



SCALE^{UP}

community-driven
bioeconomy development

Concept and Materials for Student Competitions

June 2024

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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:	D6.4: Concept and Materials for Student Competitions
Work Package:	WP6: Communication, Dissemination & Exploitation
Work Package leader:	WIP
Task:	Task 6.3: Student Competitions at Secondary Schools
Task leader:	Macedonian Section of the International Centre for Sustainable Development of Energy, Water and Environment Systems (SDEWES-Skopje)
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Internal peer review:	Barbro Kalla, Magnus Matisons (BFR)
Planned delivery date:	M22
Actual delivery date:	M22
Reporting period:	RP2

Dissemination level of this report

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ACKNOWLEDGMENT & DISCLAIMER

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

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EXECUTIVE SUMMARY

The SCALE-UP project is committed to fostering regional multi-actor partnerships to identify and scale-up innovative and sustainable bio-based value chains that leverage regional resources. As part of this initiative, the project will conduct student competitions in six regions: Northern Sweden, Mazovia in Poland, The Arc Atlantic in France, Strumica in North Macedonia, Upper Austria, and Andalusia in Spain. These competitions aim to inspire and educate the next generation about the potential of bio-based solutions to address local and global challenges. They foster a deeper understanding and appreciation of the bioeconomy among students across diverse regions.

The competitions aim to engage at least 100 students per region, encouraging them to actively participate in the learning process through hands-on projects, collaborative problem-solving tasks, and practical applications in the bioeconomy sector. Each region's competition will be tailored to its specific economic and environmental context. For instance, Northern Sweden will focus on forest residues for bioenergy and other products, while Andalusia will emphasize the utilization of olive-oil production residues.

The timeline for the competitions begins with the finalization of concepts and materials by June 2024, followed by the organization and preparation phase in July 2024. Competitions will commence between August and September 2024, aligned with the start of the school year in each region. Students will then have time until December 2024 to research and prepare their entries, with the final submissions due by the end of December 2024. The evaluation and selection of winners will take place in January 2025, culminating in an award ceremony in February 2025 or additional promotional regional events later that year.

Evaluation criteria will include innovation, feasibility, sustainability, regional relevance, scientific accuracy, presentation quality, teamwork, community impact, innovation potential, and student engagement. A regional jury composed of project members, teachers, and external experts will assess the entries. All participants will receive certificates, and winners will be promoted on the SCALE-UP website and regional partners' social media platforms. Additional awards, such as monetary prizes, travel vouchers or bio-based products, may also be provided by project partners.

To ensure the success of the competitions, regional partners will work closely with teachers, who will play a crucial role in organizing the events and guiding the students. Intellectual property rights will be carefully managed to protect the originality and value of the students' ideas, ensuring that they retain ownership and control over their innovations.

By engaging young minds in the exploration of bioeconomy, the SCALE-UP project aims to not only educate the next generation but also to inspire them to pursue careers in the bioeconomy sector, ultimately contributing to sustainable development in their regions.

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1 Introduction to Student Competitions at Secondary Schools

The SCALE-UP project aims to support regional multi-actor partnerships, consisting of private businesses, governments and policymakers, civil society organizations, and researchers in identifying and scaling-up innovative and sustainable bio-based value chains that build on regional resources. However, in order to broaden the spectrum and to engage with the younger population, it envisages student competitions. These competitions aim to inspire and educate the next generation about the potential of bio-based solutions to address local and global challenges. They foster a deeper understanding and appreciation of the bioeconomy among students across diverse regions.

The SCALE-UP student competition will be held in the six regions covered by the SCALE-UP project: Northern Sweden, Mazovia in Poland, The Arc Atlantic in France, Strumica in North Macedonia, Upper Austria, and Andalusia in Spain. Each region has unique needs that will be addressed through custom-designed interactive competitions. These activities will be tailored to fit the specific requirements and contexts of each region, ensuring that the educational content is relevant and impactful. For instance, one region might focus on agricultural bioeconomy practices, while another might emphasize food waste or forestry, depending on their local economic and environmental conditions. It is designed to introduce students to innovative bio-based solutions and employment opportunities in rural areas. By engaging with at least 100 students per region in secondary schools across six regions, the project aims to mainstream bioeconomy beyond the individual value chains covered and promoted in SCALE-UP.

The term "interactive" refers to the dynamic and engaging nature of the competitions. These activities will involve hands-on participation, encouraging students to create bio-based products, collaborative problem-solving tasks that tackle real-world challenges. Such an approach ensures that students are not merely passive recipients of information but are actively involved in their learning process. This interactive approach is intended to make learning more engaging and effective, helping students to better understand and retain the concepts of bioeconomy and sustainability. By involving them in practical, real-world applications of bio-based solutions, the competitions aim to spark their interest and inspire them to consider careers in the bioeconomy sector.

The activities will draw on the repository of educational materials on 'Bioeconomy & Sustainability,' which has been developed and tested in the frame of the BE-Rural project. These materials provide a comprehensive foundation for understanding the principles and practices of bioeconomy and sustainability, ensuring that the educational content is both robust and reliable.

A regional jury will define the winners in each region, ensuring that the competition is fair and recognizes the most innovative and effective solutions proposed by the students. Additionally, all participating students will receive a certificate of participation, acknowledging their effort and involvement in the competition. Some regions may also provide additional awards, such as cash prizes or other incentives, funded by other partners and not from the SCALE UP project.

2 General concept for the organisation of student competitions

2.1 Aim

The aim of the SCALE-UP student competition is to inspire and educate the next generation about the potential of bio-based solutions to address local and global challenges, fostering a deeper understanding and appreciation of the bioeconomy among students across diverse regions.

2.2 Indicative timeline

The indicative timeline for the organisation of the student competition and important date for specific activities is presented in **Table 1**.

Table 1: Timeline for Student Competition organisation: Tasks and Deadlines

Date	Task
30 June 2024	Finalization of D6.4 Concepts and Materials for Student Competition
30 July 2024	Finalization of regional student competition organization (design, process, timelines, evaluation criteria, prizes and selection of jury.)
1 Aug 2024	Regional partners to share the final concepts with SDEWES-Skopje for compilation and reporting purposes
Aug - Sep 2024	Start of the competition, depending on the school year start in each region
2 Sep - 9 Dec 2024	Students research and preparation of entries for the competition. This timeline may vary from region to region, from 1 day (e.g. hackathon) or for an extended period of time.
25 Dec 2024	Final date for submission of entries for the competition to the teachers
Jan 2025	Evaluation of entries and selection of winner(s) for every region
Feb 2025	Award ceremony and promotion of the winners

2.3 Participants

- Students (individuals or teams). Each region should provide detailed guidance for individual or teamwork before the start of the competition. List of participants shall be compiled in line with the Template for List of Participants (see Annex).
- All participants should be enrolled at a vocational school, or high school or university.
- Consent form on General Data Protection Regulation (GDPR) (see Annex: Template for GDPR) must be signed by the students directly if they are above 16 years old and/or by their parents if the students are younger than 16. This consent concerns approval for using the student's personal data and photographs.

2.4 Responsibilities of project partners

Each regional partner will liaise with teachers who will have the primary role in organising the student competition. The teachers in coordination with the regional partners will publish the call (Annex: Template for Open call). The regional partners have to oversee the entire process and report the organization and success of the competition.

In defining a suitable concept for each SCALE-UP region, SDEWES-Skopje explored various options and provided most suitable examples to inspire the regional partners and teachers (see

Table 2 and Chapter 5: Materials). These supporting documents offer a range of ideas and best practices to help tailor the competitions to the unique needs and contexts of each region.

Table 2: Examples of Inspiring Competitions for Regional Partners and Teachers

Competition	Target group	Concept	Link
Biobased Innovation Student Challenge Europe (well established EU-wide competition)	University	All teams develop a bio-based innovation (product or process) and present their ideas via a powerpoint presentation to a jury of experts from industry and science.	https://biconsortium.eu/BISC-E
BLOOM Stories	Primary/secondary school teachers	Having access to a repository of materials (similar to BE-RURAL), teachers can submit proposals for the competition in these categories: [1] Teaching bioeconomy in primary schools (individual work); [2] Teaching with bioeconomy in secondary schools' STEM (science, technology, engineering and mathematics) classes (individual work); [3] Integrating STEM teaching with bioeconomy (teams of two STEM teachers of different subjects); [4] Integrating STEAM teaching with bioeconomy (teams of up to three teachers of different subjects, including at least one STEM teacher and at least one non-STEM teacher)	https://bloom-bioeconomy.eu/schoolnetwork/competition/
Transition2Bio project	Primary and secondary school	Separate competitions for primary/secondary and for teacher/students. Student competitions: describe a problem and propose a bio-based solution	https://www.transition2bio.eu/school-competition/

Teacher competitions: Develop teaching materials related to the bio-based economy			
BioEnergizeMe (US)	Primary and secondary school students	Learn a concept about the bioeconomy and try to explain it through an infographic. Well developed guide, concept, scoring system and access to materials.	https://www.energy.gov/eere/bioenergy/infographic-challenge

Final details regarding the organizational issues of the student competition in each region should be communicated (see Annex: Template for Reporting) to SDEWES-Skopje latest by August 1 2024, for compilation purposes and as input to the final report.

2.5 General concept

The organisation and the concept will differ between regions. However, there are some common rules that all regional partners should follow.

Students could either participate individually or will be grouped in teams. Each region should decide on this and specify in their call for the competition.

The number of students in teams will vary between regions, but in the end, a total of 100 students per region should be engaged.

The teams shall research a bioeconomy-related topics (food, agriculture and forestry, climate change, bioenergy) relevant to the region.

Objectives

- Promote Awareness of Bioeconomy:** Introduce students to the principles and practices of the bioeconomy, emphasizing sustainable development and innovative bio-based solutions.
- Highlight Employment Opportunities:** Showcase potential career paths within the bioeconomy sector, particularly in rural areas, to inspire future workforce engagement.
- Enhance Educational Engagement:** Utilize interactive and hands-on activities to make learning about bioeconomy engaging and impactful.

Regional Customization

The competition will be tailored to address the specific needs and priorities of each region:

- Northern Sweden:** Address forest residues for bioenergy, chemicals, and other value-added products.
- Mazovia, Poland:** Emphasis on side-streams into wood products, fertilizers, and functional food ingredients.
- French Arc Atlantic, France:** Promote bio-based insulation from flax and hemp, and other regional bioeconomic activities.
- Strumica, North Macedonia:** Highlight agricultural residues for composting and organic fertilizers, as well as food processing industry residues.
- Upper Austria:** Leverage food processing by-products for biogas, chemicals, and innovative bioeconomy applications.
- Andalusia, Spain:** Focus on olive-oil production residues into high-value chemicals, fertilizers, and other products, focusing on food waste reduction.

Interactive Components

The interactive nature of the competition will be reflected in various activities designed to actively involve students:

1. **Hands-on Projects:** Students will create bio-based products, providing practical experience with bioeconomy principles.
2. **Collaborative Challenges:** Group tasks will address real-world bioeconomy challenges, fostering teamwork and problem-solving skills.
3. **Practical Applications:** Activities will demonstrate the relevance of bioeconomy in daily life and potential career paths.

Student entries could include:

- A. Essay complemented with an infographic to improve visual presentation (Suggestion of possible topic: How should your region look like in the future?).
- B. Collage, short video, photograph representing current bioeconomy-related barrier or challenge and ways forward to overcome and promote solutions on regional level.
- C. Business concept or model plan (to further support the winning ideas of the Call for Expression of Interest or independent plan focused on the bio-based value chain).
- D. Waste-free recipe, suggesting creative solutions to reduce waste generated in the process of cooking and using food in the home/restaurants, but also how potential food waste can be reused.
- E. Hackathons on innovative ideas related to bio-based value chains selected in the region.

2.6 Evaluation criteria

The general evaluation criteria are listed in **Table 3**. However, the regional jury will define the criteria according to the specific needs of the region and the selected concept by the regional partners. Each criterion should be rated from 1 to 5, with the total score reflecting the overall quality and impact of the student project. The student or team with the highest number of points is the winner in the respective region.

Table 3: Evaluation Criteria for Competition Proposals

Criteria	Description	Rating (1-5)
Innovation	Originality and creativity in the proposed bio-based idea	
Feasibility	Practicality and viability of implementing the proposed idea	
Sustainability	Environmental impact and sustainability of the idea	
Regional Relevance	Alignment with the specific needs and resources of the region.	
Scientific Accuracy	Accuracy and reliability of scientific principles and data used.	
Presentation	Clarity, organization, and effectiveness of the presentation	

Team Collaboration (if applicable)	Level of teamwork and collaboration demonstrated
Community Impact	Potential social and economic benefits for the local community
Innovation Potential	Potential for the idea to drive further innovation and development in the bioeconomy sector
Engagement and Enthusiasm	Level of student engagement and enthusiasm for the project

Rating Scale:

- 1 - Poor: Does not meet the criteria at all
- 2 - Fair: Meets some aspects of the criteria but lacks depth and quality
- 3 - Good: Meets the criteria adequately with some strengths
- 4 - Very Good: Exceeds the criteria with notable strengths
- 5 - Excellent: Far exceeds the criteria with exceptional quality and impact

2.7 Composition of the jury

The jury will consist of 3-5 members, including at least:

- 1 project member
- 1 teacher
- 1 member of the regional platform or external experts

2.8 Certificates and awards

The winning team will be promoted on the SCALE-UP website and regional partner's social media. Certificate of participation will be provided for all participants (see Annex: Templates for Certificat). For the winning ideas, a promotional event (Demo Day and Expo) could be organized, featuring presentations to judges and demonstrations to potential investors, the startup community, a wider audience, and media. Additionally, books and bio-based products can be won. More motivational award(s) would significantly improve the engagement and quality of the results from the student competition, but this will be an additional prize and should be provided by project partners from other complementary sources (as applicable).

3 Potential challenges and solutions

According to the timeline shown in Chapter 2, the planned period for organizing and implementing this project activity is considered sufficient (March 2024 to February 2025). However, the organization of the student competition might be a challenging activity, since it involves a younger population to whom bioeconomy might not be of focal interest.

Therefore, when a project partner decides to begin promoting the competition, they should first establish contact with teacher(s) from secondary school(s) in their regions. This could be a vocational school directly or indirectly connected to the bio-based value chain of the region, or a high school offering courses on biomass availability, circular economy, environmental sustainability, etc. The teacher will serve as the liaison focal point for further communication between the country partner and the students.

Additionally, a list of schools and contact information for teachers is already included in the stakeholder mapping database created under Task 2.1. If this is not the case and a partner does not have relevant contacts, it would be beneficial for them to draft a list of potentially interested schools as soon as possible. Moreover, SDEWES-Skopje is providing support (or conducting bilateral calls) on how to approach teachers and present the concept note for organizing the student competitions.

In student competitions, intellectual property (IP) is a crucial aspect that needs careful consideration, especially for participants developing business plans or presenting innovative bio-based ideas. Intellectual property refers to the legal rights that protect creations of the mind, such as inventions, designs, and artistic works. It's essential for safeguarding the originality and value of ideas, ensuring that creators receive recognition and potential economic benefits from their innovations.

The protection of IP is carefully managed to ensure fairness and respect for participants' rights. Only the jury and the organizing committee have access to the ideas and submitted documents, including personal information, which is strictly used for competition-related matters. All IP and know-how contained within the submitted materials remain the property of the original creators. The organizers jury, or any other third parties do not acquire any ownership rights over the ideas or innovations presented in the competition. Any IP or know-how developed by the students during the competition belongs to them. They will have the autonomy to decide how to protect or publish their work, with guidance from their supervisor at the school. This approach ensures that participants retain control over their intellectual property while also fostering an environment conducive to innovation and collaboration. By respecting and safeguarding participants' IP rights, the competition promotes creativity and entrepreneurship among students in the bioeconomy sector.

4 Regional concepts

After reviewing all options presented in Chapter 2, each region has chosen a unique concept for the student competition that best suits their needs. Selected concepts per region are further detailed below.

4.1 Sweden

COMPETITION FOR HIGH SCHOOL

The purpose is to increase public awareness of the bioeconomy.

Students are to develop a competition entry in two parts:

1. An engaging description of a bio-based product in any format
2. A short-written report (at least 2-3 pages) based on the assessment criteria

MORE ABOUT THE COMPETITION

- Target group: high school students – group work (4-5 students in each group) in Norrbotten, Västerbotten, Västernorrland and Jämtland.
- Competition period: August 2024 – December 2024
- Time required: Optional and based on the number of subjects that can collaborate on this task (minimum of 10 hours).
- One winning group will be selected, and the competition entry will also be communicated by the project.

THEME: BIO-BASED PRODUCTS

Learn more about products we can make from bio-based raw materials instead of fossil raw materials. Be inspired by:

- Where does the pizza box come from?
- Which clothes come from the forest?
- What can replace plastic in electronic products?
- Can we use wood/cellulose in artificial grass?
- What can artificial spider silk protein be used for? What can transparent wood be used for?

INSTRUCTIONS FOR COMPETITION CONTRIBUTIONS

1. SUBMISSION

The entries must be submitted by December 20, 2024:

- Competition entry part 1: Engaging description of bio-based product/products
- Competition entry part 2: A short report in Word (at least 2-3 pages) describing the work based on these instructions.

2. SCHOOL APPROVAL

3. CLEAR CONNECTION TO BIOECONOMY

- Describe the material and the product/products.

- What fossil material does it replace, and what positive environmental effects does it provide?
- How much is it used today?
- How does it contribute to the global goals (provide at least one example)?

4. INTEREST, KNOWLEDGE, AND ENGAGEMENT

- Describe how the task has affected your interest, knowledge, and engagement in these issues.
- Describe how you have spread the information to others.

5. FORMAT OF PRESENTATION

- The description of the bio-based product/products should be designed in a way that makes it interesting and easy to understand, even for someone with limited knowledge of the subject, and based on any format.
- Design, creativity, and dissemination are important assessment criteria.

SUGGESTED MATERIAL

- Bioeconomy materials based on BE-Rural repository (see Chapter 5)
- Region specific materials such as [Skogslabbet](#) (The forest lab), which is a free web-based teaching resource adapted for high school and based on research on forests and sustainable development (Adapted for GY11 – interdisciplinary). The material has been reviewed by SLU researchers. High school teachers have developed the content and ensured its connection to the curricula. The purpose of the teaching resource is to increase knowledge about forests and to train students in handling complex issues in a changing world. The material, Skogslabbet, follows the curriculum. This section matches the core content of the upper secondary courses below. The teaching material is well-suited for interdisciplinary collaborations.

EVALUATION & PRIZE

The contribution will be evaluated according to the project's criteria stipulated in Chapter 2.6 above and according to the specified instructions for what is stated that the report should contain. BioFuel Region will award a travel scholarship of 450 EUR to the winning group supported by BioFuel Region. The winner will be celebrated during the BioFuel Region's annual meeting in May 2025. All participants will receive a SCALE-UP certificate confirming their participation.

Jury Composition:

- 1 project member
- 1 teacher
- 1 member of the regional platform
- 1 external expert

CONTACT & SUBMISSION

The competition entry should be submitted by each student group to a designated email address, with the responsible teacher copied. The deadline for submissions is December 20, 2024.

4.2 Austria

COMPETITION FOR HIGH SCHOOL

The purpose is to raise awareness related to zero-waste principles. Students are to develop a competition entry in two parts:

1. An appealing visual presentation of the business plan for the reuse of waste in a video lasting a maximum of 3 minutes.
2. A detailed business plan focusing on biomass conversion on maximum 10 pages.

MORE ABOUT THE COMPETITION

- **Target group:** Secondary school students (16-19 years old) – group work (either one overall project or a maximum of 5 projects per school class can be submitted).
- **Competition period:** September – December 2024
- **Winners:** Two winning groups will be selected in January 2025. The winning entries will be additionally promoted at the annual conference of the Upper Austrian food industry organised by OÖ Technologie- und Marketing GesmbH (TMG).

THEME: ZERO-FOOD WASTE CHALLENGE - VON DER TONNE ZUM BUSINESS (FROM THE BIN TO THE BUSINESS)

Explore innovative ways to repurpose waste and develop sustainable business plans using biomass. Be inspired by:

- Development of new uses/marketable products from food waste and unused by-products.
- Development of new technologies/processes for biogenic waste streams generated in our households, in the field or during production.

INSTRUCTIONS FOR COMPETITION CONTRIBUTIONS

1. SUBMISSION

A detailed business plan (max. 10 pages and video max. 3 min) focussing on biomass conversion and sustainability should be submitted, providing:

Answer the following questions as guidance:

- What previously unused raw material do we want to/can we use?
- Where does it come from?
- How much of it is produced in Upper Austria approx. produced in Upper Austria?
- What (new) products can be made from it (not limited to food!)? Who is the target group?

2. SCHOOL APPROVAL

3. CLEAR CONNECTION TO ZERO-WASTE PRINCIPLES

- Describe the materials and products involved
- Explain the environmental benefits of repurposing waste
- Highlight current usage and potential for wider adoption
- Link to global sustainability goals (provide at least one example)

4. INTEREST, KNOWLEDGE, AND ENGAGEMENT

- Describe how the task influenced your interest and understanding of zero-waste principles
- Explain how you have disseminated information to others

5. FORMAT OF PRESENTATION

- The visual representation should be engaging and easily understandable
- The business plan should be comprehensive and well-structured
- Creativity, design, and dissemination are key assessment criteria

SUGGESTED MATERIAL

- Bioeconomy materials based on BE-Rural repository (see Chapter 5)
- Utilize resources such as digital teaching materials adapted for secondary education
- Examples of innovative waste repurposing and biomass conversion
- Interdisciplinary teaching materials that align with the curriculum and encourage sustainable practices

EVALUATION & PRIZE

The winners of the first and second prizes will receive prizes and will be additionally honoured at the annual conference in May 2025. All participants will receive a certificate confirming their participation.

Jury Composition:

- 1 project member
- 1 teacher
- 1 member from the regional platform or external experts

CONTACT & SUBMISSION

The competition entries should be submitted by each student group to the designated email address. The deadline for submissions is October 2024.

4.3 France

COMPETITION FOR UNIVERSITIES

The purpose is to develop innovative bio-based building solutions through a collaborative hackathon. Students will work in mixed groups to create and pitch their projects.

MORE ABOUT THE COMPETITION

- **School partners:** UniLaSalle Rouen and ENSA (École Nationale Supérieure d'Architecture) Normandie (validation pending)
- **When:** 1st semester (Oct-Dec 2024)
- **Length:** 1 day (8:30 AM - 6:00 PM)
- **Format:** Hackathon
- **Subject:** Building and bio-based solutions

- **Age of students:** Above 20

THEME

During one day, mixed groups of students from UniLaSalle and ENSA will work on biobased building solutions. The specific topic will be provided on the day of the hackathon.

INSTRUCTIONS FOR COMPETITION CONTRIBUTIONS

1. SUBMISSION

- Each group (max. 6 students) will pitch their project to the jury at the end of the day.

2. PROJECT REQUIREMENTS

- Clear and innovative bio-based building solutions
- A comprehensive business plan
- A well-prepared pitch

3. EVALUATION CRITERIA

- Creativity and innovation
- Feasibility and sustainability
- Presentation and pitching skills

SUGGESTED MATERIAL

- Bioeconomy materials based on BE-Rural repository (see Chapter 5)
- Digital resources and teaching materials relevant to bio-based building solutions
- Interdisciplinary materials adapted for university students to enhance their understanding and project development

EVALUATION & PRIZE

The winning group will be selected based on the jury's evaluation. The prize will include recognition and potential opportunities for further development of their project. At the end of the day, each group will have to pitch their project in front of a jury of experts.

Jury Composition:

- 1 project member
- 1 professor from each school
- 2-3 external experts

CONTACT & SUBMISSION

The competition entries will be presented in-person at the end of the hackathon day. Each group will have to pitch their project in front of the jury.

4.4 Spain

COMPETITION FOR HIGH SCHOOLS

The student competition on bioeconomy in Andalusia will take place in November 2024. The target audience is students in the 4th year of Compulsory Secondary Education, aged between 15 and 16 years old. For the implementation of the activity, the collaboration between Corporación Tecnológica de Andalucía (CTA), partner of the SCALE-UP project, and Andalucía Emprende, a regional public entity in charge of promoting entrepreneurship among young students, is proposed.

An Entrepreneurial Ideas Competition on bioeconomy will be held in Andalusia. Specifically, ideas will be sought for innovative companies or products that propose the use of olive residues to improve the circular economy associated with this crop.

The competition will be entitled: "Express Ideas Competition: Let's undertake in the olive grove!". The competition will be a way of explaining to the students some concepts related to the economic and social importance of the olive grove in Andalusia, the challenges and needs it faces and the business sectors in which olive residues are used.

MORE ABOUT THE COMPETITION

The activity proposed by CTA will last for 3 hours and will take place in the facilities of the participating educational centers. It could be developed over one or two days, reaching up to the 100 students required by the SCALE-UP project. To this end, CTA will seek one or two educational centers in Andalusia interested in participating in the activity and will contact the teachers of each class.

Once the competition date is confirmed, members of CTA and Andalucía Emprende will visit the educational centers to conduct the activity on-site. At the beginning of the competition, the CTA team will present to the students some key concepts related to the circular economy and the olive grove, show them the main olive tree residues, the industrial sectors in which they are used, and some examples of companies or innovative ideas related to them.

Additionally, Andalucía Emprende staff will explain some key concepts related to entrepreneurship or generating innovative ideas, along with the competition rules. Once this is done, students will be divided into teams of 5-6 people to work collaboratively on developing their ideas.

The activity will involve students brainstorming a business idea within an 'express' timeframe that addresses some of the challenges faced by the olive grove and its social environment. The business idea must focus on valorizing olive by-products. To participate, students will need to fill out a sheet detailing their business idea or innovative solution. They may include a drawing as illustrative support material.

At the end of the session, there will be a pitch session where teams will present the ideas they have developed.

THEME

The central theme of this Express Ideas Competition is the development of business ideas or innovative solutions based on the olive bioeconomy and the valorization of by-products.

INSTRUCTIONS FOR COMPETITION CONTRIBUTIONS

Jury Composition:

- 1 member of CTA
- 1 technician from Andalucía Emprende
- 1 sponsor

The jury will value the:

- Originality of the proposal
- Feasibility of the idea
- Acquired understanding of the concepts of bioeconomy
- Teamwork

SUGGESTED MATERIAL

CTA will prepare dissemination material, adapting the contents of the SCALE-UP project and using the educational resources on the circular economy from the BE-Rural project as an example, as well as content from the European bioeconomy projects as BIOTRANSFORM, BIObec, and ROBIN. In addition to a PowerPoint presentation, printed sheets will be prepared for the students to fill in with their proposed innovative ideas, along with blank sheets and pens.

EVALUATION & PRIZE

CTA will collect the application sheets containing the innovative ideas and will allocate time for their evaluation by the jury. The awards ceremony is expected to take place in December 2024. For this purpose, the winning educational center will be informed, and a visit will be organized by CTA, Andalucía Emprende, and a potential sponsoring company. A photograph will be taken with the winning team of students and the school's management team for promotional purposes.

The prize for the winning team and their teacher will include social media promotion, tickets to an amusement park, and an olive oil kit provided by a sponsoring company of the activity. Additionally, the educational center will receive promotion on CTA's and Andalucía Emprende's social media and website. All participating students will receive a small promotional gift for taking part in the competition.

CONTACT & SUBMISSION

On 17 September 2024, the application period for school participation will close, allowing for the preparation of the activity with teachers between October 2024 and its celebration in November 2024.

CTA will be responsible for contacting the educational centers and collecting the participation sheets from students with their innovative ideas. To manage the activity with CTA, you can contact their team at the following email address: sofia.sanchez@corporaciontecnologica.com

4.5 Poland

COMPETITION FOR HIGH SCHOOL

The High-School - Centre of Agriculture (Zespół Szkół Centrum Kształcenia Rolniczego) is strategic, led by the Ministry of Agriculture and Rural Development, and provides education in areas relevant to the SCALE UP project, such as food and gastronomy, renewable energies, agrotechnics, and environmental planning.

MORE ABOUT THE COMPETITION

- **Date:** The proposed date by the high school is late September, 2024, chosen to align with the school calendar and student availability after the start of classes.

- **Format:** Interactive and agile hackathon for co-ideation and co-creation of innovations. Follow-up activities include presentations at the [Mazovia Development Forum 2024](#).
- **Objectives:**
 1. To promote bioeconomy and the SCALE-UP project in the Mazovia region.
 2. To foster green skills and engage high-school students in co-designing innovative bio-based solutions.
 3. To equip youth talents with agile concepts for rapid development of bioeconomy innovations.
 4. To support integration of the Mazovian higher school in the local economy and promote ecosystem collaboration.
- **Agenda and Timing:** Two interconnected phases

Phase A: Hackathon Preparation, Organization, and Feedback (April 2024 - September 2024)

- Introduction to bioeconomy and circular business models.
- Community-driven bioeconomy presentation.
- Agile hackathon dynamic session, including ideation and co-creation.
- Awarding ceremony and feedback session.
- Media coverage and analysis of hackathon results.

Phase B: Hackathon Follow-up Activities (September 2024 - October 2024)

- Design of follow-up activities and cross-fertilization with other SCALE-UP initiatives.
- Presentation of hackathon results at Mazovia Development Forum 2024.
- Additional activities based on hackathon outcomes.

THEME

Agile Hackathon for Bioeconomy Development – student competition in the Mazovia region within the SCALE-UP project.

INSTRUCTIONS FOR COMPETITION CONTRIBUTIONS

- Submission of bioeconomy concepts developed during the hackathon.
- Evaluation based on innovation, feasibility, and presentation.

SUGGESTED MATERIAL

- Bioeconomy materials based on BE-Rural repository (see Chapter 5)
- Interdisciplinary resources adapted for high school students.

EVALUATION & PRIZE

The winning teams will be evaluated in-person and awarded by a jury.

Jury Composition:

- 1 project member
- 1 teacher
- 1 member from the regional platform or external experts

CONTACT & SUBMISSION

Competition entries should be submitted according to the regional guidelines provided by the organizing committee.

4.6 North Macedonia

COMPETITION FOR HIGH SCHOOL

The competition in Strumica is planned to be organised in the period October-December 2024 in the vocational high school „Dimitar Vlahov“ - Strumica, and possibly in other high schools in the region.

MORE ABOUT THE COMPETITION

The competition "Bioeconomy through Art" aims to engage students in exploring and creatively expressing concepts related to bioeconomy through various artistic and media forms. Participants will have the opportunity to showcase their talents, raise awareness about bioeconomy issues, and inspire positive change through their artwork.

A preparatory phase, planned to be scheduled for late August and September, will involve a "train the trainers" session. Representatives from SDEWES-Skopje will train high school teachers from Strumica. These teachers should then conduct classes to familiarize students with the topics and inspire them to think in the spirit of the bioeconomy. In early October, an open call should be published, allowing students to submit their entries by mid-December, individually or in teams. Afterward, a jury will evaluate the submissions and announce the top three ideas. The award ceremony should take place somewhere between January and mid-February.

THEME

The theme for the student competition in Strumica is Bioeconomy through Art Competition. Participants can submit entries in the following categories:

- Visual Artwork (Painting, Drawing, Sculpture)
- Photography
- Short Films or Documentaries
- Digital Art
- Poetry or Spoken Word
- Music
- Mixed-Media Projects

INSTRUCTIONS FOR COMPETITION CONTRIBUTIONS

- **Creativity and Originality:** Entries should demonstrate innovative interpretations of bioeconomy concepts through artistic expression.
- **Relevance to Theme:** Submissions should clearly relate to bioeconomy themes, such as sustainable agriculture, renewable energy, or biodiversity conservation.
- **Impact and Message:** Submissions should effectively convey messages about the importance of bioeconomy and sustainability to viewers or audiences.

- **Presentation:** Entries should be well-presented and effectively communicate the artist's intentions and ideas.

SUGGESTED MATERIAL

- Bioeconomy materials based on the BE-Rural repository (see Chapter 5)
- Workshops and seminars to provide background knowledge on bioeconomy concepts, artistic techniques, and media production skills.
- Mentorship opportunities connecting participants with experienced artists, media professionals, or bioeconomy experts.

EVALUATION & PRIZE

Prizes will be awarded to outstanding entries, including monetary prizes for the first, second and third place, certificates, and recognition in promotional materials.

Jury Composition:

- 1 member from SDEWES-Skopje
- 1 teacher
- 1 member from the regional platform or external experts

CONTACT & SUBMISSION

- Each participant or team can submit one entry per category.
- Submissions should be original works created specifically for this competition.
- Entries must be accompanied by a brief description (max. 200 words) explaining the inspiration and message behind the artwork or media project.
- All submissions must be sent to a designated email address by 10 December 2024.

5 Materials

The materials designed to prepare students are based on a repository developed as part of the **BE-Rural project**. The resources for the SCALE-UP student competition will provide essential guidance and support to participants, helping them to understand the bioeconomy concepts, develop their projects, and prepare their submissions. These resources can be accessed by project partners through the following [link](#). The purpose of utilizing these presentations is to familiarize teachers and students with the broad aspects of the bioeconomy. One way to achieve this is by organizing "train the trainer" sessions, where project partners will conduct a session with the teachers to present the material. The trained teachers will then present the material to the students to inspire their ideas for the competition. Another solution is for the teachers to present or give the materials directly to the students. These materials cover a variety of bioeconomy topics to provide students with insights and inspiration for their solutions. There are seven presentations focusing on various topics. However, teachers and regional partners should decide which presentations to choose based on the needs of the students, so not all presentations are mandatory. The main topics included are:

Presentation 1

Title: The Bioeconomy: Opportunities, Challenges, and Solutions

Outline

- Definition and Scope of Bioeconomy and Biomass
- Global Perspectives on the Bioeconomy
- Socio-economic Impacts and Employment in the Bioeconomy
- Relationship between Bioeconomy and Sustainable Development Goals (SDGs)
- Bioeconomy's Role in Climate Change Mitigation
- Ecological Constraints and Resource Management
- Transition Complexities and Challenges in the Bioeconomy
- Biodiversity Considerations and Impact Assessments
- Strategies for Net Positive Outcomes and Mitigation Hierarchy

What is the Bioeconomy?

The bioeconomy involves the production of goods, services, or energy using biological materials as primary resources. It emphasizes sustainability, leveraging biodegradable resources to eliminate waste and preserve resources for future generations. Biomass forms the foundation of the bioeconomy, encompassing the biodegradable fraction of products, waste, and residues from various biological origins such as agriculture, forestry, fisheries, aquaculture, and industrial waste.

Video Link: [What is Bioeconomy?](#)

European Bioeconomy Strategy

The **European Commission's Bioeconomy Strategy** aims to promote sustainable bioeconomic practices and prevent ecological overreach. Initiatives include implementing an EU-wide monitoring system and providing guidelines to ensure the bioeconomy operates within safe ecological limits.

Bioeconomy Jobs by Sector and Socio-Economic Impacts

The bioeconomy creates local jobs, but its impacts on rural communities' livelihoods must be carefully managed to prevent negative outcomes. Investments in the bioeconomy should avoid exacerbating inequalities in access to land and resources.

Key Sectors and Related SDGs:

- Agriculture: SDGs 1, 2, 3, 6, 8, 11, 12, 13, 15
- Forestry: SDGs 12, 13, 15
- Fishing and Aquaculture: SDGs 12, 13, 14
- Food and Beverages: SDGs 1, 2, 3, 6, 12, 13, 14, 15
- Bio-based Textiles: SDGs 8, 9, 12
- Wood Products and Furniture: SDGs 8, 9, 12
- Paper: SDGs 8, 9, 12
- Bio-based Chemicals and Pharmaceuticals: SDGs 3, 8, 9, 12
- Plastics and Rubber: SDGs 8, 9, 12
- Liquid Biofuels and Bioelectricity: SDGs 7, 8, 9, 11, 12

Bioeconomy activities can advance several SDGs, but potential negative effects such as land grabbing and displacement must be mitigated.

Bioeconomy and Climate Change

The bioeconomy offers significant opportunities for climate change mitigation by reducing dependence on fossil fuels and enhancing carbon sinks such as oceans, forests, and soils. The European Commission supports sustainable bioeconomic practices to foster climate resilience and reduce carbon emissions.

Ecological Limits and Resource Management

Bioeconomy resources range from discarded shells and fish skin to algae, seaweed, and even elephant poo. Efficient and sustainable resource use is crucial to avoid overexploitation and ensure ecological balance.

Video Link: [Bioeconomy Starts Here](#)

Transition Complexities and Challenges

Transitioning to a bioeconomy involves navigating technical and political challenges, addressing energy, food, and water security, and managing complex interactions among various drivers and constraints.

Biodiversity Considerations and Impact Assessments

Biodiversity assessments are vital in the bioeconomy to identify and mitigate impacts on ecosystems. This includes evaluating direct, indirect, and cumulative impacts and involving local specialists and communities in the assessment process.

Five Steps for Biodiversity Assessment:

1. Identify major constraints and significant impacts early on.
2. Use local specialists and integrate social, economic, and biodiversity considerations.
3. Engage with affected communities and use traditional knowledge.
4. Apply a precautionary approach when baseline information is limited.
5. Aim for net positive contributions to biodiversity conservation.

Environmental Impact Assessments (EIA) and Strategic Environmental Assessments (SEA)

EIAs and SEAs are processes to evaluate the environmental consequences of projects and policies, respectively, to inform decision-making and ensure sustainable development. These

assessments help in mitigating negative impacts and enhancing positive outcomes through the mitigation hierarchy (avoid, minimize, restore, offset).

Conclusion

The bioeconomy presents numerous opportunities for sustainable development, job creation, and climate change mitigation. However, careful management of resources, biodiversity, and socio-economic impacts is essential to realize its full potential and ensure long-term sustainability.

Presentation 2

Title: Bioeconomy and key principles of sustainability

Outline

- What is Sustainability?
- The Sustainability Problem
- Weak vs Strong Sustainability
- Tragedy of the Commons
- Quick Quiz
- How the Bioeconomy Contributes to Sustainability
- Ecological Limits and the Bioeconomy
- The Importance of Innovation

What is Sustainability?

Sustainability is often defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987). The Oxford English Dictionary (2020) further describes it as the degree to which a process can be maintained while avoiding the long-term depletion of natural resources. Essentially, sustainability is about managing resources so they remain available for future generations, encompassing both infinite and finite materials found on Earth.

The Sustainability Problem

Sustainability is a complex issue, often described as a “wicked problem” (Rittel and Webber, 1973) or the “problematique” (Reid et al., 2006). The challenges include incomplete knowledge, evolving targets, and the interdependence of social, economic, and ecological factors. This complexity necessitates integrative approaches to address sustainability comprehensively (Gibson, 2006).

Weak vs. Strong Sustainability

Weak sustainability posits that human-made and natural capital are substitutable in the long term. In contrast, strong sustainability asserts that they are not substitutable, emphasizing the necessity to preserve natural capital. This distinction is crucial in framing policies and approaches towards sustainability.

Tragedy of the Commons

The “Tragedy of the Commons” illustrates the conflict between individual interests and the common good. It occurs when individuals overuse a shared resource, leading to its depletion. Historical examples include the overfishing of the Grand Banks. Sustainable management of commons is critical to prevent resource depletion.

Quick Quiz

Participants can engage with a quick quiz on Mentimeter to match different scenarios to concepts such as the sustainability problem, weak sustainability, strong sustainability, and the tragedy of the commons.

How the Bioeconomy Contributes to Sustainability

The bioeconomy involves the production of goods, services, or energy from biological materials. It is inherently linked to sustainability by utilizing biodegradable resources and minimizing waste. The European Bioeconomy Strategy aims to promote sustainable bioeconomy practices to avoid reaching ecological limits. Key actions include:

- Implementing an EU-wide monitoring system.
- Enhancing knowledge through the Knowledge Centre for the Bioeconomy.
- Providing guidance on operating within ecological limits.

Ecological Limits and the Bioeconomy

Ecological limits revolve around food resources, ecosystem capacity, and population pressures. A linear economy with a growing global population, projected to reach 10 billion by 2050, risks surpassing these limits. The European Commission's measures aim to ensure that bioeconomy practices remain sustainable and within safe ecological boundaries.

The Importance of Innovation

Innovation is crucial for advancing sustainability. It involves developing new technologies and practices that reduce resource use, enhance efficiency, and minimize environmental impact. The bioeconomy exemplifies how innovation can drive sustainability by creating a circular economy where biological materials are continuously reused and recycled.

Conclusion

Sustainability requires a comprehensive approach that integrates social, economic, and ecological considerations. The bioeconomy offers a promising pathway to sustainability by utilizing renewable biological resources and promoting waste reduction. However, it must be managed within ecological limits to ensure long-term viability and equity for future generations. The European Bioeconomy Strategy and the emphasis on innovation are crucial steps towards achieving these goals, highlighting the need for continuous monitoring, knowledge enhancement, and the adoption of best practices.

Presentation 3

Title: Introduction to the Sustainable Development Goals and their connection to the bioeconomy

Outline:

- What are the Sustainable Development Goals (SDGs)?
- What are the targets in each SDG?
- Exercise on SDGs achievement around the world.
- The links between the bioeconomy and some of the SDGs.

What are the Sustainable Development Goals (SDGs)?

In September 2015, the United Nations adopted 17 Sustainable Development Goals (SDGs) with 169 specific targets, agreed upon by governments from 193 countries to achieve the 2030 Agenda for Sustainable Development. These goals aim to address global challenges including poverty, inequality, climate change, environmental degradation, peace, and justice.

A New Way of Viewing the SDGs

Johan Rockström and Pavan Sukhdev from the Stockholm Resilience Centre propose a model where the economy and society are embedded parts of the biosphere. This model emphasizes that all SDGs are interconnected, with Goal 17 focusing on global partnerships essential for sustainable development.

Exercise on SDGs Achievement Around the World

Participants can explore the achievement of SDGs in various countries through the SDG Index and Dashboards. For instance, checking the SDGs achievement in Poland in 2019 can provide insights into how well the country is progressing towards these goals.

The Bioeconomy and Its Contribution to Sustainability

The bioeconomy involves producing goods, services, or energy from biological materials. It is closely linked to sustainability as it often uses biodegradable resources and minimizes waste. The European Commission promotes a sustainable bioeconomy to avoid ecological limits and supports initiatives to develop a circular bioeconomy at national and regional levels.

Links Between the Bioeconomy and the SDGs

The bioeconomy can significantly contribute to several SDGs:

- **Goal 1: No Poverty** – The bioeconomy can help eradicate poverty by fostering local economic development and creating jobs in both urban and rural areas.
- **Goal 2: Zero Hunger** – By promoting sustainable agriculture, improving food security, and reducing food waste, the bioeconomy contributes to ending hunger. For example, using organic waste residues to produce sprays that keep food fresh longer.
- **Goal 3: Good Health and Well-being** – The bioeconomy supports good health by providing modern probiotics, essential nutrients, and reducing pollution from fossil-based products.
- **Goal 9: Industry, Innovation, and Infrastructure** – It stimulates growth in bio-based industries and fosters innovation, such as converting solid wood waste into cellulosic sugars for biofuels and other products.
- **Goal 11: Sustainable Cities and Communities** – The bioeconomy links rural and urban areas through bio-based products and contributes to sustainable construction, such as using moss plantations for air filtration.
- **Goal 12: Responsible Consumption and Production** – By decoupling production and consumption from fossil resources, the bioeconomy promotes the use of renewable resources and waste products in sectors like fashion and furniture.
- **Goal 13: Climate Action** – The bioeconomy helps combat climate change by replacing fossil resources with renewable ones and using CO₂ as a feedstock for products like building materials and fuels.
- **Goal 14: Life Below Water** – The blue bioeconomy makes sustainable use of marine resources for high-value products, such as biodegradable plastics from fish and seaweed residues.
- **Goal 15: Life on Land** – It promotes biodiversity and sustainable land management by valuing natural resources and preventing overexploitation.

Monitoring and Counteracting Negative Effects

While the bioeconomy has the potential to advance SDGs, it is crucial to monitor and mitigate any negative impacts, such as land grabbing and unequal resource distribution. Sustainable bioeconomy practices should align with broader sustainability goals, including reducing consumption and extending product life.

Conclusion

The Sustainable Development Goals provide a comprehensive framework for addressing global challenges. The bioeconomy, through sustainable practices, can significantly contribute to achieving these goals. However, careful monitoring and mitigation of potential negative impacts are essential to ensure that the bioeconomy truly supports sustainable development.

Presentation 4

Title: Bioeconomy and the Circular Economy

Outline

- Quiz on Waste Statistics
- Linear Economy
- Finite Resources
- Circular Economy
- Circular Business Models
- Barriers to Circular Economy
- Conclusion

Quiz on Waste Statistics

The quiz highlights that every second one garbage truck of textile waste is disposed of, 44.7 million tonnes of electronic waste were produced in 2016, 1.3 billion tonnes of food is wasted annually, and 300 million tonnes of plastic waste is generated each year globally.

Linear Economy

The linear economy operates on a 'Take – Make – Waste' model. In 2015, approximately 93 billion tons of virgin raw materials were extracted, with almost 70% of these being finite resources. Only 9.3 billion tonnes (9%) are recycled, with 68% becoming unrecoverable waste, leading to significant environmental and economic issues such as resource depletion, pollution, and biodiversity loss.

Finite Resources

Finite resources include metals, minerals, fossil fuels, and ecosystems. Their depletion poses severe challenges to sustainability and economic stability (UN, 2019; BBC, 2012).

Circular Economy

Defined by the Ellen MacArthur Foundation, the circular economy aims to maintain the utility and value of products, components, and materials at all times. This system emphasizes waste valorization and the continual use of resources through repair, reuse, sharing, refurbishment, remanufacturing, and recycling (Geissdoerfer et al., 2017).

Principles of Circular Economy:

1. Design out waste and pollution.
2. Keep products and materials in use.
3. Regenerate natural systems.

Video Resource:

"Rethinking Progress: The Circular Economy" (Ellen MacArthur Foundation) [Video Link](#)

Circular Business Models

1. Circular Supplies:

- Replace virgin raw materials with bio-based, renewable, recyclable, or biodegradable materials.
- Example: Vollebak's T-shirt made from pulped eucalyptus, beech, and algae biodegrades in 12 weeks.

2. Resource Recovery and Recycling:

- Recover and reuse resources or energy from waste.
- Example: Toast Ale converts bread waste into beer.

3. Product Life Extension:

- Extend product life through repair, upgrading, remanufacturing, and reselling.
- Example: Kaiyo repairs and resells unwanted furniture.

4. Sharing Economy:

- Enable sharing of underutilized products and assets.
- Example: Spinlister allows bike owners to rent out their bikes.

5. Product as a Service:

- Provide product access through leasing or pay-per-use, retaining product ownership.
- Example: Philips offers 'pay-per-lux' lighting services.

Barriers to Circular Economy

- **Cultural and Mindset Issues:** Lack of awareness or interest, and difficulty transitioning the entire supply chain.
- **Technical Barriers:** Lacking proven technologies, circular designs, high-quality remanufactured products, and data.
- **Economic Barriers:** Low price of virgin materials, high upfront costs, steep learning curves, and limited funding.
- **Regulatory Barriers:** Lack of supportive policies, obstructive laws, limited circular procurement, and lack of global consensus (Kirchherr et al., 2017).

Conclusion

The circular economy is an economic model designed to valorize waste and continually use resources. It operates on three principles: designing out waste, keeping products in use, and regenerating natural systems. Five circular business models facilitate this transition: circular supplies, resource recovery, product life extension, sharing economy, and product as a service. Despite its potential, the transition faces significant cultural, technical, economic, and regulatory barriers.

Presentation 5

Title: Agriculture and Bioeconomy

Outline

- Bioeconomy overview – what it is, ecological limits and challenges
- Agriculture feedstock
- Agriculture = A plethora of biological resources
- Why is the bioeconomy important for agriculture?
- Agriculture and SDGs
- Agri-derived Bio based products
- Impacts of biofuels
- Video: bioeconomy in a rural setting

Bioeconomy Overview

The bioeconomy refers to the production of goods, services, or energy derived from biological materials. Emphasizing sustainability, it aims to use biodegradable resources and eliminate waste, thereby preserving resources for future generations and protecting the planet. The European Commission's Bioeconomy Strategy promotes sustainable practices and tracks progress towards a circular bioeconomy, ensuring operations within ecological limits.

Agriculture Feedstock

Agriculture provides a wide array of biological resources critical for the bioeconomy. These include animal produce, manure, various crops, fruits, and vegetables. Utilizing agricultural feedstocks must avoid competing with food production and harming biodiversity, necessitating comprehensive biodiversity assessments.

Importance of the Bioeconomy for Agriculture

The farming industry, inherently linked to natural processes, produces both food and waste. The bioeconomy transforms agricultural waste into valuable resources, offering farmers opportunities to diversify, compete, and adapt to climate change and shifting dietary habits.

Agriculture and Sustainable Development Goals (SDGs)

Agriculture intersects with several SDGs:

- **SDG 1:** No poverty
- **SDG 2:** Zero hunger
- **SDG 6:** Clean water and sanitation
- **SDG 7:** Affordable and clean energy
- **SDG 12:** Responsible consumption and production
- **SDG 13:** Climate action
- **SDG 15:** Life on land

Agri-derived Bio-based Products

FPC™ (Fiber Particulate Composite)

FPC™, made from agricultural waste like coffee residues and rice husk, offers a biodegradable alternative to plastic, helping reduce oceanic plastic waste.

Biofuels from Waste Straw

Biofuels derived from agricultural residues like straw avoid competing with food crops. The EU produces 240 million tons of cereal straw annually, which can be converted into biofuel.

T-Shirts Made with Waste Milk

Using excess milk to produce clothing reduces water usage and carbon emissions, addressing waste from the dairy and fashion industries.

Paper from Cocoa Beans Shells

Transforming cocoa bean shells into paper reduces waste from chocolate production, which generates significant biomass.

Grass Fed Mobile Biorefinery

This technology processes grass into juice and fiber. The juice becomes a protein-rich feed for cows, while the fiber serves as a sustainable fertilizer or biofuel, enhancing resource efficiency.

Impacts of Biofuels

Biofuels' environmental impacts vary by generation:

- **1st generation:** Derived from food crops, they compete with food production and can cause habitat changes.
- **2nd generation:** Use non-food biomass like agricultural residues but still compete for land.
- **3rd generation:** Include engineered crops like algae, which grow in non-arable areas using wastewater, minimizing competition with food production and reducing environmental stress.

Conclusion

The bioeconomy harnesses agricultural resources to create sustainable products, aligning with several SDGs. It addresses challenges like waste management, resource competition, and climate change. By leveraging diverse feedstocks and innovative technologies, the bioeconomy transforms agricultural practices, promoting sustainability and resilience in the agricultural sector.

Presentation 6

Forestry and bioeconomy

Outline

- Bioeconomy Overview
- Biodiversity Assessment
- Forestry Feedstock
- Video: Forest Bioeconomy
- SDGs Linked to Forest Bioeconomy
- Forestry Technology
- Examples of Bioproducts

Bioeconomy Overview

The bioeconomy involves the sustainable production of goods, services, and energy from biological resources. It emphasizes using biodegradable materials and minimizing waste to ensure long-term resource availability and environmental stability. The **European Commission's Bioeconomy Strategy** supports a sustainable bioeconomy, aiming to avoid ecological limits and promote circular economy principles.

Biodiversity Assessment

Assessing biodiversity is crucial within the bioeconomy to prevent adverse impacts on ecosystems. It ensures that bioeconomy activities do not compete with food production and do not harm biodiversity hotspots, such as marginal lands important for ecosystem diversity.

Forestry Feedstock

Forestry provides diverse feedstocks for the bioeconomy, including wood residues, sawdust, bark, and various agro-forestry residues. These resources are essential for producing a wide array of bioproducts, ranging from biofuels to biomaterials.

Video: [Forest Bioeconomy](#)

SDGs Linked to Forest Bioeconomy

The forest bioeconomy aligns with several Sustainable Development Goals (SDGs), particularly SDG 15 (Life on Land), by promoting sustainable forest management, biodiversity conservation, and combating land degradation.

Forestry Technology

Sustainable Fibres from Wood

Spinnova Ltd. develops technology to produce yarn from wood fibers without harmful chemicals, offering a sustainable alternative to traditional textile materials like cotton and polyester.

Small-scale Pelletising Units

GEMCO and abc Machinery provide pelletizing technology that transforms wood waste, sawdust, and crop residues into biofuels, organic fertilizers, and animal feed, supporting local economies with decentralized processing.

Containerised Pyrolysis Unit

ETIA Biogreen offers containerized pyrolysis units that convert biomass and forest residues into valuable products like pyrolysis oil, syngas, and biochar, suitable for small-scale and temporary applications.

Biomaterials from Agro-forestry Residues & Mycelium

Spawnfoam utilizes mycelium to create biocomposite materials from agro-forestry residues, offering biodegradable alternatives for products like packaging materials and construction components.

Mobile Wood Chipping Units

Erpék Ind SRL's mobile wood chipping units provide a flexible solution for processing wood into chips, enhancing local income streams and supporting sustainable forestry practices.

Examples of Bioproducts

- **Health Drink Ho-Fi:** Utilizes conifer needle foliage for producing sodium chlorophyllin, contributing to health and immunity.

- **Eco Hairbrush by Wild Good:** Made from wild boar hair and sustainably sourced wood, offering a natural alternative to plastic hairbrushes.
- **Cosmetics Containers by Sulapac:** Biodegradable packaging material made from wood and plant-based binders, reducing plastic waste and environmental impact.
- **Bathroom Sink by Woodio Ltd:** Constructed from small woodchips bound with resin, providing a lower carbon footprint alternative to traditional ceramic sinks.

Conclusion

The forest bioeconomy represents a significant sector within the broader bioeconomy, leveraging sustainable forestry practices to produce a variety of bioproducts. By aligning with SDGs and promoting biodiversity assessments, it ensures that bioeconomic activities contribute positively to environmental conservation and societal well-being. Embracing innovative technologies like sustainable fibres and biocomposites further enhances the bioeconomy's role in achieving sustainability goals while minimizing ecological impacts.

Presentation 7

Title: Bioeconomy in the sector of essential oils and herbs for cosmetics and pharmaceuticals

Outline

- Bioeconomy Overview
- Essential Oils and Herbs: Production Methods
- Case Study Bioproducts
- Extracting Oils from Coffee Waste
- SDGs Applicable to Bioproducts in Cosmetics and Pharmaceuticals

Bioeconomy Overview

The bioeconomy focuses on producing goods, services, and energy from biological resources, promoting sustainability by utilizing biodegradable materials and minimizing waste. It aims to preserve resources for future generations and ensure environmental stability while avoiding ecological limits.

Essential Oils and Herbs: Production Methods

Essential oils are extracted from aromatic plants through methods like steam distillation or cold pressing. These oils contain unique compounds known for their health benefits, such as antibacterial and antimicrobial properties, making them valuable ingredients in cosmetics, pharmaceuticals, and aromatherapy.

Case Study Bioproducts

- **Herbs in Cosmetics and Pharmaceuticals**

Aromatic plants like lavender and peppermint are used in cosmetics for their natural essence compounds, offering benefits such as soothing skin and promoting relaxation. In pharmaceuticals, these herbs contribute to medicinal properties that aid in health and wellness treatments.

- **Essential Oils in Cosmetics and Pharmaceuticals**

Essential oils extracted from plants like pomegranate and rose are increasingly popular in organic cosmetics due to their antioxidant properties. In pharmaceutical applications, oils from conifer trees such as pine and spruce provide healing and anti-inflammatory effects for sensitive skin conditions.

- **Extracting Oils from Coffee Waste**

Revive-Eco utilizes waste coffee to extract oils, providing a sustainable alternative to palm oil in cosmetics and reducing coffee waste. This approach supports environmental conservation by mitigating deforestation linked to palm oil production.

- **SDGs Applicable to Bioproducts in Cosmetics and Pharmaceuticals**

The production of bioproducts in cosmetics and pharmaceuticals aligns with several Sustainable Development Goals (SDGs), including SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land). These goals emphasize sustainable resource use, biodiversity conservation, and reducing environmental impact.

Conclusion

The integration of new technologies in processing herbs and extracting essential oils underscores the bioeconomy's role in advancing sustainable practices within the cosmetics and pharmaceutical industries. By leveraging natural resources and minimizing waste, these innovations contribute to environmental stewardship and support economic growth while meeting consumer demand for natural, effective products. Embracing such technologies not only enhances product quality but also promotes global sustainability efforts outlined in the SDGs, fostering a harmonious balance between industry advancement and ecological responsibility.

6 Annex

6.1 Template for Open call

The template for Open call is designed to be adapted to the specific needs of each region participating in the student competition. It serves as a guide for regional partners to organize a student competition focused on advancing bio-based ideas in rural areas. The template should be customized and outline the competition format, topic, and timeline, ensuring a cohesive and region-specific approach. Regional partners will use this template to engage secondary school students and promote the event within their communities.

Open Call for Student Competition

Are you a student with a passion for innovation and sustainability? Do you want to make a difference in your community while exploring the exciting potential of the bioeconomy? If so, we invite you to participate in our student competition focused on advancing bio-based ideas in rural areas.

About the Competition:

The student competition aims to foster creativity, collaboration, and entrepreneurship among secondary school students in six regions participating in the SCALE-UP project: Northern Sweden, Mazovia in Poland, The Arc Atlantic in France, Strumica in North Macedonia, Upper Austria, and Andalusia in Spain. This competition provides a platform for students to showcase their innovative ideas and projects that contribute to the development of sustainable bioeconomies in their regions.

Who Can Participate:

- Secondary school / Universities students enrolled in the specified regions are eligible to participate.
- Individuals or Teams

How to Participate:

1. Apply individually or form a team with fellow students who share your interest in sustainability and innovation.
2. Register individually or your team with the responsible teacher.
3. Develop a bio-based idea that addresses a challenge or opportunity in your region's rural areas.
4. Prepare a presentation summarizing your idea for judging purposes.

Why Participate:

- Gain valuable experience in problem-solving, teamwork, learning about bioeconomy.
- Showcase your creativity and innovation to a panel of expert judges.
- Make a positive impact on your region by contributing to the development of sustainable bioeconomies.
- Have the chance to win prizes and recognition for your achievements.

Important Dates:

- Registration Opens:

- Submission Deadline:
- Judging and Evaluation:
- Winners Announcement:

Don't miss this opportunity to be part of a dynamic community of young innovators driving positive change in the bioeconomy. Register today and start making a difference!

For more information and to register, ask the [email address].

[Organization Name/Logo]

[Contact Information]

6.2 Template for GDPR

In compliance with the General Data Protection Regulation (GDPR), all students participating in the project are required to sign a consent form. This form ensures that students' personal data is collected, processed, and stored in accordance with GDPR standards. To facilitate this process, the form can be made available in both paper and digital formats. Partners have the flexibility to choose the method that best suits their preferences: they can either submit a paper copy or complete an online form based on the template provided below. This approach ensures that data collection is secure, convenient, and accessible, while also respecting the privacy rights of all participants.

Consent form and General Data Protection Regulation (GDPR)

According to the General Data Protection Regulation (GDPR) of the European Union (Regulation (EU) 2016/679) the collection, processing and use of personal data is allowed only if the legal provision allows or provides or the person concerned agrees to it. By signing this consent form, you as [student/parent/teacher] agree to SCALE-UP collecting, processing and using [your/ your child/student's] personal data provided under this activity solely for the purposes of the research of this project which is part of the Horizon Europe program (no. 101060264). Participation is voluntary and your contribution will be kept secret for a period of five years prior to its destruction. If you need additional information or want to exercise your rights under the EU GDPR (e.g. for accessing, correcting or deleting data), please contact the [enter your organisation name] team at [email address of the person responsible for GDPR regulations in your organisation]. Personal data and all other information will not be disclosed, shared or sold to third parties.

- I confirm that I have a copy of the SCALE-UP fact sheet which explains the project and the research it is conducting.
- I agree that my child is voluntarily attending and participating in the student competition within this project.
- Understand the purpose of the research and how her/his contribution will be integrated and used within the project.
- I consent to my child's personal data being used for the internal use of the project.
- I am aware that any information my child provides will be anonymous and will not be personally identified in the reports, papers and other documents of this project unless I have given specific consent to do so.
- I understand that I may withdraw my consent at any time.
- Understand that researchers will report and take photographs to document student competition. I agree that my child's photo may be shared for the purposes of the project and that I will notify the event organizer if I wish my child to be out of the group photo.
- I agree my child to participate based on the above and understand that this consent form will be kept secure and separate from the reports and photographs of the student competition.

Name and Surname of the Student:

Name and Surname of the Parent/Teacher: [in case of younger than 16]

Date: _____

Signature: _____

6.3 Template for List of Participants

The template provided for the list of participants must include details for each student, such as their full name, last name, grade level, school name, and either their email address or phone number and should be submitted by the teachers to the regional partners in SCALE-UP project. In addition, it is crucial for teachers to include a GDPR consent form to ensure compliance with data protection regulations.

Competition Name:

Date:

Location:

No	First and Last Name	Grade	School Name	Team name (if there are few students in same team)	Contact Information (email/phone)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Note: For any queries, contact [partner/teachers name] at [Email/Phone Number].

6.4 Template for Reporting

The reporting template serves as a comprehensive framework for documenting and evaluating student competitions, ensuring all key aspects from planning and execution to outcomes and reflections are systematically captured. It aims to provide a structured approach for organizers to analyze successes, address challenges, and identify opportunities for improvement in future competitions. This template encourages detailed reporting on preparation efforts, event logistics, judging criteria, participant feedback, and media coverage, facilitating a thorough assessment of each competition cycle. The reporting template should be filled out by the teachers or regional partners. The template should be adapt to the regional needs if necessary by omitting any points that might not be of relevance.

Student Competition Oversight and Reflection

Region:

Reporting Period:

Name of Partner Organization:

Contact Person:

Email:

1. Overview of Student Competition

1.1 Competition Title:

1.2 Date(s) and Duration:

1.3 Location(s):

1.4 Number of Participating Schools/Institutions:

1.5 Number of Participating Students:

1.6 Main Objectives of the Competition:

2. Preparation and Organization

2.1 Planning Process:

- Describe the initial planning phase. Include timelines, key milestones, and any challenges faced.

2.2 Coordination with Schools and Universities:

- Detail the communication and coordination efforts with educational institutions.

2.3 Resource Allocation:

- Summarize the resources allocated for the competition, including prizes, materials, and personnel.

2.4 Promotion and Outreach:

- Outline the promotional strategies used to attract participants.

2.5 Registration Process:

- Describe the registration process, including the number of registrations and any issues encountered.

3. Competition Execution

3.1 Event Schedule:

- Provide an overview of the event schedule, including key activities and their timing.

3.2 Judging Criteria:

- Explain the criteria used for judging the competition entries.

3.3 Roles and Responsibilities:

- List the roles and responsibilities of the organizing team and volunteers.

3.4 Technology and Tools Used:

- Describe the technology and tools used during the competition (e.g., online platforms, games).

4. Outcomes and Achievements

4.1 Winners and Awards:

- List the winners and the awards/prizes they received.

4.2 Key Achievements:

- Highlight key achievements and successful outcomes of the competition.

4.3 Feedback from Participants:

- Summarize feedback received from students, teachers, and other participants.

4.4 Media Coverage:

- Provide information on any media coverage the event received.

5. Reflection and Lessons Learned

5.1 Successes:

- Discuss the aspects of the competition that were particularly successful.

5.2 Challenges:

- Identify the challenges encountered and how they were addressed.

5.3 Areas for Improvement:

- Suggest areas for improvement for future competitions.

5.4 Best Practices:

- Highlight any best practices that emerged from the competition process.

Future Recommendations

6.1 Recommendations for Future Competitions:

- Provide recommendations for organizing similar competitions in the future.

6.2 Potential Collaborations:

- Suggest potential collaborations with other organizations or stakeholders.

6.3 Resource Needs:

- Identify any additional resources that would be beneficial for future competitions.

Additional Comments

- Include any additional comments or insights that were not covered in the sections above.

6.5 Templates for Certificates

The SCALE-UP project will provide participants and winners of the student competition with certificates for acknowledgement and recognition. These templates, could be available either in printed or digital formats depending on regional partner budgets, aim to celebrate and honor the achievements of students involved in the competition. They will serve as a formal means to acknowledge outstanding contributions and showcase the impact of their efforts within the SCALE-UP project.

1. Certificate of winning idea



2. Certificate for participants



Note: Please note that the content and style of this certificate are subject to change in the future without prior notice. The issuing organization reserves the right to modify, update, or replace any part of this certificate to reflect new information, regulations, or stylistic preferences.