
 <https://be-rural.eu>

Three-day virtual BE-Rural summer school for teachers interested in developing bioeconomy curricula

Day 1 – 25 May 2021 – Introduction to the bioeconomy and overview of the bio-economy educational resources developed by BE-Rural



Dr Elsa João, University of Strathclyde, Scotland

 <https://be-rural.eu>

Day 1 outline programme

14:00 – 15:30 CET (1.2.30pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- About bioproducts and small group discussion
- Q&A

Break (15:30 – 15:45 CET) (2.30-2.45pm UK time)

15:45 – 17:15 CET (2.45-4.15pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 – 17:30 CET (4.15-4.30pm UK time)

- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2

 **Welcome!**

Dr Elsa João
(elsa.joao@strath.ac.uk)



Senior Lecturer, Department Civil and Environmental Engineering,
University of Strathclyde, Glasgow, Scotland
<https://www.strath.ac.uk/about-us/people/civil-environmental-engineering/>

Director MSc in Environmental Entrepreneurship and
MSc in Sustainability and Environmental Studies - that
accepts students from all backgrounds.

- University lecturer in the UK since 1992.
- Expertise in Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), enhancement of positive impacts, sustainability, bioeconomy, Circular Economy and Writing Skills.
- First degree: Environmental Engineering (New University of Lisbon, Portugal).
- Master (USA) and PhD (UK) in Geography

The University of Strathclyde (founded in 1796 as 'a place of useful learning'), is a leading technological University with around 23,000 students from more than 100 nations.


University of Strathclyde launches consultation to name flagship building after inspirational women



1st May 2020 - 1st July 2020

THE ANIMOS 2019 WINNER
University of the Year

<https://www.strath.ac.uk>

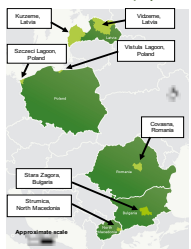
 **About the BE-Rural Project**

BE-Rural - Bio-based strategies and roadmaps for enhanced rural and regional development in the EU (April 2019 – March 2022)

BE-Rural supports

... regional stakeholders in **5 countries**:


- Bulgaria: Stara Zagora
- Latvia: Vidzeme and Kurzeme
- North Macedonia: Strumica
- Poland: Szczecin and Vistula Lagoons
- Romania: Covasna

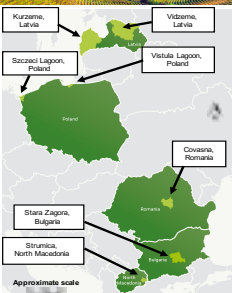


The goal of BE-Rural is to realise the potential of regional bio-based economies by supporting relevant actors in the participatory development of bioeconomy strategies and roadmaps.

This includes educational activities and resources.

<https://be-rural.eu/innovate-to-n-regions/>

 **Sectors of BE-Rural**



Vidzeme and Kurzeme, Latvia: focus on the potential of by-products of **forest management** (i.e. young forest stand thinning, short rotation coppice and forestry plantations, removing overgrowth in abandoned agricultural lands).






Szczecin Lagoon and Vistula Lagoon, Poland: focus on small-scale **fisheries**, specifically the sustainable use of underused and low-value fish species in the lagoons.

Covasna, Romania: focus on addressing fragmented value chains and implementing the **circular economy** concept within the county's industrial sectors (i.e. wood and furniture, textiles, agro-food, mechanical engineering, green energy).

Stara Zagora, Bulgaria: focus on new technologies for the application of **essential oils and herbal plants** in the cosmetics and pharmaceutical industry, combined with tourism activities.

Strumica, North Macedonia: focus on the use of **agricultural residues**, specifically the by-production of organic materials from agricultural activities, as a source of energy for domestic and industrial purposes.

 **Regional & country facilitators**

| | |
|--|--|
|  | Bulgarian Industrial Association – Union of the Bulgarian Business (BIA), Bulgaria https://en.bia-bg.com |
|  | Institute for Economic Forecasting (IPE), Romania http://www.ipe.ro/ |
|  | International Centre for Sustainable Development of Energy, Water and Environment Systems – Macedonian Section (SDEWES-Skopje), North Macedonia https://www.sdeswes.org |
|  | Latvian State Forest Research Institute (SILAVA), Latvia http://www.silava.lv/ |
|  | National Marine Fisheries Research Institute (NMERU), Poland https://mir.gdynia.pl/ |

Virtual 3-day summer school

Day 1 - Tuesday 25 May, 14:00-17:30 CET
Introduction to bioeconomy and overview bioeconomy educational resources developed by BE-Rural
 Dr Elsa João (University of Strathclyde), with the support of Neil Georgieva (European Policies Research Centre)

Day 2 - Tuesday 1 June, 14:00-17:30 CET
Bioeconomy of different sectors (e.g. fisheries, agriculture) and how best to integrate bioeconomy teaching in schools in Bulgaria, Latvia, North Macedonia, Poland and Romania.
 Dr Elsa João (University of Strathclyde), with the support of Stefan Kah (European Policies Research Centre)

Day 3 - Tuesday 8 June, 14:00-17:30 CET
Developing the industrial biotechnologists of the future: the innovative work of IBioIC (Industrial Biotechnology Innovation Centre) with Scottish schools.
 Chair: Dr Kirsty Robb (RapidBio Senior Scientist, IBioIC), with the support of Dr Elsa João (University of Strathclyde)

At the end of each day there is a short survey for attendees to fill in - important for the CPD (Continuing Professional Development) certificate of the participation in summer school.

Virtual 3-day summer school


Day 3 will be run by IBioIC




IBioIC supports companies in their innovation journey working across the bioeconomy.

<https://www.ibioic.com>


Summer School Speakers




Dr Elsa João
 Senior Lecturer, Department of Civil and Environmental Engineering, University of Strathclyde (Scotland)
 (Days 1, 2 and 3)




Neil Georgieva
 Research Associate, European Policies Research Centre based at University of Strathclyde (Scotland) & TU Delft (the Netherlands)
 (Day 1)




Stefan Kah
 Research Fellow, European Policies Research Centre, based at University of Strathclyde (Scotland) & TU Delft (the Netherlands)
 (Day 2)




Dr Kirsty Robb
 RapidBio Senior Scientist, IBioIC - Industrial Biotechnology Innovation Centre (Glasgow, Scotland)
 (Day 3)



Debbie McCreath
 Public Affairs Manager, IBioIC - Industrial Biotechnology Innovation Centre (Glasgow, Scotland)
 (Day 3)



Graeme Rough
 Head of STEM programmes of the Scottish Schools Education Research Centre (SSERC)
 (Day 3)

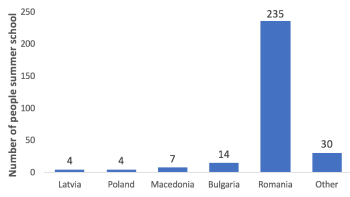


Dr Jo Sadler
 Research Fellow and Principle Investigator at the University of Edinburgh, Scotland.
 (Day 3)

Summer School Attendees

Plan A (before pandemic) – do a summer school in person, in Glasgow, Scotland, for **15-20 people**.

Plan B (after pandemic) – do a virtual summer school, **with more than 15-20 people**



Total of 294 people!

Using zoom

First things first!

In zoom, rename your name as:

Name (Country)

Using zoom

1. We will use polls

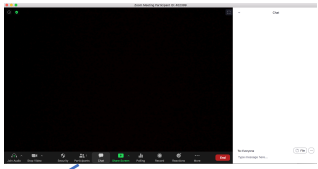
Poll 1: Have you used zoom before?

1. Have you used zoom before?

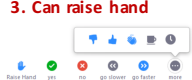
☐ Yes

☐ No


2. We will use the chat function



3. Can raise hand



4. We will use breakout groups



First breakout group

This course is also a way for attendees to interact with each other

In small groups, introduce yourself using zoom breakout rooms (5 minutes task):

Your name

What is your work

What makes you happy



Day 1 outline programme

14:00 – 15:30 CET (1-2:30pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- **Key principles of bioeconomy**
- About bioproducts and small group discussion
- Q&A

Break (15:30 – 15:45 CET) (2:30-2:45pm UK time)

15:45 – 17:15 CET (2:45-4:15pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 – 17:30 CET (4:15-4:30pm UK time)

- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2

The magic of bioeconomy - 1



3 minutes video

https://www.youtube.com/watch?v=d6RUh7PGnU_M

The magic of bioeconomy - 1



Water saving:

1 kilo of milk fibre – 1 litre of water

Vs

1 kilo of cotton – 15 litres of water

Special properties of milk fibre:
antibacterial and anti-allergic

New industry and new jobs



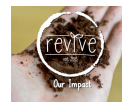
The magic of bioeconomy - 2



1:20 minutes video

https://www.youtube.com/watch?v=lc7d/a_h5CtM

The magic of bioeconomy - 2

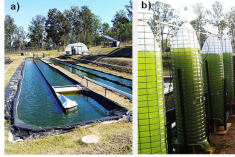


The magic of bioeconomy - 3

Third generation biofuels

Third generation biofuels (e.g. engineered crops such as algae), present the best possibility for alternative fuel because they don't compete with food. Algae can grow in areas unsuitable for 1st and 2nd generation crops, which would relieve stress on water and arable land used. Plus it can be grown using sewage, wastewater, and saltwater.

Note:
First generation biofuels (e.g. rape oil, sunflower oil, beet, sugarcane, corn, potatoes) - main drawback: come from biomass that is also a food source.
Second generation biofuels (e.g. agricultural and forest residues) come from non-food biomass, but still compete with food production for land use.



Algae Energy Farm (Algae Biotechnology Laboratory, University of Queensland, Australia): (a) Cultivation on open ponds, following initial growth in sealed bags (b).

Source: Corrie, D., Heathorn, B., Ferguson, L., Hill, J., Broadbent, H., Thomas-Morris, P. (2019). Toward the implementation of sustainable biofuel production systems. *Renewable Energy* 130: 252-259.

Source: Oregon State University (n.d.). Bioenergy Education Initiative. <https://www.bioenergyeducation.org/energy-education-portal/bioenergy-education-portal-v3.3.pdf>

What is the bioeconomy?


European Bioeconomy Strategy

The Bioeconomy...

- Is the production of goods, services, or energy from biological material as the main resource.
- Is strongly linked to sustainability as biodegradable resources are often used and waste is often completely designed out of the system.
- Can avoid the depletion of resources for future generations and protect the stability of the planet.

The European Commission is taking steps towards a sustainable bioeconomy and has a bioeconomy strategy to promote the bioeconomy and to avoid reaching ecological limits.


"To be successful, the European bioeconomy needs to have sustainability and circularity at its heart."
 (European Commission, 2018, p. 4)



European Commission (2018). A sustainable bioeconomy for Europe strengthening the connection between economy, society and the environment. *United Bioeconomy Strategy*. Directorate-General for Research and Innovation October 2018. <https://ec.europa.eu/research/bioeconomy/pdf/eu-bioeconomy-strategy-2018.pdf>

Bioeconomy around the world

Bioeconomy Policies around the World



- dedicated bioeconomy strategy
- bioeconomy-related strategy
- bioeconomy-related strategy, dedicated strategy under development

As of March 2019

Jobs and the bio-based sector

EU Bioeconomy Jobs by Sector (2015)

| SECTOR | EMPLOYMENT (MILLION) | TURNOVER (BILLION EUR) | VALUE ADDED (BILLION EUR) |
|--|----------------------|------------------------|---------------------------|
| AGRICULTURE | 9.2 | 380 | 174 |
| FORESTRY | 0.5 | 50 | 24 |
| FISHING AND AQUACULTURE | 0.2 | 12 | 7 |
| FOOD, BEVERAGES AND OTHER AGRO-INDUSTRIES | 4.5 | 1153 | 233 |
| BIO-BASED TEXTILES | 1.0 | 103 | 28 |
| WOOD PRODUCTS AND FURNITURE | 1.4 | 174 | 47 |
| PAPER | 0.6 | 187 | 46 |
| BIO-BASED CHEMICALS AND PHARMACEUTICALS, PLASTICS AND RUBBER | 0.4 | 177 | 56 |
| LIQUID BIOFUELS | 0.05 | 12 | 3 |
| BIOELECTRICITY | 0.01 | 11 | 3 |

The 2015 employment numbers in the EU for the bioeconomy sectors. These industries reached close to **18 million jobs** and added value back to the economy that reached approximately **€621 billion**.

Source: European Commission (2018). A sustainable bioeconomy for Europe strengthening the connection between economy, society and the environment. *United Bioeconomy Strategy*. Directorate-General for Research and Innovation. <https://ec.europa.eu/research/bioeconomy/pdf/eu-bioeconomy-strategy-2018.pdf>

Warning: The bioeconomy can also have negative impacts in local jobs. The quality of work and livelihoods of rural communities depend on direct access to land and water for food production, community and cultural life. So if production of bioproducts effects livelihoods of rural communities, then that would be an unacceptable negative impact.

It is critical that investments in the bioeconomy do not increase inequalities in income, power and access to resources, such as land and water.

What is the bioeconomy?



A SUSTAINABLE BIOECONOMY FOR EUROPE:
STRENGTHENING THE CONNECTION BETWEEN ECONOMY, SOCIETY AND THE ENVIRONMENT



18 November 2017
Carlos MOEDAS
EU Commissioner for Research, Science and Innovation

Video (2 minutes and 9 seconds): https://www.youtube.com/watch?v=RFRN_hHelKk
 Languages for subtitles for video include: Bulgarian, Latvian, Macedonian, Polish and Romanian

Key terms linked bioeconomy

Bio-based - Derived from biomass.

Biomass - The biodegradable fraction of products, waste and residues from biological origin from agriculture, including vegetable and animal substances, from forestry and related industries, fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin.

Bio-based product or bioproduct - Product wholly or partly derived from biomass

Bioeconomy or Bio-based Economy - The sustainable production of biomass and the conversion of biomass into value added products, such as food, feed, bio-based products and bioenergy. It includes the sectors of agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries.


Biotechnology - The application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or nonliving materials for the production of knowledge, goods and services.

Bio-based sector - The sector that incorporates businesses and associations that self-identify as bio-based or bioeconomy (Leipold and Petit-Brix, 2018)

Source: European Commission (n.d.). Bioeconomy Glossary. Knowledge Centre for Bioeconomy. <https://knowledgecentreforbioeconomy.eu/bioeconomy-glossary>
 Leipold, S and Petit-Brix, A (2018). Bioeconomy and the bio-based sector - Perspectives of European and German stakeholders. *Journal of Gender Product*, 10, 112-122.

Biomass knowledge is critical

Biomass is the physical basis of the bioeconomy



- Knowledge on biomass production, availability and uses is key.
- Measuring biomass availability is important because it is limited, which can potentially lead to competition for biomass between different biomass-using sectors.
- Very importantly, it is fundamental that the bioeconomy operates within safe ecological limits.
- It is critical that the bioeconomy does not compete with food production and does not affect biodiversity. For example, marginal lands may not be used for food production but may be important for biodiversity.

EC (2019). Biomass - Knowledge for policy. https://ec.europa.eu/knowledge4policy/bioeconomy/topic/biomass_en

Q&A

Any questions in the chat?

BE-Rural
<https://be-rural.eu>

Day 1 outline programme

14:00 – 15:30 CET (1-2:30pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- **About bioproducts and small group discussion**
- **Q&A**

Break (15:30 – 15:45 CET) (2:30-2:45pm UK time)

15:45 – 17:15 CET (2:45-4:15pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 – 17:30 CET (4:15-4:30pm UK time)

- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2

Bioeconomy resources

So what can the bioeconomy use as resources?

- Discarded Shells and Fish Skin from Fisheries
- Aquafaba (the water leftover from cooking chickpeas)
- Algae and Seaweed
- Milk Protein
- Mushroom Roots
- Coffee Grounds
- Wheat Bran
- Plants
- Insects
- Wood
- Elephant Poop



From these resources, bioproducts are created.

Discussion on bioproducts

In small groups, explore and discuss this bioproducts catalogue (5 min task)

Catalogue of bioeconomy solutions
Finding key information of promising bioeconomy solutions

Refine results choosing one or more of your desired properties



Access in here:
<https://www.bio-based-solutions.eu/#/>

Key: TRL (Technology Readiness Level) - the maturity of a technology ranging: 1 (low) - 9 (high). Values TRL6-TRL9 included in catalogue (TRL6 = prototype demonstration).


This catalogue, created by Power4Bio, is an online database with factsheets on existing bio-based solutions chosen from the application fields of bioenergy, biomaterials, biochemicals, and food & feed. The catalogue intends to be used by stakeholders in a region to get an overview of available promising options to cover a wide range of biomass feedstock into a range of bio-based products, paying special attention to solutions ready to be deployed at small-scale in rural areas. The solutions shall inspire regions to replicate them in their local context.

POWER4BIO
REGIONS FOR BIOECONOMY
<https://power4bio.eu>

Q&A

Any questions in the chat?


Break



Back at:

15:45 CET

(2.45pm UK time)





Day 1 outline programme

14:00 – 15:30 CET (1-2.30pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- About bioproducts and small group discussion
- Q&A

Break (15:30 – 15:45 CET) (2.30-2.45pm UK time)

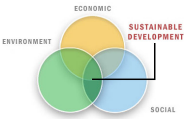
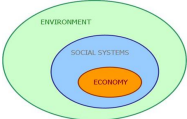
15:45 – 17:15 CET (2.45-4.15pm UK time)


- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 – 17:30 CET (4.15-4.30pm UK time)


- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2

Sustainability diagrams




Weak vs Strong sustainability



Weak Sustainability

- Assumes that manufactured capital is of equal value, can take the place, of natural capital.
- Allows for the depletion of natural resources, so long as such depletion is replaced by increases in human-made capital (e.g. by investing royalties from depleting mineral reserves in factories).
- It allows trade-offs.



Strong sustainability

- Requires that all forms of capital must be maintained independently of one another.
- Existing natural stocks must be retained, e.g. timber stocks, as the functions they perform cannot be replaced.
- Limits substitution of environmental capital by human-made capital and allocates some resources as critical natural capital (stock) to survival.
- It imposes thresholds.

UN Sustainable Development Goals (SDGs)

- The SDGs came into effect in January 2016.
- The 17 SDGs contain **169 specific targets**.
- The aim is to try and reach these targets by **2030**.
- Achieving the SDGs requires the partnership of governments, private sector, civil society and citizens.





















<https://sdgs.un.org/goals>

UN Sustainable Development Goals (SDGs)



THE 17 GOALS

169 targets 3042 indicators 1278 platforms 5420 actions



After the summer school, check UN resources on SDGs
<https://sdgs.un.org/goals>

SDGs 'Wedding Cake Model'

New way of viewing the economic, social and ecological aspects of the SDGs
(proposed by Johan Rockström and Pavan Sukhdev, Stockholm Resilience Centre)

- The economy and society are integral part of the biosphere (which relates to the concept of "strong sustainability").
- All SDGs are directly or indirectly connected to each other.
- Goal 17 is the global partnership required for sustainable development.

Wedding Cake model of the Sustainable Development Goals - 1:41 min video
<https://www.youtube.com/watch?v=Wu8xyzIPRhM>

Source: Author (images for Stockholm Resilience Centre, Stockholm Resilience Centre)

Links between SDGs and Bioeconomy

Sustainable Development Goals are affected by bioeconomy activities

A sustainable bioeconomy has the potential to advance several SDGs.

However, there can also potential negative effects that should be eliminated or reduced. For example, "increased demand for land can lead to land grabbing, displacements, unequal distribution of land considering soil quality, and loss of communal land" (Heimann, 2019, p. 52)

Blue arrow: Socioeconomic targets.
Green arrow: Ecological targets.
Red arrow: Clean industry & economic targets.

Source: Heimann, T. 2019. Bioeconomy and SDGs: does the bioeconomy support the achievement of the SDGs? *Birth's Future*, 7(1), pp.43-57.

Interactions among Sustainable Development Goals (SDGs)

This assessment reveals the relative importance of the **potential trade-offs** and the **co-benefits** by mapping the summed scores of influencing (horizontal) and influenced (vertical) interactions among SDGs. Figure also shows important gaps in knowledge where certain cells in the matrix are left blank.

This figure is based on 65 global assessments comprising UN reports and international scientific assessments, as well as 112 scientific articles published since 2015 with explicit reference to the SDGs.

Source: Independent Group of Scientists appointed by the Secretary-General (2019), *Global Sustainable Development Report 2019: The Science to Achieve the Sustainable Development Goals*, (United Nations, New York).
<https://www.un.org/sustainabledevelopment/global-sustainable-development-report-2019/>

SDGs around the world

Exercise on SDGs achievement around the world

Sustainable Development Report Dashboards 2019
Transformations to Achieve the Sustainable Development Goals

Access this site <https://dashboards.sdgindex.org/map> and pick a country of your choice to check their SDGs achievement (including the 169 targets).

Q&A

Any questions in the chat?

Day 1 outline programme

14:00 – 15:30 CET (1-2:30pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- About bioproducts and small group discussion
- Q&A

Break (15:30 – 15:45 CET) (2:30-2:45pm UK time)

15:45 – 17:15 CET (2:45-4:15pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural**
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 – 17:30 CET (4:15-4:30pm UK time)

- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2

BE-Rural Educational Materials

Output 2 - Power point slides for presentations with notes for teachers

Power point slides on:

1. What is the bioeconomy: opportunities, challenges and solutions
2. Key principles of sustainability and links to bioeconomy
3. Intro to the Sustainable Development Goals (SDGs) and their links to bioeconomy
4. Key principles of the Circular Economy and links to the bioeconomy
5. Agriculture and the bioeconomy
6. Forest bioeconomy
7. Bioeconomy in the fisheries sector
8. New technologies for processing herbs and producing essential oils for cosmetics and pharmaceutical industries

Slide

Notes for teacher, comments and links

Notes to the teacher:
Teacher's name to go in the space in the space at the bottom left of the slide. Explain that this presentation introduces the new technologies for processing herbs and producing essential oils for the cosmetics and pharmaceutical industries.

Excluding the video, the outline slide and this first slide, there are 11 slides - so these slides should take between 11 and 22 minutes to present, depending on amount of explanation.

Notes to teachers:
Explain the structure of the lecture to students to set the scene on what will be covered.

The lecture provides information on the processing of essential oils and herbs for use in the cosmetics industry and gives some examples of how these are currently being used. Links to the Sustainable Development Goals (thereafter SDGs) are also made to highlight the additional socioeconomic benefits which creating bioeconomy in these industries bring.

Available in English, Bulgarian, Latvian, Macedonian, Polish and Romanian (all in here: <https://be-rural.eu/resources>)

BE-Rural Educational Materials

Output 3 - Workshops, quizzes and games

Workshop and Card Game "Business Match"

Easier word search - 10 hidden words

K E N N E D Y
M A S O N
N O I T
R E U C A U O A
S U S T A I N A B L E
G R A S S L A N D
M E S L O C U V O
F E R T I L I S E R G
A N O P C A M X M

Bioeconomy Word Search Puzzles

Game "Sustainability and SDGs Heatwave"

Available in English, Bulgarian, Latvian, Macedonian, Polish and Romanian (all in here: <https://be-rural.eu/resources>)

"BE-Match" and "SDG-Link" Games - One set of cards for two games

BE-Rural Educational Materials

Output 4 - Proposed extracurricular activities (e.g. school clubs or societies)

- Activities could run weekly, bi-weekly or monthly.
- Decisions on extracurricular activities should come from students and teachers, in terms of interests and what is possible and relevant for their school.

Using the chat, write your views on these suggestions or add new ideas for extracurricular activities on bioeconomy or sustainability.

Welcome to the "Trash is Gold" Club
Fair meeting - students could see three short videos on bioeconomy, one on CE and one on SDGs. Students could decide club name and agree activities to be done over the year.

Circular me
Each club member to think how they can become more circular and sustainable at home and in the things they do. Then they share ideas and successes with the club.

Grow food from scraps
Some fruits and vegetables that you can replant and grow yourself from scraps! Lettuce, celery, ginger, pineapple, garlic, onions, basil, apples, sorting on time. Give it a try!

What job and career?
What qualifications would be needed to pursue a career in the bioeconomy? Explain the bioeconomy career map.

Games and Quizzes
Play with the wide range of games and quizzes on bioeconomy, CE and SDGs. Could compete in groups. Could vote for best quiz and game. Could create new games and quizzes.

Ethical Fashions
Think of the environmental and social impacts of the fashion industry, and what can be done about it. Can you do some clothes from recycled materials? Can you recycle some old clothes?

Visit in or visit out
Invite an industry speaker to come and talk to the club or go on a site visit. Could you also present what the club is doing? Could industry guest help with some of your work?

Repair Fair
Organise event where people bring broken items that need repairing and they learn to repair them from people who volunteer to help - repair bikes, clothing, Reduce waste and improve quality of life.

Life on land
This is SDG15 - what can we do to achieve it? What products we can get from forestry and agriculture? What about essential oils from plants to be used in cosmetics and medications?

Life below water
This is SDG14 - what can we do to achieve it? What products we can get from fisheries? What art work we can do with this theme? How can we reduce plastic in the sea?

BE-Rural Educational Materials

Day 1 outline programme

14:00 - 15:30 CET (1-2:30pm UK time)

- Welcome - plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- About bioproducts and small group discussion
- Q&A

Break (15:30 - 15:45 CET) (2:30-2:45pm UK time)

15:45 - 17:15 CET (2:45-4:15pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 - 17:30 CET (4:15-4:30pm UK time)

- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2

Educational Events

The five OIP regions have carried out a series of educational events where the BE-Rural educational materials were used.

Educational events in Strumica region, North Macedonia

TEACHERS

1. First educational event, online, 8 participants, 18.02.2021
2. Second educational event, online, 6 participants, 25.02.2021

STUDENTS

1. First educational event for high school students, online, 94 participants, 15.03.2021
2. Second educational event for high school students, hybrid, 10 participants, 24.03.2021
3. Third educational event for pupils, online, 74 participants, 26.03.2021
4. Fourth educational event for pupils, online, 25 participants, 26.03.2021

presentations, quizzes, polls, videos

Educational events in Polish Lagoons region

TEACHERS
1st educational event, Kadyń, 6 participants, 18.02.2021

STUDENTS
2nd educational event for high school students, Nowy Dwór, 20 participants, 05.03.2021
3rd educational event for primary school pupils, on-line, 34 participants, 09.03.2021
4th educational event for University students, online, 36 participants, 19.04.2021

presentations → quizzes → games → workshops →

Educational events in Covasna region, Romania

TEACHERS AND UNIVERSITY STUDENTS
1. First educational event, online, 35 participants, 10.03.2021

HIGH SCHOOL STUDENTS
2. Second educational event for high school students, online, 33 participants, 11.03.2021
3. Third educational event for technological high school students, online, 31 participants, 12.03.2021

CLOSE TO 100 PARTICIPANTS: TEACHERS, UNIVERSITY STUDENTS AND HIGH SCHOOL STUDENTS
Another educational event aimed at business people was part of the 3rd SWG Meeting, on 5.12.2020, with 18 participants online.

Educational events in Latvia

TEACHERS and other interests online.
1. First educational event, online, 21.08.2020.
Records of video education posted on LSFRI Silava website - <https://youtu.be/T9L4TK8CkUg>, and introduction with materials in Latvian (6.04.2021.) <https://youtu.be/rHxvk-SkD7c>

Open air fair/exhibition visitors «Bioeconomy come to Jelgava»
2. Promoting of education materials and short introduction how to use them, open air fair, 18.09.2020.

Attendees of Side by side Vidzeme innovation week
3. Educational event for schools, life long, high schools teachers, online, 22.02.2021.
<http://innovation.vidzeme.lv/lv/pasakumi/2021-02-22/bioekonomikas-peles-kolas-darba-kolektivos-un-draugu-loka.html>

Promoting of education materials and records from online events in Forest sector conference (January 2021 and Science night April 2021)
<http://www.silava.lv/73action.aspx?1118>
<https://www.zinatneskonferencija2021.lv/main-feed>

Educational events in Stara Zagora region, Bulgaria

THREE EDUCATIONAL EVENTS IN THE STARA ZAGORA REGION

- Two online events held by the **Trakia University**
25 January 2021 - 27 participants
26 January 2021 - 27 participants
- One physical event held by the "Knyaz Simeon Tarnovski" **Trade High school**
2 March 2021 - 70 participants

OVER 120 EXTERNAL PARTICIPANTS

Q&A

Any questions in the chat?

Day 1 outline programme

14:00 – 15:30 CET (1-2:30pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- About bioproducts and small group discussion
- Q&A


Break (15:30 – 15:45 CET) (2:30-2:45pm UK time)

15:45 – 17:15 CET (2:45-4:15pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching**

17:15 – 17:30 CET (4:15-4:30pm UK time)


- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2



Mini-Snowball discussion

If you had all the money, time and resources you needed (e.g. 1 million EUR, 2 full days each week, and you were the education minister of the country), **what would be the best ways for bioeconomy learning to be integrated in school teaching?**

- Individually** – write 3 best ways for bioeconomy learning to be integrated in school teaching (5 min).
- Discuss in **small groups** – decide only three best ways (15 min).
- Write the three points in slide (3 min) – choose slide number according to group number - **see link for the white board in the zoom chat.**
- Each group to present slide in **plenary** (1 minute per group).



Day 1 outline programme

14:00 – 15:30 CET (1-2:30 pm UK time)

- Welcome – plus about Dr Elsa João and the University of Strathclyde
- About the BE-Rural Project
- Introduction to the Summer School
- Key principles of bioeconomy
- About bioproducts and small group discussion
- Q&A


Break (15:30 – 15:45 CET) (2:30-2:45 pm UK time)

15:45 – 17:15 CET (2:45-4:15 pm UK time)

- Key principles of sustainability and the UN SDGs
- Overview of educational resources by BE-Rural
- Overview bioeconomy events in each region
- Discussion on how can bioeconomy learning be integrated in school teaching

17:15 – 17:30 CET (4:15-4:30 pm UK time)

- Fill feedback survey about Day 1 of the summer school
- Q&A, summary day 1, and link to day 2



First breakout group

Fill feedback survey about Day 1 of the summer school

Check survey link in the zoom chat

Important for the CPD (Continuing Professional Development) certificate of the participation in summer school.



What to do before Day 2

Watch videos with subtitles in your language



Check BE-Rural education materials in your language



<https://be-rural.eu/resources/>

Look at the maps and data of SDGs and their targets around the world



<https://dashboards.sdgindex.org/map>

Check the e-UNESCO resources



UNESCO resources for educators of early childhood care and education, primary education, & secondary education.
<https://en.unesco.org/themes/education/digital>

Check the learning scenarios of the BLOOM School Box



<https://bloom-bioeconomy.eu/school-one-two-4/school-box/>



Day 2 outline programme

14:00 – 15:30 CET (1-2:30 pm UK time)

- Introduction to Day 2 of the Summer School
- Summary of Day 1 of the Summer School
- More about the BE-Rural Project and the different working packages
- Key principles of circular economy
- Connecting student learning with industry projects, lessons from Strathclyde
- Small group discussion about students' industry projects
- Q&A

Break (15:30 – 15:45 CET) (2:30-2:45 pm UK time)

15:45 – 17:15 CET (2:45-4:15 pm UK time)

- Bioeconomy of different sectors (e.g. fisheries, agriculture, forestry, cosmetics)
- Workshop on teaching bioeconomy in each of the five innovation regions, grouped by country and language

17:15 – 17:30 CET (4:15-4:30 pm UK time)

- Fill feedback survey about Day 2 of the summer school
- Q&A, summary day 2, and link to day 3



Questions and Discussion

