages, food sharing platform and sustainable business models.

Upper Austria (AT)

The overall interest of Upper Austrian survey participants in social innovations in rural bioeconomies medium compared to other work streams. The highest interest was shown in the sub-topic of “*Waste and energy management systems*” as well as in “*Sustainable business models*”. Additionally, “*Social Farming*” is a topic which is also relevant to most of the participants. “*Social innovations for water supply strategies & urban farming*” was also rated with comparably high interest, especially compared to the low know-how self-evaluation. A cross-regional capacity-building activity on this topic might be the most beneficial to Upper Austrian stakeholders, also because Austria in general experienced high-temperature summers and the beginning of water shortages in some areas.

Know-how is mainly existent in *food sharing platforms*, which makes sense since most of the survey participants of Upper Austria have a background in food-related fields. In addition, the participants could contribute with their knowledge in regards to *sustainable business models* and partly in *waste and energy management systems*. The least know-how was evaluated for “*Eco-villages*”, but since the interest shown in this sub-topic is also rather low it might not be a relevant topic in Upper Austria.

Community of Practice (CoP)

The Community of Practice show medium interest in work stream 6 “practices of social innovation in rural bioeconomies”, except for the topics of “*Sustainable business models*” and “*Policies in context of social innovation*” with a medium-high interest rate. In accordance, the rating of the know-how of the CoP in these matters was medium-low, except for “Food sharing platforms”, which was rated with medium-high.

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3.3.7 Work stream 6: Effective and innovative governance of regional bio-based systems (incl. public support schemes).

The development and implementation of bio-based systems has the potential to create significant environmental, economic, and social benefits for regions, including reducing dependence on fossil fuels, decreasing greenhouse gas emissions, and creating new job opportunities in the bio-based sector. However, in many cases, regions lack the capacity to effectively govern and support the development of these systems, particularly in regard to public support schemes, which often lack innovation and fail to fully realize the potential benefits of bio-based systems.

The goal of this capacity training is to bridge this gap by providing the necessary knowledge, skills, and tools for effective and innovative governance of regional bio-based systems. This training will focus on understanding the governance challenges associated with bio-based systems, and learning best practices for addressing these challenges, including the use of innovative policy instruments and the effective management of public support schemes. By developing a pool of experts equipped with these skills, regions will be better able to promote sustainable development of bio-based systems while minimizing negative impacts and maximizing benefits. Table 12 contains an overview of the sub-topics for the trainings in work stream 6 in which the experts can share their knowledge in.

Table 12: Cross-regional rating of the know-how and interest in the sub-topics of work stream 6 “Effective and innovative governance of regional bio-based systems“ on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 6	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Participatory governance methods	15	20	18	11	7	7	13	17	14	21
Relevant policies and public support schemes	16	22	21	11	8	5	7	21	20	27
Communication strategies and techniques	8	17	27	13	7	1	13	20	18	21
Sustainable developments and LCA	15	17	27	13	5	2	2	16	25	30
Open innovation in bio-based systems	18	17	20	10	6	2	4	12	26	26
Market analysis and business models	16	21	19	10	8	4	7	12	18	34

Compared to other work streams covered in the training programme the governance of regional bio-based systems is of medium interest overall, with an average number of participants of participants that rated the interest with 5 out of 5 of 26.5. The cross-regional evaluation shows that a training need in the sub-topics of “*Open innovation in bio-based systems*”, “*Market analysis and business models*” as well as “*Sustainable developments and LCA*” can be found in all project regions and the project CoP. Since “*Market analysis and business models*” has the highest rated interest but a comparably low know-how, an intensive training session with cross-regional knowledge exchange and additional regional activities will have the highest benefit for all regions. Stakeholders from **Mazovia (PL)** and **Upper Austria (AT)** have experience in conducting market analyses and developing business models. In order to meet the individual needs of each region for the market analysis and business models, regional break-out sessions to jointly draft a business model or analyse the market of a region-relevant biomass are planned.

For “*open innovation in bio-based systems*”, some of the CoP regions have high experience and knowledge and could greatly support the region in the trainings, as the overall know-how of the regions is intermediate. One CoP stated experience with private investments in the bio-based economy, which is a highly relevant expertise for the capacity-building activities in “*open innovation in bio-based systems*” as well as for the “*market analysis and business models*”.

Furthermore, there are a few selected stakeholders that have medium-high knowledge in “sustainable developments and LCA”. Participants benefit from cross-regional activities as well as on a regional basis, as methods of best practice examples in sustainable developments could provide the necessary input for region-specific LCA breakout sessions. In order to ensure that the need of a training in this sub-topic is met, a targeted invitation of experts, apart from the survey participants, from all regions should be ensured. Further expertise can be brought in with the Community of Practice. With a joint approach and practical examples (e.g., open discussion round about best practices and how they tackled challenges of sustainable development), the regions can benefit from the training in this sub-topic.

Since *policies and public support schemes* are highly region-specific, a cross-regional approach would only make sense if the knowledge exchange is based on EU-level policies. For this, external experts can be targeted and invited to the training sessions. Otherwise, regional breakout-sessions with local policy makers would provide a more region- and biomass-specific information exchange with potentially outlining which steps could be taken to understand and apply the local policies. For this sub-topic a combination with “*Communication strategies and techniques*” and “*participatory governance methods*” could also prove to be fruitful for a training, as policymakers are one of the essential stakeholder groups in these topics and the training sessions provide a platform for discussions between the policymakers and other stakeholder groups.

Cross-regional rating of identified hurdles of regional bioeconomy deployment

Within the frame of the questionnaire, the participants were asked to choose the biggest barriers of the deployment of bio-based systems in their regions. Table 13 shows the identified hurdles that have been selected by all participants. It was eligible to choose more than one hurdle.

Table 13: Rating of hurdles of regional bioeconomy deployment.

Biggest hurdles of regional bioeconomy deployment	Σ selected
Finance for demo-projects	57
Collaboration with end-users	47
Lack of adequate legislation	38
Supply of feedstock of right quality	28
Lack of infrastructure for feedstock supply	35

All regions identified unanimously “*Lack of finance for demo-projects*” as the greatest hurdle. Additionally, one of the CoP regions pointed out that there is a need in a training for investors about the financial potentials of bio-based economy. This coincides with the aforementioned hurdle. With a cross-regional as well as cross-sectoral training for investors and other stakeholder groups, essential information can be shared, which is on the one side the importance and rentability of the bio-based solutions and on the other side the financial feasibility and possibilities of such solutions.

Another big barrier identified in Andalusia (ES), Northern Sweden (SE), Strumica (MK) and Upper Austria (AT) is the *lack of adequate legislation* and the respective information flow from the side of policy makers. Also here, a workshop that includes on one hand policy makers and key-note speakers that have a good understanding of legislation in bioeconomy and on the other hand applicants of those legislations to identify targeted challenges where the legislation needs improvement would be most beneficial to the participants.

Further hurdles that were identified as relevant in some regions (Andalusia, Mazovia, Strumica and the North Atlantic Arc) are *collaboration with end-users* and the *lack of infrastructure for sufficient feedstock supply*. An approach with a variety of best practice examples from other regions or the Community of Practice and concluding cross-regional exchange on how these best practice examples were implemented in the regions would help the participants to tackle those barriers.

Individual rating of interests and knowledge in work stream 6 of each SCALE-UP region and identification of hurdles of bioeconomy deployment in the region

The following sections include the major outcomes of each regional knowledge/interest rating for work stream 6. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the Community of Practice for work stream 6 is provided at the end of the section.

Andalusia (ES)

The following needs were detected in the issues raised:

- “Market analysis and business models”
- “Open innovation in bio-based systems”

These topics have a high level of interest for all participants and an intermediate level of knowledge.

As for the biggest barriers to the regional deployment of the bioeconomy, those related to collaboration (both financial for demo projects and with end users) and those related to the lack of adequate legislation have been identified.

French Atlantic Arc (FR)

Main knowledge gaps appear to be on “Participatory governance methods” and “Market analysis and business models”, and the stakeholders look very interested in the work stream, particularly on the “Relevant policies”, “Sustainable developments” and “Market analysis” sub-themes.

Among the main hurdles identified for the regional bioeconomy deployment, the lack of infrastructure for feedstock supply is the most highly rated by the stakeholders. A comment was also related to the cost of bio-based solutions that are often more expensive than conventional solutions (and so, affordable only for one part of the population).

Mazovia (PL)

High interest:

- Open innovation in bio-based systems
- Market analysis and business models

High knowledge:

- Participatory governance methods
- Market analysis and business models
- As the largest barrier for regional bioeconomy deployment participants voted “Finance for demo-projects”. The other important were problems with “Collaboration with end-users” and “Lack of infrastructure for feedstock supply”.

Northern Sweden (SE)

Policy development on an EU level connected to forest management practices and the use of biomass are of great concern and will have a huge impact on the forest bioeconomy. Emerging biorefinery technologies are dependent on policy support (political and economic). Stakeholders also show interest in Sustainable development and Open Innovation biobased systems.

Understanding that landownership and use rights in bio-based systems must be understood and respected. And that the importance of the products and services that come from bio-based systems are poorly understood by many people living in cities.

Hurdles identified in Northern Sweden:

- Lack of finance for demo projects
- Lack of adequate legislation

Strumica (MK)

There is vaguely established governance of regional bio-based systems, as the responses from the questionnaire speaks for the on-site happenings. The know-how in Strumica is lagging behind more developed countries, especially in open innovation in bio-based systems and market analysis and business models in agricultural bio-based value chains. Nonetheless, they are highly interested to widen the approaches and understanding in those pillars, as well as the participatory governance methods.

The biggest identified barriers for regional bioeconomy deployment, thus better governance in Strumica region are:

- Finance for demo-projects
- Collaboration with end-users
- Lack of adequate legislation
- Supply of feedstock of right quality

Upper Austria (AT)

Compared to other work streams, Upper Austrian participants have shown less interest in the topics of Governance of regional bio-based systems. One reason could be that a majority of the Upper Austrian participants have a background in academia, research and education and the proposed sub-themes of work stream 6 are not necessarily relevant to them. Nonetheless, the participants show higher interest in “*Sustainable developments and LCA*” compared to other sub-topics. “*Participatory governance methods*” is the sub-theme with the lowest rated interest. For the cross-regional knowledge-transfer a section for “*Open innovation in bio-based systems*” would be the most profitable, since the Upper Austrian participants have little knowledge and higher interest in this regard.

As for the self-evaluation on the know-how, Upper Austrian participants show a high variation in knowledge-rating. For the capacity-building activities, the participants can contribute with their experience in “*Communication strategies and techniques*” as well as “*Market analysis and business models*”.

In addition to the self-evaluation, the participants identified the biggest barriers that are in the way of the bioeconomy development in Upper Austria. Similar to other regions “*Finance for demo-projects*” and “*lack of adequate legislation*” were rated as the biggest challenges to overcome in Upper Austria.

Community of Practice (CoP)

The participating CoP showed very high interest in all sub-topics of regional bio-based systems. Especially, “*Sustainable developments and LCA*”, “*Open innovation in bio-based systems*” and “*Market Analysis and business models*” are particularly relevant. Most of the CoP not only show high interest in aforementioned topics but have quite high experience and knowledge as well. In addition, a CoP from Germany has experience with private investments in the bio-based economy, which could contribute greatly to the project regions interests in “*Open innovation in bio-based systems*” and “*Market analysis and business models*”. Furthermore, the German CoP stated a need in training investors about the potentials of the bio-based economy. This need coincides with the region’s highest rated barrier for the regional bio-economy deployment, that is a lack of finance for demo-projects. Additionally, to the knowledge/interest-rating, two of the CoP regions stated, that they would be willing to share their experiences and knowledge in this work stream within the frame of the training programme.

3.3.8 Work stream 7: Strategies to address social, ecological and economic trade-offs in regional bioeconomy development.

Regional bioeconomy developments are embedded in existing structures. Implementing new bioeconomy concepts regionally might lead to social, ecological and/or economic trade-offs. It is obvious that the achievement of specific bioeconomy goals must not be at the expense of other goals. Under this work stream, we want to identify related challenges in the six SCALE-UP regions and discuss how trade-offs between competing interests of different stakeholders on ecosystem management or use can be effectively addressed by local communities. Focus areas include landownership in the context of the bioeconomy, sustainable use of biomass residues, increased demand and competition for biomass inputs, food security, and environmental sustainability of regional bioeconomies. Table 14 shows the sub-topics to be covered in the training sessions of work stream 7 and the cross-regional rating of the know-how and interests of the survey participants.

Table 14: Cross-regional rating of the know-how and interest in the sub-topics of work stream 7 “Strategies to address trade-offs in regional bioeconomy development“ on a scale of 1-5 with the total number of votes from all participants.

Training topics of work stream 7	Know-How					Interest				
	1	2	3	4	5	1	2	3	4	5
Landownership in the context of bioeconomy	22	26	11	2	5	5	17	12	20	11
Competition for biomass	19	17	19	7	6	6	6	15	26	15
Food security (not enough land for food)	11	20	24	8	6	4	6	15	19	24
Ecological boundaries of regional bioeconomies	9	24	25	8	9	4	4	15	23	24
Sustainable use of biomass residues	11	19	19	11	8	4	2	16	31	24

With an average participant number with high interest of 19.6 in strategies to address social, ecological, and economic trade-offs in regional bioeconomy development, the participants showed comparably low interest in the sub-topics of work stream 7. One reason could be, that the topics are not of immediate relevance to the participants, since the represented stakeholder groups mostly do not concern themselves directly with strategic work in their daily business. Nonetheless, there are a few sub-topics that have a high interest rating and medium-low knowledge, for which a capacity-building activity would provide the highest benefit.

Both “*Food security (not enough land for food)*” (high priority of 3 out of 6 regions) and “*Ecological boundaries of regional bioeconomies*” (high priority of 4 out of 6 regions) had the highest rate of interest, followed by “*competition for biomass*”. In all of the three sub-topics the cross-regional evaluation showed that the regions have medium-low knowledge, with the highest rated knowledge coming from **Andalusia (ES)**, **Strumica (MK)**, **Mazovia (PL)** and **Upper Austria (AT)**. Additionally, for “*ecological boundaries of regional bioeconomies*”, one of the **CoP regions** can contribute with their experiences. Since competition for biomass and food security are concomitant, region/biomass specific workshops with a potential combination of those two sub-topics would have the benefit of a cross-sectoral approach. With this out-of-the-box method, new ways of tackling occurring hurdles in these topics could be derived from.

Furthermore, for *ecological boundaries of regional bioeconomies* a biomass-specific approach instead of a region-focussed one might have more value since ecological boundaries are highly biomass-dependent. With biomass-themed and cross-regional breakout sessions, the participants can learn about the boundaries of their biomass, get to know best practice examples from other countries and cover individual needs with panel discussions about pushing the ecological boundaries to get the highest exploitation rate of the biomass use. Moreover, the outcomes of the trainings from previous work streams related to biomass can provide more information for the participants and their needs.

Strategies to address the *sustainable use of biomass residues* were overall also interesting for the participants, with fewer votes than the aforementioned topics. For this sub-topic an open panel discussion on what is regarded as sustainable and what the biomass residues could be used for, seems like the best option to unite the interests of the participants. With a key-note speaker from the stakeholder group “Governments and policy makers”, barriers of biomass residue use can be addressed and discussed.

Since all regions have identified at least two key knowledge holders that can contribute with their experiences in work stream 7, biomass-themed breakout sessions could facilitate the cross-regional exchange with experts in the participant’s individual value chain and provide biomass-related best practice examples.

Individual rating of interests and knowledge in work stream 7 of each SCALE-UP region

The following sections include the major outcomes of each regional knowledge/interest rating for work stream 7. The detailed evaluation of each region will be included in the regional information packages provided in future project activities. Furthermore, a summary of the outcomes of the Community of Practice for work stream 7 is provided at the end of the section.

Andalusia (ES)

For work stream 7 “Strategies to address social, ecological and economic trade-offs in regional bioeconomy development”, the most interesting topics for Andalusian participants are “Sustainable use of biomass residues” (78% of participants have a high or very high interest) and “Ecological boundaries of regional bioeconomies” (56% of participants have a high or very high interest). The issue of food security is also of some interest to the participants.

In terms of know-how, participants are very polarised. In general, the knowledge on “Landownership in the context of bioeconomy” and “Competition for biomass” is low for all participants from the Andalusian region except for companies related to the agricultural sector of the value chain that present a more extended knowledge on “Sustainable use of biomass residues” and “Ecological boundaries of regional bioeconomies” for example.

French Atlantic Arc (FR)

Important knowledge gaps and strong stakeholder interest appear also in this work stream. The sub-topics “Competition for biomass”, “Food security” and “Ecological boundaries of regional bioeconomies” seem particularly relevant for the stakeholders.

Among hurdles mentioned by the participants, the economic issue was again raised, and a training on collaborative economy was suggested by one participant.

Stakeholders could contribute with their knowledge on circular (bio)economy and by sharing good practices around the benefits of crop rotation with different crop families (agronomic and productivity interest), among which the hemp is a good example. A stakeholder mentioned his experience in a 2-3 hectares’ collective vegetable garden on the outskirts of Nantes (La Coutelière) which is the result of a citizen’s reappropriation.

Mazovia (PL)

Interest:

- Competition for biomass
- Food security (not enough land for food)

Know-How:

- Ecological boundaries of regional bioeconomies
- Sustainable use of biomass residues

Northern Sweden (SE)

No specific trends or areas of interest can be observed from the stakeholders in the region of Northern Sweden.

Strumica (MK)

The work stream related to the strategies that are addressing social, ecological, and economic trade-offs in regional bioeconomy development might be envisaged as complex topic focusing on many cross-cutting sectors. Therefore, trainings are of high interest for the stakeholders in Strumica region with an emphasis on the sustainable use of biomass residues and ecological boundaries of regional bioeconomies.

There is rather limited, yet valuable know-how on the landownership and biomass competition on regional level, that remains to be shared during the training programmes.

Upper Austria (AT)

There is a high variance in the interest of the topics given for work stream 7 – Strategies to address social, ecological and economic trade-offs in regional bioeconomy development. There is no particular topic with very high or very low interest, but the *sustainable use of biomass residues* as well as determining *ecological boundaries of regional bioeconomies* were rated as quite interesting by most of the participants. Surprisingly, *food security* was rated with intermediate interest, even though the competition of land for biomass vs. for food/agriculture would directly influence the Upper Austrian stakeholder groups that have participated in the survey, considering that their background is mostly in food-related fields. Lastly, the *competition for biomass* in rural bioeconomies is not relevant to Upper Austrian stakeholders, as the know-how as well as the interest are rather low.

In regard to the know-how of the region, the Upper Austrian participants can contribute with a few best practice examples as well as intermediate knowledge about how to *secure food availability* as well as the *sustainable use of biomass residues*.

Community of Practice (CoP)

The sub-topics of the last work stream covered in the training programme regarding strategies to address social, ecological and economic trade-offs in regional bioeconomy development, garnered rather high interest of the participating CoP. Particularly interesting are a strategy to address “competition of biomass”, how to address the issue of not having enough land for food while using it for other biomass (Food security) as well as the sustainable use of biomass residues. These topics were also interesting to most of the other regions – the know-how rated by the CoP for those topics was medium-low. One CoP rated their knowledge in ecological boundaries of regional bioeconomies as high and also stated, that they would contribute in this regard to the training programme.

3.3.9 Preferred training methods

In order to determine which formats are the most beneficial to the stakeholders, the survey participants were asked to vote for their preferred way of participating in the online training. Table 15 gives an overview of the available options and the respective votes of all participants. Additionally, different methods were highlighted in the context of the questionnaire evaluation in the previous chapters.

Table 15: Cross-regional voting on preferred training method.

Method	Votes
Video of visit to best practice company	44
Live presentations with experience/best practice examples	64
Online workshop with breakout sessions	40
Online world café & discussion groups	14

The highest number of votes was given to the options of live presentations of experiences and/or best practice examples. This format is the most beneficial for cross-regional plenum sessions, as all the regions can benefit from the input of the presentations. To address individual needs of the regions, further training methods such as online workshops with breakout sessions shall be applied.

In addition to the given options, the participants could include their own ideas. One idea that was mentioned, is a physical meeting instead of an online training. Since a cross-regional session with more than 6 regions would not be feasible, this option could only be implemented on a regional level. The project partners are free to choose if they would like to cooperate a live workshop into the online training sessions to conduct the regional breakout sessions on site.

3.4 Additional activities within the training programme

In the previous chapter, the outcomes of the needs analysis questionnaire on a regional level as well as cross-regionally were discussed and the potential contents of the training programme elucidated. Besides the capacity-building events that are based on the needs identified with the questionnaire, the SCALE-UP training programme includes further activities for the participants to establish a better understanding of bioeconomy. The subsequent sections include two additional activities that are conducted within the frame of the training.

3.4.1 Videos of on site visits/Best practice examples

The survey was used not only to determine the level of knowledge and the needs in the regions in the field of the bioeconomy, but also to ask for best practice examples in the individual work streams. These examples will be presented in the training programme and will also serve as a basis for discussion. In order to get a better understanding of the best practice examples for the participants of the training, videos about the innovation, the company and the ideas presented would be beneficial. Since there is no direct capacity to shoot those videos within the framework of the programme, existing videos should be requested and collected by the project partners for this purpose. These videos can then be either shown directly in the trainings or they will be made available centrally on the homepage. The demo video should be either in English or with English subtitles to tackle the language barrier.

If no information video of a best practice example is available, the regional partners are free to find the resources to create a short video of the innovations of their regions for the training programme outcomes. Ideas for the video contents are listed below in table 16. If the project partners and/or stakeholders are not able to create a short film, the best practice example will be made available via a short presentation or written article. It is planned that part of the site visits and international study tour that are conducted within the training programme (see chapter 3.4.2) will also be filmed and a short video created, in order to provide input for those who are unable to attend the tours.

Table 16: Ideas for video contents of best practice examples

Content
Introduction of the company and the best practise example
Presentation of the innovation (e.g., what is new, what were challenges during implementation, how were they tackled?)
References to bioeconomy
Anchoring in the region

3.4.2 International study tour and site visits

The 21 planned capacity-building activities are completed by two site visits and one international study tour in the project regions. These visits are intended to give an even more detailed insight into the activities carried out in the regions. They should help pinpoint specific regional needs, capacities and priorities and build the stakeholders' and innovators' capacity to understand market dynamics and identify business opportunities as well as potential barriers for commercialisation (e.g., regulatory schemes, social acceptance issues) through physical discussions, tours, and direct contact to other regions. Knowledge holders from each platform will be involved, sharing experiences and good practices that can be taken up in other regions. They will show best practice examples in specific value chains and point out possibilities and obstacles pushing bioeconomy in their region. If possible, the site visits and the study tour should be related to the work streams. In the survey for every work stream and every region various best practise examples were announced which can be visited. This will allow for the new knowledge, experience and network connections generated through these activities to remain in the region for their further exploitation and expansion beyond the project's lifetime. Therefore, we build up capacity in the field of the bioeconomy covering a wide range of topics but will also facilitate cooperation between participants to jointly co-create business models. Table 17 shows the chronological time frame of the planned visits.

Table 17: Overview of planned site visits and international study tour

Type	Date	Project partner	Project region	Value chain
Site visit	Autumn 23	SDEWES or BFR	North Macedonia or Sweden	Agricultural residues and raw materials from forest biomass (NM) or sawdust, bark, logging residues (S)
International study tour	Spring 24	TMG	Austria	side streams and waste from food industry or forestry residues
Site visit	Autumn 24	SDEWES or BFR	North Macedonia or Sweden	Agricultural residues and raw materials from forest biomass (NM) or sawdust, bark, logging residues (S)

The time schedule of the site visits and international study tour still need some coordination to fix the exact date and region. The site visits will last one day, during which the project team will look at different best practice examples from a region together with the regional and international stakeholders. A guided tour through the companies and a description of the best practice examples will give an overview of the activities and innovations through the best practice for the market and the region. Table 18 shows an overview of the planned activities of the site visits.

Table 18: Planned activities of the site visits

Activities	
1	A guided tour through the best practice companies
2	Description of the best practice examples
3	Demonstrating the added value for the region
4	Stakeholder input from the regions for the visited projects

The international study tour will be conducted across countries. The starting point is the capital of Upper Austria, Linz, which is easily accessible within Europe by air and train. Participation in the annual international conference "Future Forum" is a good introduction to the topic of sustainability and bioeconomy. The expert talks are translated synchronously into English for all participants. In the following two days, we will visit interesting initiatives, projects, research institutions and companies in the north of Upper Austria, as well as in the Czech Republic and Germany, which are developing innovations in the field of bioeconomy. The region is home to numerous small and medium-sized enterprises in the food sector as well as intensive forestry due to the Bohemian Forest. Innovations in both value chains are therefore very pronounced here. Table 19 shows an overview of the planned activities of the international study tour.

Table 19: Planned activities of the international study tour

Activities	
Day 1	Participation in the Future Forum of Upper Austria: Conference on Sustainability, Sector Food or Sustainability
Day 2	A guided tour through two best practice companies or research institutes situated in the north of Upper Austria and in the Czech Republic covering two different value chains (e.g., side streams and waste from food industry or forestry residues)
Day 3	Visiting a best practise company in Germany

Within work package 2 of the project a stakeholder database was created, which covers regional actors relevant to the individual value chains explored in SCALE-UP, but also societal actors that are interested in shaping (bio-based) rural development pathways in the region. These stakeholders will be invited to participate in the site visits as well as the international study tour directly by email or personal contact via the respective project partner. Approximately three stakeholder per region are able to take part in each of these activities. The travel expanses of these stakeholders are covered by the project (700 € per person per trip). This ensures that people from different company groups can participate in the tours without having to consider travel costs. Additionally, members of the CoP are invited to participate in the 2 site visits activities and the international study tour.

4 Implementation Guidelines

With the structure, time frame and needs and therefore the potential contents of the training programme covered in the last chapters, the last chapter is addressed to the project partners for the facilitation of the capacity-building events. In general, the implementation guidelines include recommendations on different tools and methods that can be used in the trainings as well as different moderation techniques for the breakout sessions. Furthermore, a detailed guideline for the preparation time before the trainings is included. The last section includes options on overcoming the language barrier of the cross-regional trainings as well as a guideline on how the capacity-building activities should be evaluated. With the outcomes and the evaluation of the first trainings, the implementation guideline will be adapted in order to improve the subsequent trainings.

4.1 Potential online platforms

Each facilitator can decide which online video conference tool or platform should be used. The facilitators are different for each work stream and in consequence the technical supervision of the training might also change from work stream to work stream. Within one work stream, however, the tool should remain the same. It is important that the facilitators are familiar with the online tools used. Table 20 lists the minimum requirements of the platforms that the online tool must be able to offer in any case. If feasible it is recommended, that the same platform will be used throughout the trainings, in order to avoid confusion on the participant's side.

Table 20: Platform requirements

Requirements	MS Teams	Zoom	Webex	GoTo
Chat function	✓	✓	✓	✓
Possibility to have breakout sessions	✓	✓	✓	✓
Share screen	✓	✓	✓	✓
Work with external boards and tools (Concept-board, Mural, Mentimeter, etc)	✓	✓	✓	✓

4.2 Preparatory period before the trainings

To guarantee a successful training, the preparation phase is essential. There are several aspects that need to be considered and arranged before the training sessions start. This chapter includes recommendations on what and how the capacity-building events can be prepared by the work stream facilitators. The first section includes a detailed plan which work steps should be finished at what point of time before the session, the second gives an overview on how and when to prepare online materials, such as concept boards, and the last section covers methods on how to keep the participants engaged in the virtual trainings and how to prepare oneself to apply these methods.

4.2.1 Preparation timeline for the capacity-building activities

Online workshops and seminars need more structure and facilitation than their offline counterparts. It is much more difficult to get people on board and, above all, to keep them motivated over a longer period of time. Therefore, the goals of the workshop need to be fixed right at the beginning and communicated well to the participants. This gives the participants orientation and helps them to mentally tune in and prepare. It is best to communicate the goal in the invitation and again at the beginning of the workshop.

The following questions can help you define your goals:

1. What do you want the participants to take away from the workshop?
2. What do you want the participants to know after the workshop?
3. What results do you want the workshop to deliver?

These goal definitions for each work stream are extracted from the needs analysis and have already been outlined in the evaluation of the survey. They must now be worked out for each individual training module in order to determine the content of the training sessions.

Digital training needs to be well structured and planned in detail. Tables 20, 21 and 22 give a detailed overview of the individual steps needed to plan the work streams and the individual sessions in a work stream and gives a recommendation on when the steps should be done. We recommend detailed planning for digital workshops, both for the agenda and the timing for each slot or agenda item.

Table 21: Work steps before the work stream sessions starts.

Work step	Scope	Time before training start	Partner involved
Save the date	All stakeholders and survey participants should be reminded of the training programme. This invitation letter should be accompanied by a calendar entry that automatically enters the dates of the training sessions in the calendars.	4 Months	TMG, all regional partner
Decide on focus topics within the work stream	Based on the results of the survey and the summary in D3.1. the selection of topics within the WS can be made on which to focus the training.	4 Months	facilitator of the WS
Contact knowledge holder for presentations	With the help of the list from the survey, knowledge holders can be identified who can give input to the trainings. The facilitators select the relevant persons and contact the project partners from the respective regions where the knowledge holders come from. The project partners then contact the knowledge holder and establish the connection to the facilitator. Facilitator discusses with knowledge holder their contribution to the training (presentation, discussion, ...)	3-4 Months	facilitator of the WS, regional partner, knowledge holder
Topics for breakout sessions	In the breakout sessions, the regional partners can address topics that are specific to them and discuss them with the participants. The facilitators and the regional partners should decide beforehand the specific topics of the breakout sessions. These topics may differ from region to region.	3 Months	facilitator of the WS, regional partners
Presentation fixed	The facilitator together with the knowledge holders: it is decided which presentations will be given.	2 Months	facilitator of the WS

Creative methods	Based on the topics of the presentations, the creative methods in the individual training sessions are decided and the corresponding additional material is selected and adapted for the training, the work stream, and the participants.	1 Month	facilitator of the WS
PPT slides	The facilitators request the PPT from the knowledge holders who give a presentation in the trainings. The slides are in English. These slides will be sent to all PP to be translated in the local languages.	1 Month	facilitator of the WS
Agenda	Agenda is fixed.	1 Month	facilitator of the WS
Invitation letter	A general invitation text is written.	1 Month	facilitator of the WS
Invitation	The invitation will be adapted to the work stream and the content of the training. The invitation will be written in English and sent to all PPs. The PPs will translate the invitation letter into the local language.	1 Month	facilitator of the WS, regional partner
Online training tool	Decide which online tool you use and create a link.	1 Month	facilitator of the WS
Create a registration link for all participants	Create a registration link for all participants, which can be included in the invitation email. The participants can register there. So that the number of participants is known before the event.	1 Month	facilitator of the WS
Invite stakeholder	The invitation letter will be disseminated: - per mail to all stakeholder - social media and newsletter - face-to-face talks/phone calls with important stakeholder	1 Month	regional partners
Creative methods	Prepare boards for the discussions using creative methods. Use the material prepared for this purpose.	1 Month	facilitator of the WS
Create overview presentations (Welcome, introduction and closing)	The presentation should include a short overview about SCALE-UP, an overview about the work stream and the addressed topics within the work stream.	1-2 weeks	facilitator of the WS
Warm Up methods	Create or choose warm up method and design it with Mentimeter or PPT.	1-2 weeks	facilitator of the WS
Evaluation of the training session	Prepare the template for the evaluation of the training programme.	1-2 weeks	BTG

Table 22: Work steps before each training sessions starts.

Work step	Scope	Time before training start	Partner involved
Contact knowledge holder	Keep in touch with knowledge holders who are giving a presentation. Send them the agenda and the link to the training.	1 week	facilitator of the WS, knowledge holder
Registration	Close the registration and list all participants according to their region. Send the list with the participants from the regions to the PP.	3 days	facilitator of the WS
Translated PPT slides	The PP sends out the translated PPT to the participants in their region. Include also the link to join the training.	1 week	regional partner
Create breakout sessions	Create breakout sessions for the regional workshops (6 rooms).	2 days	facilitator of the WS
Presentation and agenda	Summarize all presentations and structure all according to the agenda, final control	2 days	facilitator of the WS
AI translation tool	Include the AI translation tool into your training session	same day	facilitator of the WS
Training	conduct training	same day	facilitator of the WS, regional partner, knowledge holder

Table 23: Work steps after the training

Work step	Scope	Time before training start	Partner involved
Lessons learned	Summarize the lessons learned for the upcoming training and the next sessions	same/next day	facilitator of the WS, regional partner
Evaluation outcome	The results will be summarised in a short report with the main conclusions and recommendations as to use for the training courses that will be conducted later in the project and after the project period in the regions.	following week	BTG

4.2.2 Preparation of concept boards/collaboration tools

In the breakout sessions, online white boards will be used to support the discussion and to better explain the moderation techniques. Mural, Miro or concept board can be recommended here (Table 24). For the various creative moderation tools, there are ready-made boards in the programmes that can be used and adapted to the needs and questions of the sessions.

Table 24: Key functions of white boards.

Key functions	Concept board	Miro	Mural
Functions: Post Its, Texts , Figures , ...	✓	✓	✓
Upload files	✓	✓	Only 1
Possibility to comment	✓	✓	✓
Grouping & arranging	✓	✓	✓
Guest access, follow me function	✓	✓	✓
Breakout sessions		✓	
Chat		full version	✓
Number of boards	unlimited	3	5
Map	✓	✓	✓
Template library	ok	ok	big

4.2.3 Preparation of stakeholder engagement methods

Online workshops are always a big challenge for the preparation, to keep the attention span at all participants high. A well-designed online workshop helps to build knowledge, generate ideas and solutions and strengthen trust. Because it's the results that count in a workshop, asynchronous communication and collaboration tools are key factors for any successful online workshop. The key to achieving high levels of engagement is to be interactive, varied and tailored to your team (Table 25).

Table 25: Challenges that need to be overcome in virtual online trainings.

Challenges	Overcome	Methods
Participation	Ensure equal participation and involvement of all participants.	Camera on, warm up, icebreaker methods, check in methods, expectations of participants, reflexion and feedback, check out.
Creativity	Stimulation of creativity through the generation of ad-hoc interventions.	Breakout sessions with creative moderation techniques.
Mix	Creating the right mix of flexibility and structure.	Presentations and breakout sessions with discussions, preparation of templates (white boards).
Activate	Activating participants for activities can often be challenging.	Creative moderation techniques, white boards, discussions.

Start with a CHECK-IN:

The Check In method is a way to start meetings or workshops mentally. Each participant is given the time to arrive at the training. A good check-in allows all participants to adjust to the work ahead and at the same time relaxes the atmosphere in the group. It can also be used to remind participants what the aim of the event is and what everyone can contribute. A question or small activity is posed that is solved together before starting with the content, objectives, and topics. Usually, creative questions are used at the check-in, which interactively involve the participants, stimulate their creativity, and contribute to getting to know each other personally.

Check in keeps participants mentally present:

- A check-in promotes common understanding
- Check-in gives each participant a voice
- The check-in method strengthens trust among each other

There are several ways to prepare a check in for each session:

- Check in Daresay: <https://checkin.daresay.io/>
- Tscheck: www.tscheck.in
- Digital workplace: <https://thedigitalworkplace.com/checkin/>

4.3 Moderation techniques

In order to facilitate the capacity-building events, the regional breakout sessions in particular, and to keep the participants engaged in the activities, several moderation techniques can be applied. This chapter shows on the one hand general information about the organisation of the capacity-building events and on the other hand different moderation techniques which could be used for brainstorming or generating and evaluating ideas from the participants. All techniques should be seen as suggestions, it is not mandatory to use them.

4.3.1 Organisation of capacity-building events

The aim of these events is to disseminate among the participants the process of transferring the contents of the different work streams, as well as to dynamise the discussion around the topics in the work streams. In addition, the aim will be to generate the necessary spaces and conditions for co-creation, transparency, and open innovation with representatives such as end users, private investors, representatives of funding programmes, accelerators, those responsible for open innovation in private companies, etc.

A stakeholder participation strategy is foreseen from the initial phases, with the objective of enriching the proposal with knowledge and learning, as well as providing legitimacy, transparency, and efficiency to the content of each work streams. If deemed necessary, the capacity event may also include some bilateral meetings to discuss the conclusions of the meeting, to share the progress of the project and to raise the possibilities of improvement necessary for its exploitation.

The preparation of the capacity-building consists of 5 distinct stages, involving successive exchanges with consortium members for decision-making during the design and coordination of the delivery of the event.

Stage 1: Definition of the content, and other key aspects of the capacity event in coordination with SCALE-UP partners

The organisation of the capacity event will start from a coordination meeting with the relevant members of the consortium, where the following key aspects will be discussed for the parameterisation and final design of the workshop:

- 1.1 Content.
- 1.2 Date.
- 1.3 Geographical scope.
- 1.4 Workshop format: Face-to-face or online

Stage 2: Submission of draft agenda

The proposal for the content of the capacity event, with an agreed programme and methodology, will be sent approximately one month before the event is held.

As a preliminary proposal, an event consisting of three distinct sessions is proposed.

1. The first one will consist of a presentation session of the project by the consortium. The presentation will be prepared and will be previously contrasted and validated with SCALE-UP partners.
2. The second session will consist of dividing the whole audience according to their interests in different working tables to collect opinions on the different work streams.
3. The third and last part will be based on some bilateral meetings previously scheduled, according to the interests of the audience.

This structure will enable the following objectives to be achieved:

- To develop and implement a demand-driven training programme, facilitating knowledge exchange across the SCALE-UP regions and with members of the CoP.
- To build capacity among regional stakeholders, enabling them to identify and promote innovative bio-based solutions and to contribute to discussions on inclusive rural development pathways.

Stage 3: Dissemination of the workshop

The target audience will be end-users, private investors, funding programme representatives, accelerators, open innovation managers from private companies. The dissemination of the workshop includes the following activities:

- Dissemination in the media
- Digital communication

Communication speakers will be identified to maximise the impact of the dissemination. In this sense, the contact networks of SCALE-UP partners shall be used.

Stage 4: Holding of the capacity-building event

The event will be delivered by the responsible partner. There are moderators for the different working groups, to compile conclusions, as well as to guide the different rounds of meetings.

Stage 5: Follow-up and evaluation of the workshop.

Quantitative and qualitative measurement of the development of the event provides information that helps to improve and strengthen subsequent phases of the project. Each of the capacity event will be organised by a partner responsible of one work stream. Following there are descriptions of different techniques to be used in the capacity event to maximize the interaction between the participant, the exchange of knowledge and the participation.

4.3.2 WORLD CAFÉ

The World Café is a straightforward yet sophisticated technique for facilitating meaningful discussions about significant issues in large group settings. The World Café is an excellent tool for promoting participant interaction and can promote deeper engagement with difficult or complex themes.

Conversations can be made more focused, laid-back, and interactive by breaking large gatherings into smaller subgroups. This creates more opportunities for everyone to speak out and contribute equally, which promotes real sharing of experiences and information. The World Café is a creative participatory method best used for:

1. Knowledge exchange.
2. Capturing collective knowledge quickly.
3. Tackling multiple related issues.
4. Exploring diverse opinions on issues that matter.

Methodology

Each World Café session is pre-planned with an overarching subject determined; 3-5 key questions are then developed within the theme for debate; and each question is allocated to a single table host (an expert or someone with a keen interest in the matter).

In order to achieve this, 3-5 tables (one for each question) are put up in a "café" setting to foster a laid-back and informal attitude.) To begin, participants separate into groups and select (or are given) a table. The discussion of the subject is followed by a quick introduction from the host.

The host stays behind to reintroduce the question and wrap up the preceding conversation for a fresh group of participants after the allotted time has passed. The thoughts of the new participants are then added to the discussion, improving, or changing what was said by the earlier group.

This procedure is repeated until participants have had the opportunity to discuss up to three different questions/issues. A plenary session follows the discussion to bring it to a close. The debate is made more valuable by the rotation of groups from one table to another because it enables one group to expand on the thoughts and views of the prior group on a particular subject.

Practical example: Work stream 5 (Effective and innovative governance of regional bio-based systems) will be used as a basis for the example. In this Work stream the selected topics are: "Open innovation in bio-based systems", "Market analysis and business models" and "Participatory governance methods". In order to implement the "World Café" methodology, we must set up a table for each selected topic, so there will be three tables. At each of these tables, the stakeholders participating in the training programme will be seated and will be guided and moderated by the WS 5 partners (there will be one moderator per table). The sessions at each table will last about 15 minutes, after which the stakeholders will move to the next table where the moderator will introduce the results of the previous topic and present the next one. At the end of this second table, the same procedure is followed for the last table.

In the intermission of the session (e.g., between the second and the third table), a coffee break will take place and then the following sessions will continue.

At the end of the World Café there will be a 20-minute reporting back for each topic.

4.3.3 DESIGN THINKING

It is a process for producing unique ideas that focuses its efficacy on recognizing and meeting users' actual needs. It stems from the manner in which product designers work. It is currently defined as "A discipline that uses the sensibility and methods of designers to match people's needs with what is technologically feasible and what a viable business strategy can turn into value for the customer as well as a great opportunity for the market." DESIGN THINKING can be defined by the following terms indicated in figure 6 below.

Figure 6: Depiction of the definition of design thinking



Design Thinking is established through a process that highlights what we view to be its five distinguishing characteristics:

1. Generate empathy
2. Teamwork
3. The generation of prototypes
4. Playful
5. High visual content

Methodology

The Design Thinking approach is divided into five stages. It is an iterative, non-linear approach designed to address complicated difficulties comprised of so-called wicked problems, which are difficult to describe and solve.

1. Empathy phase: A thorough awareness of the needs of the users involved in the solution we're producing, as well as their surroundings.
2. Definition phase: We will identify problems whose answers will be critical to achieving an innovative outcome.
3. Ideation phase: The Ideation stage or phase seeks to generate a plethora of choices.
4. Prototyping: Making prototypes brings ideas to life and allows us to visualize potential solutions.
5. Testing phase: During the Testing phase, we will test our prototypes with users who are involved in the development of the solution.

Practical example: For this methodology, the example for Work stream 5 and the three selected topics are taken once again: "Open innovation in bio-based systems", "Market analysis and business models" and "Participatory governance methods".

First, the moderator will present the topic to be discussed to the stakeholders as a whole (example: "Open innovation in bio-based systems"). Once presented, the first phase of Design Thinking is to empathize (empathy exercise): we are going to begin to characterize our users of the training program and their skills and knowledge in relation to the selected topic. After which, an "Empathy Map" is going to be elaborated (In this case we are going to answer questions about our user: what do they think (What do they think or know about Open innovation?) and feel (Do they think they Is it useful? How is it useful to you?), what they hear, what they see, their efforts and their results. For this, the application of multiple online tools already developed for the application of this methodology will be studied.

After the knowledge acquired in the previous stage, the definition exercise begins (synthesize the knowledge acquired in the previous stage), what is sought is to generate a new perspective and keep what adds value (it can be put on an interactive whiteboard).

Idea: Creative and alternative ideas are generated. New visionary ideas are sought from all the proposals indicated by the stakeholders (they are chosen or improved among the previous definitions).

Prototype: Drawing or model (sketch) that allows us to visualize the options available to us (Possible real applicable options).

Test: It aims to validate the solution and solve the needs of the target audience. We will mature the solution in the training program (for example).

4.3.4 SIX THINKING HATS

The six thinking hats technique allows you to approach a subject from six different perspectives. Each perspective can then be carefully analysed without having to argue or jump to conclusions about what is "right" or "wrong". So, after trying on all six hats, each participant will have a broad collection of ideas to help them pick their next actions.

Each of the six thinking hats represents the following:

- **Blue Hat:** "the Conductor's Hat" It is utilized to control the thought process.
- **Green Hat:** "the Creative Hat" It focuses on the possibilities, alternatives, and new ideas of creativity.
- **Red Hat:** "The Hat for the Heart" It represents feelings, hunches, and intuition.
- **Yellow Hat:** "The Optimist's Hat" It represents brightness and optimism.
- **Judge's Hat:** "the Judge's Hat" There are risks, obstacles, and problems.
- **White Hat:** "the Factual Hat" It requests information that is either known or required.

Methodology

Six Thinking Hats is a helpful technique for approaching decision-making from several perspectives. It allows people to be more engaged and mindfully immersed in a discussion by offering a disciplined parallel thinking approach.

1. Brainstorm: Start brainstorming through each of the different hats.
2. Group: Examine responses for recurring topics that can be grouped.
3. Vote: Participants are asked to vote on the themes they would most like to talk about.
4. Share: Share the findings and aid the decision-making process.

Practical example: For each of the topics, a recommended minimum of 6 stakeholders representing (if possible) each part of the quadruple helix are brought together. For each of these topics, a group will be formed and there will be a moderator per topic who will introduce the topic as a pre-decision exercise (therefore, for WS 5 we will have 3 different groups).

Within each group, 6 teams will be formed (each group must therefore consist of at least 6 people) and each team will have to choose one of the following colours: white, red, black, yellow, green and blue. Depending on the chosen colour, the facilitator will give each team a hat (white, red, blue...) and an instruction sheet according to the colour of the chosen hat.

The moderator will then present to the whole group a problematic or interesting situation to analyse.

Each team will have 15 minutes.

The moderator will then ask the members of each team (by colour of hat) to present, in an orderly manner, the ideas obtained in the group, on the topic analysed. Each time a team member takes the floor, he/she should wear the hat he/she has chosen.

Once all the teams in the group of the selected topic have spoken, conclusions will be drawn and after a rest period, the next topic will also be discussed, until the total of the 3 topics chosen for WS 5 has been completed.

4.4 How to overcome language barriers

From experience in other EU projects, it was realised that trainings and workshops in English, which are often integrated into EU projects, is a hurdle for many stakeholders and therefore participation in cross-regional capacity-building is often low. These stakeholders and their know-how are not represented in international discussions. To ensure that non-English speakers will be able to take part in the training programme, different simultaneous translation tools were tested in order to apply them in all (cross-regional) virtual events of the SCALE-UP training programme, providing a basis for discussion and knowledge sharing.

Table 26 gives an overview about the different translation tools and techniques which were tested and analysed to use in the trainings programme. The quality of the translation, the price of the tools and the covered languages differ quite a lot between the translation forms. The project partner decided to prefer voice translation upon subtitles because reading subtitles is very tiring and it not feasible for a half a day training. Life translation would provide the best quality for translation but is far beyond our financial possibilities.

There is currently heavy investment in the development of AI-driven translation tools. The project partners have tested a few of said translation tools and decided to use Wordly in the trainings of the first work stream to evaluate the practicability and will ask for feedback from the participants. Translation programmes based on AI are a quite recent development and the different tools learn after each application, thus they increase its quality over time and use.

Table 26. Different translation tools and forms analysed for usage within the training programme

Translation form		Translated languages	Advantages	Disadvantages
Life translation	Life interpreter with channels for translation	all	Good quality	Too cost intensive
AI Translation tools	Stenomatic	all	all languages	quality of translation is not good, many mistakes

	Wordly AI-Powered Interpretation	no Macedonia n	English, German, Spanish, French full translation, translation into Swedish and Polish, quality of translation for some languages quite good, continuous improvement of AI, inclusion of glossary	no translation of Macedonian, no translation from Swedish or Polish into other languages
	Kudo	no Macedonia n		no testing possible, very young AI, little experience
Subtitles	MS Teams	all	Cheap	reading subtitles is very tiring, not feasible for a half day training
	Zoom	all	Cheap	
	Webex	all	Cheap	

In addition to the translation of the spoken language in the plenary, all presentations are collected in advance and translated into all 6 project languages. Before the training session starts, the presentations are sent out to all participants. Each participant receives the presentation in their respective language to ensure maximum understanding and communication.

The virtual exchange formats will feature break-out sessions that allow for parallel discussions in different languages. Local project partners will further interact with stakeholders in their region and ensure that their knowledge and feedback are taken up in the project activities. Finally, key project outputs will be made available in local languages.

4.5 Evaluation of the capacity-building activities

The training will be evaluated on organisation, content, presentation, and usefulness. For the evaluation, work stream facilitators, as well as the participants, will be approached.

The facilitators will be asked to fill out a template with questions (after each session) to learn what could be done better the next time. Facilitators will be asked to review the organisation and the appropriate level and content of the presentations with respect to the background and interests of the participants. The template will include questions such as:

- How was the cooperation between work stream facilitators?
- Please describe the organisation of the training session.
- How would you rate the level of knowledge needed to follow the training?
- How would you rate the contents of the presentation?
- What went well during the training?
- What could have gone better? And how would you do it differently the next session?
- What recommendations could you give following this session?

In addition, the training programme participants will be asked to fill in a short online survey (after every session), in which they will be asked to rate the content, presentation, understandability and the usefulness with respect to their work in their region.

The results will be summarised in a short report with the main conclusions and recommendations as to use for the training courses that will be conducted later in the project and after the project period in the regions.

5 Conclusions and Outlook

The results of the needs analysis showed which specific topics should be included as potential content of the demand-driven capacity-building activities. Furthermore, they showed that there are quite a few similarities in the identified hurdles of each project region, but more varying needs when it comes to the different stakeholder groups that participated the survey. The assessment clearly indicates that the work streams that are directly related to biomass are of higher interest than other work streams that cover strategic work, technology involved in biomass handling or politically influenced topics. This could again be influenced by the specific stakeholder groups that have participated in the survey. Two underlying topics that have been rated with high interest through all work streams, but with different focuses, are the development of bio-based business models as well as different aspects of legislation, regulation and policies related to biomass. To make sure that the identified priorities of the training participants are met, the contents of the trainings will be built around these priorities.

To ensure the sustainability of the training programme outcomes and to share the knowledge collected during the training with the SCALE-UP community, two measures will be taken in subsequent project activities. Firstly, the detailed evaluation of the regional needs analysis surveys and the information collected therein, as well as best-practice examples and further information from the questionnaire will be included in regional information packages that will be disseminated during future SCALE-UP activities. Secondly, based on the framework of the evaluation questions included in the implementation guideline in this document, a synthesis reports that summarises the lessons learned from the knowledge exchange and capacity-building activities will conclude the project's training period.

With the outcomes of the needs analysis survey, the lessons learned included in the synthesis report and the identified best practice examples, the regional stakeholders and members of the SCALE-UP Community of Practice will be equipped to adopt and implement the results in future activities that may not be directly related to the project itself. This approach will not only guarantee the sustainability of the project, but will also facilitate the roll-out of bioeconomy in rural areas, contributing to a resource-efficient, and sustainable future.