BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Deliverable 2.1

Collection and assessment of good practices and case studies related to EU and regional training initiatives in bioeconomy

Consortium

CIVITTA · Q-PLAN INTERNATIONAL · LOBA · PEDAL CONSULTING · FVA NEW MEDIA RESEARCH · ZVT Agricultural Research, Ltd. Institute · CoE BBE Centre of Expertise Biobased Economy · DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRO-ALIMENTARI · btg biomass technology group · WILA Bonn

Funded by the European Union

@biogovnet
info@biogov.net www.biogov.net

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Deliverable 2.1

Collection and assessment of good practices and case studies related to EU and regional training initiatives in bioeconomy

DELIVERABLE TYPE	MONTH AND DATE OF DELIVERY
Report	Month 12, May 2023

WORK PACKAGE	LEADER
WP 2	PEDAL Consulting

DISSEMINATION LEVEL	AUTHORS
Public	Jana Bielikova (PEDAL) John Vos (BTG) Georgios Sakellaris (ART)

Programme	Grant Agreement Number	Duration	Start
Horizon	101060742	36 Months	1 June 2022

Funded by the European Union

Contributors

NAME	ORGANISATION
GABRIELA MEZEIOVA	SLOVAK ECO-QUALITY
STANISLAV MISKUF	PEDAL CONSULTING

Peer Reviews

NAME	ORGANISATION
SELENIA MARINELLI	FVA
BEATRIZ CORREIA	LOBA
WILLEM SEDEREL	CIRCULAR BIOBASED DELTA
KONSTANTINOS E. VORGIAS	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
MARI SAAR	CIVITTA ESTONIA

Revision History

VERSION	DATE	REVIEWER	MODIFICATIONS
0.1	08/05/2023	JANA BIELIKOVA	DRAFT VERSION SENT FOR REVIEW
0.2	09/05/2023	SELENIA MARINELLI	MODIFICATIONS INCLUDING EDITORIAL COMMENTS
0.3	22/05/2023	KONSTANTINOS E. VORGIAS	COUNTRY PROFILE OF GREECE UPDATED
0.4	23/05/2023	BEATRIZ CORREIA	COUNTRY PROFILE OF NETHERLANDS UPDATED
0.5	23/05/2023	WILLEM SEDEREL	MODIFICATIONS INCLUDING EDITORIAL COMMENTS
1.0	29/05/2023	MARI SAAR	FINAL VERSION FOR SUBMISSION

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Table of Abbreviations and Acronyms

Abbreviation	Meaning
Art	cultural and creative industries
BBI JU	Bio-Based Industries Joint Undertaking
CoP	Community of practice
ECTS	European Credit Transfer and Accumulation System
EQF	European Qualification Framework
EU	European Union
H2020	Horizon 2020
HE	higher education
HEI	Higher education institution
JRC	Joint Research Centre
LGBTIQ	People who identify themselves as lesbian, gay, bisexual, trans, non-binary, intersex and queer
MOOC	Massive Open Online Course
NEET	Not in Education, Employment, or Training
NGO	Non-governmental organization
SDGs	Sustainable Development Goals
SME	Small and medium-sized enterprises
STEM	Science, Technology, Engineering and Math
STEAM	Science, Technology, Engineering, Arts and Math
VET	Vocational education and training

Index of Contents

Index of Tables

Index of Figures

1 Executive Summary

The bioeconomy is expected to be a lever for sustainability and a solution to several ecological and social challenges, including climate change mitigation, cleaner production processes, economic growth, and new employment opportunities. However, despite all the efforts, the transition towards a sustainable bioeconomy is progressing slowly.

Therefore, the strategic objective of the BioGov.net project is to support the establishment of the innovative governance model in bioeconomy training and skills development to achieve better-informed decision-making processes, social engagement of all actors and uptake of sustainable innovations in bioeconomy. Co-creation and a systemic approach are key to ensure collaboration between bio-system actors, academia, and governments to reach a tailor-made solution for each BioGov.net region and validate the solutions on EU level.

To understand the regional contexts, (a) information was gathered on the specificities of each of the regions' bioeconomy and sector development and (b) collection and assessment of good practices and case studies in education, training and skills development in bioeconomy targeting adult learners was conducted. As the group of adult learners includes individuals with very diverse needs and potentials (e.g., complementing education for professionals versus increasing the employability of people from marginalised, disadvantaged or vulnerable groups), a variety of programs was considered (targeting various sectors, EQF levels, and delivery formats - see Section 3).

Collection of the practises and studies are envisaged to identify key elements of success, its usage and replicability in regional context by considering local capacities, opportunities, barriers, potentials, responsiveness to bioeconomy goals and bio-systems expectations, but also the needs and potentials of the final beneficiaries (the adult learners). This deliverable presents the results of work package 2 (Collection and assessment of good practices and case studies related to EU and regional training initiatives in bioeconomy), the aim of which is to:

1. Identify existing actions towards good governance approaches to training and skills building, especially those that follow system thinking, taking into account the regional availability of feedstock, the infrastructures, technological capacities, design, art and culture;
2. Analyse key elements for flexible training courses accessible for all; social innovation and new engagement approaches related to bioeconomy strategies and its goals.

With the aim to achieve these objectives and in line with the project requirements, guideline documents (see Annex 1 and 2) were developed to specify the scope of the project and provide partners with templates and instructions for data collection, focusing on both the regional specificities of the 8 BioGov.net regions, as well as examples of successful educational and/or skill development formats.

This report describes the methodology applied ***(Section 3)***, country profiles focusing on geographical and thematic orientation ***(Section 4)***, an overview of case studies collected ***(Section 5)***, main findings and recommendations to be considered in the further work of BioGov.net, especially the Communities of Practice ***(Section 6)*** and conclusions ***(Section 7)***.

2 Introduction

As defined in the EU Bioeconomy Strategy, 2012 (EC, 2013) the Bioeconomy encompasses the production of renewable biological resources and the conversion of these resources and waste streams into value-added products, such as food, feed, bio-based products and bio-energy.

Addressing cross-cutting societal and environmental challenges:

- increasing global population;
- rapid depletion of many resources;
- increasing environmental pressures;
- climate change.

Due to the complexity of the bioeconomy transition, it is obvious that significantly more bioeconomy education programmes are necessary, particularly dedicated to certain bioeconomy matters (Paris, B et al., 2023).

Given the dynamic nature of the field and the diverse range of skills required to work in this sector, designing effective and successful bioeconomy education programmes poses a significant challenge. Some of the aspects of the bioeconomy that need to be considered include the following:

- It is a **multidisciplinary field** that draws on expertise from many areas, including biology, chemistry, engineering, economics, and politics. Bioeconomy professionals need to understand how these disciplines are interconnected and how they can work together to develop sustainable products and services.
- It is a **rapidly evolving field** with new technologies and practices constantly emerging. Designing a curriculum that is flexible enough to adapt to these changes is essential to ensure that students have the most up-to-date knowledge and skills required to work in the bioeconomy.
- It is an **interdisciplinary field** that requires a variety of skills beyond the scientific or technical aspects of the sector (understanding the economic and social implications of the products and services created, as well as how to communicate their work to different audiences).
- It requires **individuals who can work collaboratively** across different disciplines and cultures. It is essential to provide opportunities for students to work together and develop effective communication skills across different cultures and languages.
- **It is a relatively new field** that does not have a well-established framework for education programmes. Unlike established fields such as engineering or medicine, it lacks a well-defined set of knowledge and skills that students need to acquire to work in the field.

As became obvious in the first months of the BioGov.net project implementation, **regional contexts** need to be considered when offering education, particularly bio-economy education. Tailoring bioeconomy education to specific regions faces several **challenges**, such as the need to consider the regional specificities, including the availability of biological resources, the existing infrastructure, and educational systems, as well as socioeconomic and cultural factors (BIOEAST 2022). Other challenges include the need to develop a skilled workforce responding to regions' development needs,

promote entrepreneurship, and ensure that the education provided is accessible to all, including marginalised disadvantaged or vulnerable groups in each of the regions.

As today's rapidly changing world has led to **the increasing importance of continuing education and professional development and** considerable work has been done in the field of bioeconomy education targeting younger audiences, BioGov.net is focusing on the area of adult education. Apart from the specific aspects of bioeconomy education itself, adult education is affected by technological advancements and changing needs and preferences of adult learners who are no longer in traditional educational settings. Educational systems need to be able to respond to the need of individuals and communities to continuously update their skills and knowledge, as well reflect the trends in adult education such as:

- **Technological advancements and automation** are rapidly changing the job market, requiring individuals to continuously update their skills and knowledge to remain relevant. Many jobs that were once considered stable and secure are now being automated, while new ones are emerging that require a different set of skills.
- On the other hand, technological advancements enable adult education to become more **personalised, accessible, and effective**. The latest trends in adult education, including online and blended learning, competency-based education, personalisation, and microlearning, are all geared towards providing relevant and effective learning experiences for adult learners.
- **Lifelong learning** has become a critical component of personal and professional development. The job market is no longer based solely on traditional qualifications and experience; employers are now looking for individuals who demonstrate a commitment to lifelong learning and professional development. In keeping with this trend, adult education programmes can provide individuals with the opportunity to develop new skills and pursue new interests.
- **Demographic changes**, such as an ageing workforce, are also driving the need for adult education programmes. With people living longer and retiring later, many individuals are looking to continue working and contributing to society beyond the traditional retirement age. Adult education programmes can thus provide them with the training they need to remain engaged in the workforce.
- Adult education can also have broader societal benefits, such as **reducing inequality and promoting social mobility**. Education is a powerful tool for empowering individuals and enabling them to achieve their potential. By providing access to adult education programmes, individuals from disadvantaged backgrounds can improve their skills and knowledge, increasing their chances of securing better-paying jobs and improving their economic circumstances.
- Adult education programmes can play a critical role in promoting **innovation and entrepreneurship**. Regions that are successful in the knowledge economy are those with a well-educated and highly skilled workforce. By investing in adult education programmes, regions can create a pool of highly skilled workers who can help drive innovation and entrepreneurship and attract new businesses and investments to the region.

In summary, **new trends in adult education** consider all those while offering new types and ways of acquiring skills and wider competencies. This creates a shift from formal education to new - usually shorter and more flexible - formats, focusing more on specific skills and/or competencies needed to succeed in a profession (for example, more

digitised and online learning, blended learning, personalisation, competency-based learning or microlearning).

As BioGov.net seeks innovative approaches in bioeconomy education governance models, effective use of **art in bioeconomy education is a specific element explored in the project.** Art as expression, way of thinking, or application of human creative skill and imagination can be utilised in bioeconomy education to meet several needs. First of all, it can play an important role in developing more collaborative, project- and problem-based learning (Marr, B., 2022), as well as fostering an appreciation for the impact of science and critical and innovative thinking (National Academies of Sciences, Engineering, and Medicine, 2020). It can also be used to promote innovation and entrepreneurship. The role of art as a communication tool, making complex scientific concepts more accessible and bioeconomy education more engaging, has also been recognised[1] (Allthings.bio, n/a). Art can be a useful tool in bioeconomy education, making it more appealing, enjoyable, and applicable to the needs of local communities, or more inclusive and relevant to learners with different learning styles or needs. Additionally, it can be used to support the development of bioeconomy education in specific regions, such as in the BIObec project, which aims to prepare the creation of bio-based education centres to meet industry needs and boost the contribution of the bioeconomy to society[2] (BIObec, n/a).

It is obvious that **tailoring bioeconomy education to specific regions and groups of adults is challenging and requires a systems approach** that considers ecological, social, and economic sustainability challenges **and involves the collaboration of different stakeholders, including policymakers, researchers, and industry players** (Salvador, R., et al., 2022), as well as engaging more unusual approaches and practices, such as those offered by art.

This deliverable presents several inspirational case studies from the BioGov.net regions. These demonstrate a variety of approaches to developing educational formats or settings in bioeconomy and addressing specific needs of regions and target groups, designed in line with the abovementioned trends in bioeconomy and adult education. Special attention was paid to formats using elements of art and addressing the needs of people from marginalised, disadvantaged or vulnerable groups.

[1] For example, co-design workshops with citizens and secondary school children can be used to gather ideas and start visualizing the bioeconomy through art.

[2] This is happening via building bridges between the bio-based industry and the education system, by interlinking universities, innovation labs, and R&D centres with industrial actors and representatives of regions.

3 Methodology

3.1. Methodology for regional data assessment

As mentioned above, bioeconomy as such is a complex field, which implies the need for different training programmes with different focuses. Similarly, the field of education itself includes formats specifically tailored to a number of diverse target groups of learners.

As neither the BioGov.net proposal, nor the Grant Agreement contains a specific description of the project scope (for example, which regions, bioeconomy (sub-)sectors, types and levels of education, or types of skills will be targeted or prioritised), the consortium decided to specify the scope, to ensure (a) that regional specificities of each of the BioGov.net regions are taken into account and (b) project is targeting the most pressing areas in bioeconomy development.

In the initial phase of the project, several aspects, relevant to the design and development of bioeconomy educational formats, have been considered. The summary of the scoping exercise is provided in the following sections.

3.1.1. National transition levels

Countries and regions have different bioeconomy potentials and are at different stages of transition from a fossil economy to a bioeconomy[3]. Depending on their level of advancement in this transition, they may benefit from different types of expert guidance and support. This should be reflected in the BioGov.net approach (see textbox – Figure 1).

NATIONAL TRANSITION LEVELS

Based on a recent JRC study, PEDAL and BTG propose using a three-level scale system to express the current level of transition of a country/region. The classification methodology applied in the JRC study yields the following country distribution:

- Basic – five partner countries (Portugal, Greece, the Czech Republic, Slovakia, and Estonia)
- More advanced - two countries (Germany and Italy)
- Most Experienced - one country (Netherlands)

The higher the current transition level, the more targeted the support can and should be. Knowledge transfer is most likely to occur (a) between regions/countries at the same level, (b) from regions/countries at a higher level to those at a lower level.

Figure 1: National Transition levels of BioGov.net regions

At the same time, **co-creation** is at the centre of the BioGov.net approach, implying that regional stakeholders are the key drivers in determining the scope. Co-creation and a systemic approach are key to ensuring collaboration between bio-system actors, academia, and governments to reach a tailor-made solution that is effective in each region. The common aim is to reach modern, responsive governance and decision-

[3] For recent overviews of the state of the bioeconomy strategies in EU countries and regions, see Bioeconomy strategy development in EU regions and EU Bioeconomy Strategy Progress Report.

making processes that follow the local needs, while also respecting European Green Deal goals, feedback loops from society to policy makers are needed. The diversity within Europe in terms of maturity level and smart specialisation related to bioeconomy is a major obstacle to having a singular common approach, especially for the Central and Eastern European regions that still need to develop viable national bioeconomy strategies and action plans[4].

In line with the bottom-up philosophy and co-creation approach adopted in BioGov.net, **regional partners have the responsibility to narrow the scope in their respective regions**, taking into account the four dimensions described below

3.1.2. Dimension 1: Geographical and thematic orientation

COUNTRIES AND REGIONS

In summer 2022 (as part of the initial T2.1 questionnaire, see Annex 1), consortium partners indicated what regions in their respective countries they believe BioGov.net should focus on.

It was proposed that the respective (individual, or pairs of) project partners focus on the following regions:

1. Southwest Netherlands (AVANS & BTG)
2. The whole of Italy (FVA & UNIBO)
3. The whole of Greece (Q-PLAN)
4. The North Region, Portugal (LOBA)
5. The Zilina Region, Slovakia (PEDAL)
6. The whole of the Czech Republic (ART)
7. The whole of Estonia (CIVITTA)
8. The Rhenish mining area (*Rheinisches Revier*) in Germany (BSS)

BIO-ECONOMY (SUB-)SECTORS AND/OR SPECIFIC VALUE CHAINS

Additional desk research and interviews with key stakeholders were recommended in the next stage of data collection.

In the follow-up Task 2.1 questionnaire (see Annex 2), the Task Leader integrated questions to help thematic scoping in the respective countries/regions.

Consortium partners were instructed to conduct research focused on the identification of existing and emerging bioeconomy areas/(sub)sectors/value chains with the highest priority in their country/region. Depending on the transition level of a region, the scope should be defined (the higher the level of bioeconomy is, the narrower the scoping of the targeted economic sectors could be).

[4] This section is derived from the project proposal text.

3.1.3. Dimension 2: Governance, education levels and skill types

GOVERNANCE STRUCTURE

As the education systems vary from country to country, data about the governance structure of adult education programmes in each of the target regions was collected, focusing on the following aspects[5]:

- Existing policies/strategic documents in (adult) education on (circular) bioeconomy, or on the wider topic of sustainability;
- How the sector is governed (for example, the role of national, regional, and local institutions and actors);
- Main stakeholders, for example, policymakers/decision-makers, main activities providers (including business support organisations, companies, NGOs, et cetera), funding providers, and other stakeholders;
- How education is organised.

LEVELS AND FORMATS OF EDUCATION

BioGov.net will contribute to establishing innovative governance models in the bioeconomy, providing an inclusive training and mentoring framework in specific European regions, aiming to build a bridge between knowledge and skills in the bioeconomy, secured by an effective governance. For this purpose, Communities of Practice (CoPs) will be set-up in each BioGov.net project country and operated to share knowledge, expertise, and feedback with the consortium of the project in key implementation stages.

A key role of the Communities of Practice (CoP's) in BioGov.net can be to determine which EQF levels are the most important for the targeted sub-sectors/value chains in their region/country.

As BioGov.net is focusing on adult education, it is envisaged that the most advanced countries will focus on EQF levels 3 to 6. These levels have a strong link to the operational activities in the industry. Countries that are less advanced in their transition from fossil-based to bio-based economies may decide to address a wider range of EQF levels.

Another key question to be answered (by the CoP) is how to put education into practice, and how to use it in the work environment. Different formats for the delivery of formal and non-formal education and vocational education shall be considered and it is anticipated that modular formats (module-based approach; shorter duration) will be prioritised.

TYPES OF SKILLS

Considering the existing work in the field of bioeconomy education, skills and competencies, the development of (a) valorisation skills/competencies and (b) transversal skills/competencies are seen as a key elements of bioeconomy education.

[5] The more advanced the region/country is (see the introduction of this scoping document), the narrower the thematic focus of this exercise can/shall be.

Because valorisation skills/competencies and transversal skills/competencies are rather broad categories, further zooming in and prioritisation will be needed so that BioGov.net partners can give those skills/competencies the highest priority. To do so effectively, the partners investigated which of those skills/competencies are already developed in current educational frameworks.

When looking at learning styles (see Section 3.1.4 below), the category of technical competencies was also considered.

3.1.4. Dimension 3: Governance, the arts and bio-economy education

LINKING ARTS AND BIO-ECONOMY EDUCATION

Although the role of combining art and bioeconomy education is recognised, further research was conducted to better understand how art can bring added value to bioeconomy education. It is important to say that, for the purposes of the BioGov.net project, the term 'art' is used to refer to a broad category referred to as the cultural and creative industries. As explained in the introduction, a number of ways for the arts to add value to education have been identified. As a result, four categories of art and bioeconomy combination were identified in BioGov.net:

1) **Using art to elicit new ways of thinking and develop skills needed in bioeconomy education.** The objectives are:
    - To define educational programmes which offer stimulation, for example:
        - Systemic vision
        - Circular and sustainable mindset
        - Structural change (biotransition)
        - Transversal competencies and skills
        - Divergent thinking
    - To co-design innovative business models and methodologies for integration of humanities/art/design/culture and social innovation.
2) **Using art to address different learning styles and facilitate the inclusion of people from marginalised communities.** The objectives are:
    - To define educational programmes which facilitate the use of arts in various ways to better address different learning styles;
    - To reach people from marginalised communities using artistic means.
3) **Using art to communicate messages, inspire people and raise their interest and awareness.** The objectives are:
    - To integrate the opportunities created by human-centric principles, offered by art, culture and (eco)-design, concerning the bio-based feedstocks including traditional and novel biological materials;
    - To leverage the "Nespresso marketing model" to link aesthetic and utilitarian values (Art and Bioeconomy).
4) **Injecting the bioeconomy into design, art, architecture, and other professions.** The objective is:
    - To engage students and professionals in artistic careers with the bioeconomy.

BioGov.net collected examples of education programmes applying art concepts (in the four dimensions discussed above), where the educational focus was either bioeconomy

or wider related topics (such as circular economy or sustainability) and the various target groups included individuals from marginalised, disadvantaged or vulnerable backgrounds. Information regarding the education providers, their target groups, objectives and ways of using art was also supplied.

3.1.5. Dimension 4: Target groups and beneficiaries

TARGET GROUPS

Section 2.1.3 of the Grant Agreement describes the target groups and is quite specific that all the mentioned groups must be targeted. Nonetheless, it is important to prioritise certain target groups, depending on the activities that BioGov.net implements and the messages that it wishes to convey in each participating region. Depending on the specific target group, different communication messages and channels will be used to address/engage them. The target groups are:

1. Research and higher education institutions
2. Vocational education institutions
3. Bio-systems stakeholders in general
4. Industry
5. Businesses (SMEs)
6. Policy makers and administrations
7. Non-governmental organisations (NGOs)
8. Wider society

MARGINALISED, DISADVANTAGED, AND MINORITY GROUPS

Following a consultation with Mr. Henk Spies, research leader on the topic of marginalised groups, it was suggested to use a specific methodology to work with those groups. The approach discussed below is taken from Sirovátka and Spies, 2017, resulting from the FP7 project CITISPYCE. The project focused on policies targeting disadvantaged young people and, among other matters, has uncovered a range of initiatives undertaken by and for disadvantaged young people to help tackle their inequalities.

The model assumes that neither marginalised groups in general nor members of any one category are homogeneous, therefore no intervention will work effectively with all individuals and in all situations. The inability of social policies to tackle inequalities is frequently due to the inadequacy of their approach when addressing disadvantaged people, for example offering educational activities in a traditional sense (teacher talking to a class, coach talking to a client), which are not suitable for everyone. For certain groups, alternative forms of education, such as informal education, peer-to-peer learning, or innovative approaches using the arts will be more suitable.

The model (see Figure 2) proposes to seek a strong intervention logic based on the **specific characteristics** of an individual and to adopt **different strategies** to address different individuals (regardless of which marginalised group they belong to). It is, for example, necessary to see how they perceive their situation and how they view themselves (ambitions) and their competencies (abilities), which can then be used to identify the best strategy for their development.

Taking into account the fact that standard educational formats are not suitable for all groups, it was also recommended to broaden the definition of 'education' to 'development', which can result in the development of specific skills or competencies in non-formal or informal settings.

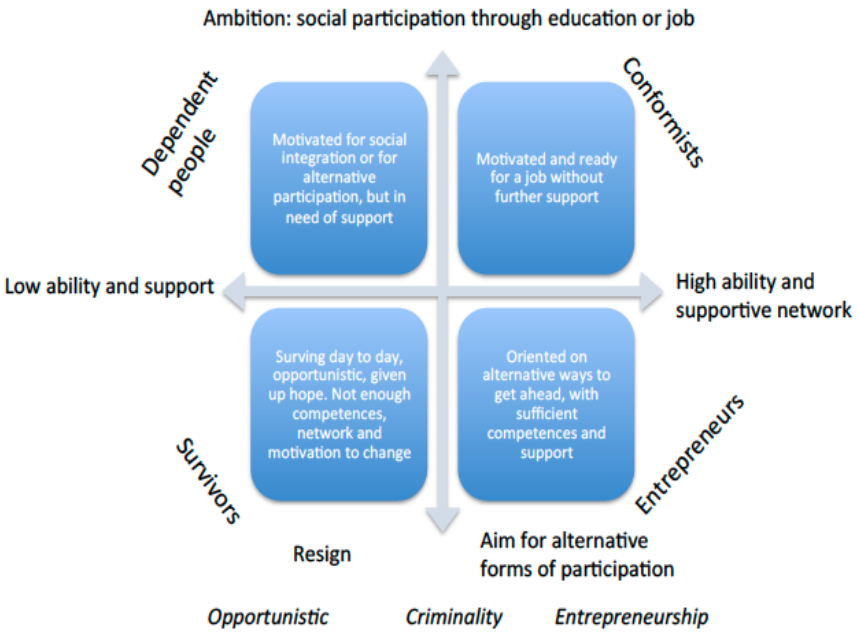


Figure 2: Individual strategies addressing disadvantaged young people

3.2. Case study guidelines

The BioGov.net project objective is to provide validated guidelines for the set-up of regional bioeconomy training and mentoring frameworks based on case studies from eight EU regions.

As defined in **SUB-OBJECTIVE 1** of the project, one of the expected outcomes of BioGov.net is the collection and assessment of good practices and case studies in education, training, and skills development. Collections of such practices and studies aim to help identify key elements of success and their usage and replicability in a regional context by considering local capacities, opportunities, barriers, potentials, responsiveness to bioeconomy goals and biosystem expectations.

Best practice case studies play a central role in knowledge transfer and inspiration in the project. The case study guideline document sought to provide consortium partners with guidance on identifying, developing and validating relevant and suitable best practice case studies.

3.2.1. Case study categories

Considering the overall goal of the project, the requirements expressed in the call text, and the discussions held at project meetings, it was proposed to develop the case studies in eight different categories:

1. Higher Education
2. Vocational Education and Training
3. Entrepreneurial Education
4. Using art to elicit new ways of thinking and develop skills needed in bioeconomy education
5. Using art to address different learning styles and facilitate the inclusion of marginalised groups and individuals

6. Using art to communicate messages, inspire people and raise their interest and awareness
7. Injecting bioeconomy into design, art, architecture, and other professions
8. Marginalised, disadvantaged, and minority groups

Higher Education, Vocational Education and Training and Entrepreneurial Education: As explained in the scoping document, BioGov.net will focus less on traditional/ academic learning, and more on adult training, retraining, and lifelong learning, in particular at European Qualifications Framework (EQF) levels 3 to 5. Relevant case studies cover innovative examples of such education in relation to (circular) bioeconomy, or the wider topic of sustainability.

Art Education refers to the expanding field of educational research and practice informed by investigations into learning through art experiences. In this context, 'the Arts' refers to a wider category of cultural and creative industries. BioGov.net can connect Art and Bioeconomy in several dimensions (see section 3.1.4.).

The call text suggests that **marginalised, disadvantaged, and minority groups** could, for example, refer to women, ethnic and religious minorities, migrants and refugees, the LGBTIQ community, disabled persons, youth and the elderly. As explained in the scoping document, BioGov.net proposes to work with different types of individuals rather than focus on a specific marginalised target group (see section 3.1.5.).

For additional background information see the separate scoping documents.

Figure 3: Types of education, role of art and marginalised groups considered in BioGov.net

3.2.2. Selection criteria

The case studies in the eight categories were preferably drawn from the BioGov.net partner regions. When no relevant experiences related to bioeconomy or bio-based economy could be identified in a partner country, the scope of the case studies could be widened to consider broader terms such as sustainability, circular economy, green development and the like.

If no relevant case studies were identified or partners were familiar with successful examples from other countries (not from Biogov.net partner countries), those case studies could be selected. Examples of best practices can be drawn from work implemented in other EU-funded programmes (for example H2020, Erasmus+), projects (for example BIObec) and studies (e.g. BIOSKILLS tender). When this is done, the BioGov.net partner should seek to expand the information covered in the case study.

Combined, the case studies were expected to offer a broad spectrum of suitable and replicable education formats.

3.2.3. Approach

To use project resources efficiently, the case studies were developed step-by-step. All ten BioGov.net consortium partners were expected to contribute to the development of case studies under the supervision of PEDAL, supported by BTG. LOBA, as a communications partner, was responsible for providing a visually attractive template to present the case studies.

The development process comprised two stages. The first stage involved the creation of an inventory of candidate case studies and the initial development of the case studies in a short template (see Annex 3). Each of the 10 BioGov.net partners were asked to

identify prospective case studies in at least four (4) out of the eight (8) categories, resulting in a list consisting of at least forty (40) case studies.

Based on the analysis carried out by PEDAL and BTG, a short list of case studies was produced. During the analysis, emphasis was placed on several aspects, including the results of activities (e.g. number of participants, achieved changes in their situation), approach to work with the target group (approaches taking into account specific needs or preferences of the target group), degree of cooperation with other relevant institutions in the region, innovativeness and uniqueness of the solution. The selection also took into account the desire to represent all categories of case studies defined above. The short list was created on the basis of scores by representatives of PEDAL and BTG. The next step involved the refinement, validation, and development of shortlisted case studies in the full template (see Annex 4), split into categories. Building on earlier desk research, it was recommended that the BioGov.net partners engaged with representative/s of their case studies intending to update and complement the data, in case of any data gaps and validation of the refined case studies.

The second step concerned the initial elaboration of at least 50% (minimum of **20**) candidate case studies. Twenty-seven (27) case studies in total, edited in the visually appealing format provided by, LOBA can be found in Annex 5.

Based on the still-to-be-expressed needs of the various CoPs that are currently being set up in eight regions under the umbrella of the BioGov.net project, the development of a second series of case studies is predicted.

The approach to developing further case studies will be decided at a later stage after the experience is gained in the first phase of case study development and with the initial operation of the Communities of Practice in the eight BioGov.net partner regions.

4 Country/regional profiles of the BioGov.net regions

This part of the document provides information on key aspects to be considered in the regional implementation of the BioGov.net project. It reflects the efforts of the partners in focusing on project activities in their respective regions, taking into consideration regional specifics.

The country/regional profiles of eight regions in participating countries (*Estonia, Greece, Portugal, Slovakia, Italy, the Czech Republic, the Netherlands and Germany*), as suggested in the scoping document, are based on results, insights and actionable knowledge gained and developed in related bioeconomy projects (e.g., BE-RURAL, Power4Bio, and BioeastUp), as well as within existing partner networks, and based on synergies with relevant activities under H2020 including BBI JU, BIOEAST Initiative (BIOEAST Regions and bioeconomy hubs), EIT Knowledge and Innovation Communities, et cetera.

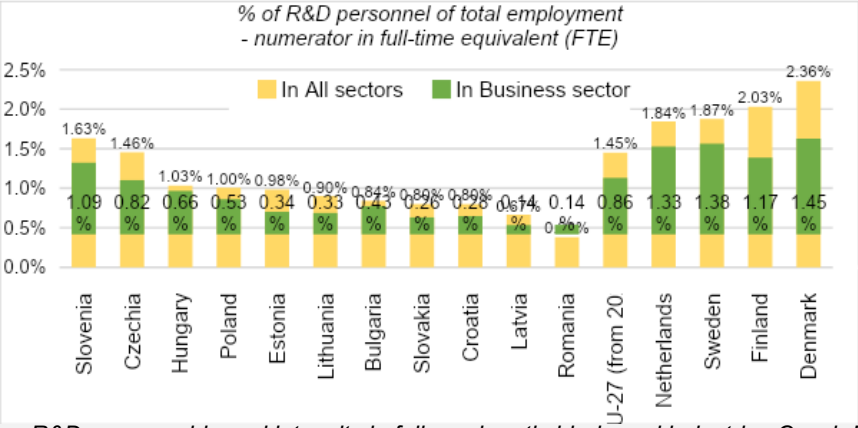
As mentioned before, when developing bioeconomy education programmes, local contexts need to be considered. The next sections provide an overview of the BioGov.net country/regional profiles, focused specifically on:

1. Existing sub-sectors / value chains in bioeconomy,
2. Key trends influencing innovation,
3. Expected sub-sectors / value chains,
4. Opportunities for advancement (growth, career, social, et cetera)

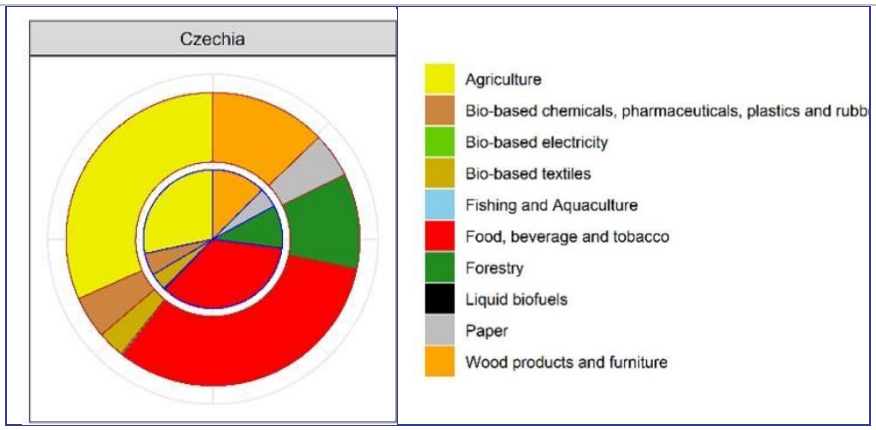
4.1. Czech Republic

Table 1: Country profile of the Czech republic

Existing Sub-Sectors / Value Chains in Bioeconomy	Most prominent and current domains: • Biogas production • Breeding • Composting • Eco-construction (wood) • Hemp industry • Phytopharma and cosmetics • Food and feed • Textiles The Czech Republic, together with other Central and Eastern European countries (the BIOEAST macro-region), has not yet sufficiently exploited the potential offered by the bioeconomy. In July 2019, the Ministry of Agriculture of the Czech Republic was the only one to prepare a Bioeconomy Concept for the Czech Republic from the perspective of the Ministry of Agriculture for the years 2019-2024, considering the bioeconomy as one of its key priorities. At the beginning of September 2022, the Government of the Czech Republic approved the Research Concept of the Ministry of Agriculture 2023+, one of whose key areas (or one of the three horizontal areas) is the bioeconomy. Bioeconomy is also embedded in the Strategic Framework Czech Republic 2030 (Ministry of Environment, 2017) and the Strategic Framework Circular Czechia 2040 (Ministry of Environment of the CR, 2021). (Ministry of Environment, 2021; Ministry of Transport in the Transport Policy Czech Republic, 2020). The National Concept Paper for the national bioeconomy strategy

	is one of the key results of the BIOEASTsUP project to serve as a basis for the further development and implementation of national bioeconomy strategies and action plans in the Czech Republic and other BIOEAST countries.
Key Trends influencing Innovation	• Cooperation among companies and research organisations is growing; the BIOEAST HUB CR is facilitating the technology transfer (technology transfer good practice was mapped in the BIOEASTsUP project). • Good examples and guidelines from businesses for implementing bioeconomy innovations include the BE IN project and e-map (mapavin.cz), established to enhance the cooperation between research organisations and entrepreneurs. • Bioeconomy is embedded in the national programme of the Ministry of Agriculture. • Digital and green transformation Agricultural and biological sciences and biochemistry, genetics and molecular biology sciences are rather well developed in the Czech Republic (each representing more than one-tenth of the country's all citable publications); meanwhile, other bioeconomy-related science areas are much less developed. The research sector in the Czech Republic is represented by research institutes (20), universities (6) and the Czech Academy of Science. The research organisations oriented towards applied research that are also actively involved in technology transfer are represented by the Association of Research Organisations (www.avo.cz, hereafter referred to as AVO, member of the BIOEAST HUB CZ), which supports the engagement and involvement of SMEs and large entrepreneurs[6]. In 2020, a total of CZK 113.4 billion was spent on R&D in the Czech Republic, of which CZK 69,113 million was spent on enterprises from private sources.  *R&D personnel-based intensity in fully and partly bio-based industries Czech Republic, in an international comparison, 2018* Source: Composition based on the Eurostat data: Total R&D personnel and researchers by sectors of performance, six and fields of science provided by the BIOEASTsUP project- D1.4.
Expected Sub-Sectors / Value Chains	Key future subsectors by 2030: • Biotechnology (new breeding techniques) • Green Chemistry • Bioplastics • Bioenergy (biogas, biomethane, bioethanol) • Health care • Construction Key generators of turnover in the bioeconomy are food, beverages and tobacco production, agriculture and the production of wooden products, furniture, and organic food.

[6] AVO is a member of the BIOEAST HUB CZ

	 *The structure of value added by the bioeconomy sector 2008 (inner cycle) and 2017* Source: BIOEASTsUP, 2021
Opportunities for Advancement (Growth, Career, Social etc.)	There are many options for personal advancement in the region: • Exploitation of the applied research results (projects implemented by the BIOEAST HUB members); • Education opportunities; • Paid jobs (The income in the region is historically below average and paid jobs are a good opportunity.); • Private enterprise (start-up, spin-off) established with the support of the regional university; • Employment in an existing company focused on the production/processing of renewable biological resources. There is no systematic and comprehensive approach towards personal advancement in the bioeconomy.

4.2. Estonia

Table 2: Country profile of Estonia

Existing Sub-Sectors / Value Chains in Bioeconomy	• Agriculture and food sector • Forestry • Marine resources • Energy sector
Key Trends Influencing Innovation	• The most optimal way to maintain the competitiveness and to increase the added value and innovation potential of the Estonian bioeconomy is additional specialisation and increasing the added value in newly emerging and fast-growing areas of the bioeconomy (such as the digital and green revolution of agriculture, blue bioeconomy and blue biotech, applications and business models of synthetic biology, and biotechnological breakthroughs in the food system and exploitation of resources). • Another possibility is niche development. • The common denominator for most bioeconomy sectors is the need for higher valorisation of resources and products. • The use of bioresources is increasingly moving from traditional chains to horizontal ones. • Estonian bioresource potential: It is estimated that, compared to the present, Estonia's wood resources will decrease significantly by 2050 due to the dynamics of harvesting maturity. At the same time, plant biomass, and meat and milk

	production have the potential to grow. Marine resources have high potential but are currently largely unexploited. • The blue economy is a great development engine opportunity for Estonia, especially for Saaremaa and other islands. The sustainable blue economy fosters substantial ambitions while offering opportunities to create new business models
Expected Sub-Sectors / Value Chains	The areas of priority in the Development Plan of Agriculture and Fisheries 2030 are: **1.** The use of residues and by-products as a valuable resource; **2.** Aquaculture and marine farming (a significant development potential); **3.** Setting up biorefineries suitable for primary producers. The priorities of the Development Plan Estonia 2035 are: • Making Estonia a recognised centre for the development of the bioeconomy in Europe; • Supporting innovation cooperation between companies and R&D institutions; • Developing technologies and innovation in marine resources.
Opportunities for Advancement (Growth, Career, Social etc.)	The premise of the bioeconomy is not only natural resources, but also human resources; that is, labour and the knowledge and skills of employees, and, in addition, the potential of businesses to think and produce creatively and in an environmentally-friendly manner. The predominance of new revolutionary trends in the bioeconomy means a highly automated and data-based economic activity, which requires a labour force with entirely different qualifications than before. In most areas related to the bioeconomy, companies are yet to start creating more jobs related to specialised research and development, which is an important prerequisite for the development of R&D capabilities.

4.3. Greece

Table 3: Country profile of Greece

Existing Sub-Sectors / Value Chains in Bioeconomy	• Agriculture/nutrition (organic farming, functional foods and foods with high added value). The agricultural sector is characterised by low productivity compared to the European average, which is attributed to several inherent ills, including: ○ The level of agricultural education of farmers in the country, which is one of the lowest recorded in the EU, a phenomenon that is also associated with the advanced age of the farmers; ○ The small size of the farms and the low level of cooperation; ○ The low level of adoption of technological innovation. • Tourism ○ An increasing number of tourism companies have established a SDG metrics ○ An increasing number of big tourism companies have established circular bioeconomy concept in food chain and waste treatment and valorisation • Textile and clothing • Material (mainly construction) • Education ○ Education Several masters in Bioeconomy have been established ○ A new Research Center for Biotechnology-Circular Bioeconomy and Sustainable Development of the National and Kapodistrian University in Athens is being organized ○ An international Summer School in Circular Bioeconomy and Sustainable Development has been organized for 5 years ○ Several small companies are creating a social educational environment

Key Trends influencing Innovation	Nowadays, a growing number of people tend to use recyclable multi-use products and avoid plastic. EU projects that focus on the circular economy and bioeconomy are multiplying, thus creating alternative cooperatives trying to adopt a “green” lifestyle. However, there is still a gap regarding the dissemination of the bioeconomy and this gap will be filled by proper education at all levels.
Expected Sub-Sectors / Value Chains	Key sub-sectors/value chains in the bioeconomy by 2030 will be: • Bioenergy-biogas; • Ecological and creative packaging design that supports both green growth and young artists; • Sun-powered circular economy solutions. The main long-term goals for Greece (2030) are: • Integrating the criteria for ecological design/planning and analysis of product life cycle, avoiding the introduction of hazardous substances into their production, and facilitating reparability and extension of product life span. The use of non-hazardous substances also improves the quality of waste during the process of manufacture, thus also reducing the environmental footprint. • Prioritisation of waste management, promoting the prevention of creating waste and encouraging re-usage and recycling; • Creating and promoting manuals for improving energy efficiency in the procedures of production; • Promotion of innovative forms of consumption, such as the use of services instead of purchasing products, or the use of electronic computers and digital platforms. • Promotion of a rational consumption model, based on information transparency regarding the features of goods and services, their life span and energy efficiency. • Facilitation and creation of appropriate channels for the exchange of information and the coordination between administrations, the scientific community, the educational community, and the economic and social actors, leading to synergies compatible with the transition to the circular model. • Highlighting the significance of shifting from a linear to a circular economy by promoting transparency in procedures, better information for citizens, training, and raising social awareness. • Processing transparent and feasible indicators for monitoring the implementation of the transition. • Food industry. Greece has high quality food production due to the top quality of the raw material. Therefore, proper scale up synergies will provide a unique value chain of high-quality food. • Increase the education level on bio-entrepreneurship • Focusing in increasing the incorporation of the marine resources in the new bioeconomy value chains
Opportunities for Advancement (Growth, Career, Social etc.)	There are many opportunities for personal advancement in the region. Some of them are in the reuse of animal waste for electricity and heat generation, the utilisation of biogas and the use of by-products for the fertilisation of crops, the reuse of food waste in food production, and the utilisation of animal waste in the generation of electricity and heat in new technologies. There are also numerous opportunities for private enterprises that focus on new technologies based on bioeconomy, which enables the use of raw residual biomass for small-scale and on-site energy production and green transformation. An enormous potential of the marine resources is expecting the proper attention to exploit its huge potential. A huge opportunity is the role of Greece in the Middle East and North Africa countries providing technology transfer.

4.4. Italy

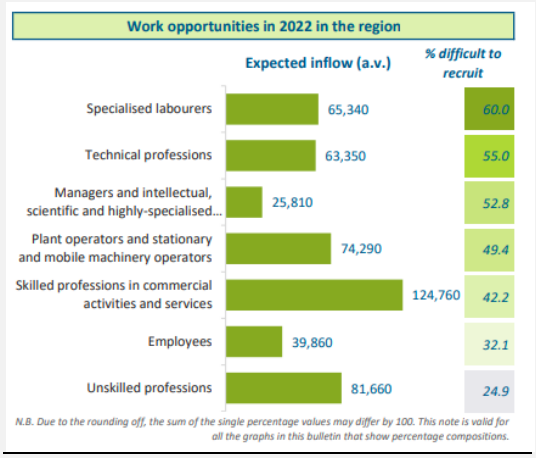
Table 4: Country profile of Italy

Existing Sub-Sectors/Value Chains in Bioeconomy	In 2017, the Italian government launched The Italian Bioeconomy Strategy (BIT), which was updated in 2019 (BIT II).
	According to this strategy, as of the year 2017, the sub-sectors below are mentioned as key sub-sectors in terms of their share in the total turnover, in addition to their share in employment. The figures are as follows:
	• Food, beverages and tobacco industries: 40.9% of the turnover and 22.4% of employment;
	• Agriculture, forestry, fisheries and aquaculture: 17.7% of the total turnover and 45.3% of total employment;
	• The bioeconomy sub-sectors of
	  ○ Bio-based apparel (10% of turnover and 10% of employment);
	  ○ Paper industry (6,9% of turnover, 3,6% of employment);
	  ○ Bio-based textiles (5%, 3.8%);
	  ○ Bio-based pharmaceuticals (4,6%, 1.9%);
	  ○ Wood industry (4,1%, 5.2%).
	Altogether, the figures accounted for a total of 90% of the total turnover in the Italian bioeconomy.
	
	In 2020, the Emilia-Romagna Region started a participatory process to define the new Smart Specialization Strategy in view of the 2021-2027 EU funds programming. The new S3 Strategy has identified eight Strategic Specialization Areas, which are:
	• Agrifood
	• Building and Construction
	• Mechatronics and Motoring
	• Health and Wellness Industries
	• Cultural and Creative Industries
	• Innovation in Services
	• Energy and Sustainable Development
	• Tourism
	In addition, there are two new areas with high growth potential:
	• Aerospace Economy
	• Critical Infrastructures
	Meanwhile, there are fifteen Cross-sector Priority Areas adopted in addressing these specialisation areas.

Key Trends Influencing Innovation	Key sub-sectors have been defined, in addition to the challenges, opportunities as well as research and innovation priorities related to each sub-sector. They are as follows:
	• Primary production: Agriculture, forestry and related industrial sectors
	  ○ Rich local biodiversity and agricultural ecosystem services;
	  ○ Local crops/varieties available regionally to be adapted to climate change and low-input cultivations;
	  ○ Innovative multi-purpose cropping systems able to regenerate marginal, abandoned and/or degraded lands and create value for local rural communities;
	  ○ Innovative precision-farming and breeding techniques, enabled by the available digital services;
	  ○ The adoption of new business models for the diversification of rural incomes;

	○ The valorisation of the underexploited agricultural, forestry and breeding residues and side streams with the production of food ingredients and valuable bio-based chemicals, fertilisers (for example, the recovering and recycling of phosphorus from sewage sludge, manure and food waste) and energy; ○ The role of agriculture (including indoor vertical agriculture) in the regeneration of the urban and peri-urban areas for greener and healthier cities; ○ Independent Sustainable Forest Management schemes for a tailored, integrated management and exploitation of forests; ○ Innovative techniques, based on digital services, enabling input reduction, and sustainable and resilient intensification of forestry; ○ Nature-based and eco-designed solutions (including new sustainable organic fertilisers and bio-pesticides) enabling the preservation of biodiversity and the implementation of low-impact management protocols; ○ Forest certification schemes and Life Cycle Analysis practices for the sustainable exploitation of valuable national wood and wood-derived materials, also for the production of added-value products and energy via tailored biorefinery schemes; ○ Business innovation models with local value chains deriving from forest products, such as mushrooms, truffles, herbs or cork as a contribution to rural development opportunities. • Food industry ○ New “typical/quality” food products (DOP, IGP, STG, etc.) to be valorised, preserved and protected at European and international levels; ○ Newly emerging global markets seeking safe and high-quality foods; ○ Alternative protein sources (insects, algae, etc.) and novel food microbes utilising pedoclimatic national areas and existing industrial infrastructures, taking advantage of climate change and anticipating novel food security needs; ○ Food by-products to be used for the production of food ingredients and feed; agri-food waste to be exploited for the integrated production of bio-based chemicals, materials, energy as well as fertilisers and compost; ○ New Urban Food Systems; for example, local food production and distribution of fresh and high nutritional value products, which create new business opportunities by overcoming the dichotomy between urban and peri-urban areas. • Bio-based industry ○ Agricultural, forestry and breeding residues and side streams currently underexploited; ○ Abandoned/marginal lands suitable for the production of autochthonous or planted industrial biomass; ○ Former oil refineries/industrial sites that can be partially converted into biorefineries; ○ New regenerative processes for cleaning polluted areas and engineering measures for the reconversion of abandoned industrial and urban sites, promoting the valorisation of brownfields rather than virgin land; ○ Expertise in the already assessed lab-scale processes for the conversion of residues, by-products and side streams into food/feed ingredients, biochemicals, biomaterials and high-quality organic fertilisers; ○ Successful case studies of bio-based products developed in Italy (i.e. compostable shopping bags/foodservice ware, biodegradable mulch

	film/bioherbicides/biolubricants) and price premiums for environmentally sustainable products, such as Made Green in Italy); ○ New emerging technologies for capturing and converting CO2 into fertilisers, chemicals and polymers; ○ Methods for the valorisation of stabilised digestates from biorefinery and bioenergy plants to provide soils with assimilable organic carbon; ○ Prominent national collections of microbes (bacteria, yeasts, moulds, fungi, algae, et cetera, including sea resources), enzymes, and genetically improved microbes of industrial interest; ○ A large network of biomethane-producing facilities (mainly fed with agri-food biowaste and municipal organic waste) and relevant potential for the valorisation of the wet fraction of urban waste in the production of compost to improve soil fertility in urban and rural areas; ○ Integration of the existing wastewater purification plants and anaerobic digestors with biorefinery schemes to combine the production of their conventional products with that of high-value bio-based chemicals and compounds; ○ Pioneering initiatives leveraging on the quotidian products of the bioeconomy for informing, educating and engaging urban communities in urban regeneration projects. • Marine bioeconomy ○ Environmentally safe practices for marine aquaculture (multi-trophic but also offshore) and robust aquaculture supply chains; ○ New emerging business models for connecting tourism to ecosystem valorisation; ○ The unique landscape and cultural heritage of coastal areas as a resource of local communities, meriting preservation and valorisation according to sustainable and integrated schemes; ○ Technology for marine bioenergy production.
Expected Sub-Sectors/Value Chains	The Joint Research Centre Report on the future scenarios of the bioeconomy in the EU (for the year 2050) has identified the main drivers of the EU that will shape the future sectors of the bioeconomy. This report will also be highly relevant to the case of Italy. The main drivers that are expected to shape the sub-sectors/value chains of the future are as follows: • Ecosystems in the EU ○ Agroecology ○ Bio-based carbon sequestration • Social systems in the EU ○ Awareness and engagement for change ○ Food security ○ Food-related health concerns • Economic systems in the EU ○ Bioeconomy-based employment ○ Bioeconomy-based international trade • Energy systems in the EU ○ Biobased electricity/CHP ○ Biobased heat ○ Biofuels for transport • Material systems in the EU ○ Biobased chemicals, plastics, et cetera ○ Biobased construction materials ○ Biobased fertilisers

Opportunities for Advancement (Growth, Career, Social, etc.)	According to the report titled *Promoting education, training and skills in bioeconomy* (European Commission a), 2022) 7,7% of the working population in Italy are employed in the bioeconomy sectors. The largest bioeconomy sector in terms of value added at factor cost and employment is agriculture, with 45% of the workers being employed in this sector. While this data gives an indication of which sector presents the most employment opportunities, the report titled "Bioeconomy in Europe", prepared by the key stakeholders of the bioeconomy industry ecosystem, provides some data concerning the number of start-ups in the Italian bioeconomy (2021), differentiated by different sectors. This data provides an idea about the trends in the bioeconomy industry and sectors which present a potential and an opportunity to pursue innovative and entrepreneurial activities. According to the table below, the highest number of start-up firms were found in Research and Development and other professional and technical-scientific activities. The second sector with the highest number of start-ups was the Food and Beverages sector, followed by the sector of Agriculture. Regarding the Emiglia Romana region examined for the purposes of BioGov.net, the work opportunities are displayed in the figure below.  Source:

4.5. Netherlands

Table 5: Country profile of Netherlands, Circular Biobased Delta region

Existing Sub-Sectors/Value Chains in Bioeconomy	• Circular Biobased Delta (CBBD): Green Chemistry; Chemical Recycling • Centre of Expertise Biobased Economy (CoE BBE): bio-based construction, bio-based products, marine biobased specialities - macro&micro (algae, fishery waste) • Smart Delta Resources (SDR, a network of many large energy and resource-intensive companies in the Flemish-Dutch Schelde-Delta region): green hydrogen, carbon capture, storage & usage (CCS/CCU), electrification, recycling • Industry Table Midden en West Brabant, a consortium of large companies such as Shell, SABIC, Cosun, Attero, EnNatuurlijk, RWE plus the province. Focused on energy transition and realisation of the necessary infrastructure, similar to SDR.
Key Trends Influencing Innovation	• Scope is widening from "bio-based chemistry" to "green" chemistry (i.e., circular, biobased, and sustainable chemistry). Less explicit focus is put on the biobased, and more on the circular economy with recycling of mixed plastic and organic post-consumer waste. Creation of new value chains with emphasis on packaging, textiles, building & construction. Starting efforts on CCU as a result of CarbonNL • More bio-based economy, less bioeconomy; • Decarbonisation and electrification of the energy need of the industry;

	• Collaboration and connection of educational actors of different education types and levels (MBO, HBO, etc.)
Expected Sub-Sectors/Value Chains	• Circular by design • Valorisation of residues and waste • Cascading (SER document Bioeconomy in the Netherlands 2030 Vision on Biomass): three phases are distinguished: phase out – transition – build-up. Phase out: low T heat, electricity from biomass, bioethanol for passenger cars Transition: high T heat and long-distance traffic (air, sea, trucks) Build-up: food (protein), high value chemicals and materials • Biomass stocks must be optimised (cascading); • Short-term: biomass is vital to realise the objectives of the (Dutch) Energy Agreement and the climate policy; • Long-term: only use biomass for non-food and feed sectors when other renewable alternatives are scarcely available (chemicals and materials; aviation and shipping; heavy long-distance road transport; high-temperature industrial heating)
Opportunities for advancement (Growth, Career, Social etc.)	• The North Brabant province (NB) supports the transition towards a bio-based economy. NB is pushing entrepreneurs towards sustainability (valorisation of residues and waste). • Support for start-up companies and lifelong learning: Universities and NB province are to deploy knowledge to address Brabant issues. The Knowledge Pact for Higher Education in Brabant (Kennispact HO Brabant) aims to boost entrepreneurship, lifelong learning, and knowledge development. • Increasing focus and catching up on practical research (*praktijkgericht onderzoek*)

4.6. Portugal

Table 6: Country profile of Portugal, the North Region

Existing Sub-Sectors/Value Chains in Bioeconomy	Portugal is in a prime position to lead Europe's bioeconomy transformation but has not exploited the full potential of biomass to create added value. The country has a diverse and rapidly growing bioeconomy, with a wide range of value chains that are contributing to economic growth, environmental sustainability, and social development. Some of the main value chains in the Portuguese Bioeconomy are: • Forest-based products • Agriculture and food • Marine sector Interest in eco-construction and eco-tourism is also on the rise. Overall, the bioeconomy of the northern region of Portugal is diverse and dynamic, with many value chains that are contributing to sustainable economic growth and social development.
Key Trends Influencing Innovation	• The increasing digitalisation of the economy and society is driving innovation in several areas, and Portugal has made significant progress in expanding broadband access and developing digital infrastructure, creating opportunities for new digital technologies and business models. • Sustainability is a key trend motivating new technologies and innovations due to the growing awareness of the need for environmental sustainability in areas such as renewable technologies, circular economy and eco-innovation. • Green transformation in recent years focused on transitioning to a more sustainable and renewable energy system, reducing greenhouse gas emissions, and promoting sustainable economic growth.

	• Cooperation among companies and universities is also a key trend that influences innovation and is constantly growing, due to common projects and funding programmes.
Expected Sub-Sectors/Value Chains	Portugal has been working on its Action Plan for Sustainable Bioeconomy (PABS) called "Bioeconomia 2030". By 2030, the expected value chains will be: • Green chemistry • Bioplastics • Bioenergy: In the development of new bioenergy, forest products, as well as the development of new bio-based materials and products. Also, the development of new bio-based products and applications. Overall, the development of these sub-sectors is expected to contribute to the growth of a sustainable and innovative bio-based economy in Portugal by 2030.
Opportunities for Advancement (Growth, Career, Social, etc.)	The bioeconomy is characterised by a predominance of new, revolutionary tendencies that call for a whole new type of workforce, for example in the fields of biomass energy, bioplastics, chemistry or aquaculture. Therefore, as the bioeconomy advances, new job opportunities are likely to become available in companies across a range of sectors and it is crucial to support the creation of jobs that will appeal to young people. Both natural and human resources serve as the foundation of the bioeconomy. Education opportunities are also an important form of personal advancement, and the range of available tools for bioeconomy education in Portugal is showing a slow but steady development.

4.7. Slovakia

Table 7: Country profile of Slovakia, the Žilina Region

Existing Sub-Sectors/Value Chains in Bioeconomy	The Žilina Region has long been noted for its focus on transport, IT and medical sciences thanks to the quality of its universities, their links to business entities, and international cooperation. Its prime focus has been on research in the field of technical sciences with an emphasis on transport and intelligent transport systems, as well as electrical engineering and telecommunications, computer science, information and communication technologies, mechanical engineering, robotics, energy and construction. Additionally, and given that woodlands cover 50% of the region, forestry plays an important role as well. Since crop and animal production are not very widespread in the Žilina Region, the energy potential is mainly represented by wood biomass.

Key Trends Influencing Innovation	The national SRI (Sector-Driven Innovations) programme for developmental changes in the labour market, considering specific needs for each sector and setting requirements for specific qualifications on a sector basis. The sectors involved include innovation and technological changes: • Agricultural, Veterinary and Fisheries • Food Industry • Forestry and Wood Processing • Pulp, Paper and Printing Industry • Construction and related Industries • Waste Management The main innovation trends include: Precision farming/ Organic farming/ Social agriculture/ Digitisation/ AI/ Vertical farming Labelling/ Functional food/ Personalised food/ Business automation/ Digitisation/ Robotics/ IT applications Robotics/ Smart technologies/ Virtual Reality/ CNC technology in wood processing / GPS applications/ Big Data for management and storage Digitisation/ Automation/ Smart packaging/ AI/ New materials/ Biodegradable materials Automation/ Digitisation/ Big Data/ Drones/ AI/ Robotics/ Smart technologies/ Green economy Sustainable and Green solutions/ Circular economy/ Process automation/ IT/ Data/ Digital security.
Expected Sub-Sectors/Value Chains	The existing economic structure of the ZSK region is based on its industrialised background, and possibly occurring changes will be due to: • Technological developments, electromobility, automation and digitalisation of production and non-production processes, robotisation, as well as demographic development; • Climate change parameters (especially in issues related to the environment); • Implementation of bioeconomy principles; • Involvement in related European projects (such as the project CELEBIO, which resulted in a National Action Plan for the Development of the Bioeconomy in the Slovak Republic); • Exploring the national potential; • Promoting cooperation in issues involving sustainable processes; • Raising awareness at all levels; • Dissemination, training and knowledge transfer at all levels. The proposed National Action Plan correlates with the priorities of the National Smart Specialisation of the Healthy Food and Environment Domain: • Priority area 5-1: Resilient and healthy local food systems • Priority area 5-2: Circular production systems based on biomass • Priority area 5-3: Society in the environment • Priority area 5-4: Sustainable use of natural resources (soil, water, air, biodiversity, ecosystem)
Opportunities for Advancement (Growth, Career, Social, etc.)	The majority of the workforce in the region consists of staff without specialised and domain-related skills (non-specialised staff). In the near future, it will be necessary to respond to the labour market problems resulting from the lack of appropriate skills in the economically active population. The total additional need for workers in the Region is estimated at more than forty thousand persons by 2025. The need will arise mainly through the replacement of the workforce due to their departure from the labour market (accounting for 78% of jobs) and 22% will arise as a result of economic expansion. Graduates entering the labour market in the period up to 2025 will

	not cover the labour demand. In the long term, the effects of climate change are perceived as important future drivers for new skills and professions.

4.8. Germany

Table 8: Country profile of Germany, the Rhenish region

Existing Sub-Sectors/Value Chains in Bioeconomy	Main sectors. • Biobased fuels, biogas • Food processing • Agriculture • Chemical industry Subsectors/Value chains: • Food products, • Electrical energy (biogas), • Hydrogen.
Key Trends Influencing Innovation	Key trends in the region are: • Renewable energies, • Decarbonization of industries, • Digitalization, • Artificial intelligence, • Sustainable transportation /mobility, • Fostering local sourcing to reduce supply chain risks.
Expected Sub-Sectors/Value Chains	In 2030 key sectors are considered to be: • Agriculture, • Food industry, • Chemistry, • Plastics and pharmaceuticals & Biotechnology, • Energy, energy storage, • Paper industry, textile industry, • Construction industry, building materials, wood processing, • Information and Communication Technology, • Logistics, mechanical engineering. It is estimated that value chains and ensuing goods of the above cited sectors will be food products, biobased packaging materials (Chinese reed), electrical energy (biogas), Hydrogen, insulating materials. It can be expected that subsectors will be combined heat and power plant (CHP), waste cogeneration plants, biofuel facilities, pulp and paper, pellet facilities, green refinery, organic and anorganic chemicals, industrial gas and gas facilities, fertiliser, food and animal feed additives, composting plants, sewage treatment plants, landfill, breweries, sugar mills, starch mills, oil presses, fruits and vegetable processing. The value chains will be more regional and will produce less carbon dioxide. For example, in the field of biorefinery, wood, paper, pulp could be used and produced in the same area. The same applies to the food sector, where plants, that are rich of proteins (lentils) can be processed in order to improve the protein intake in nutrition. Chemical recycling (Plastic, clothing) production of chemicals, smart textiles, new materials in the construction industry.

	Most of the cited subsectors have already been established in the neighbourhood of the Rhenish territory which facilitates the development of bioeconomy here.
Opportunities for Advancement (Growth, Career, Social, etc.)	With a stronger focus on various fields of bioeconomy a multitude of career chances and job profiles have to be created. Assumingly there will be the need for experts in various fields and specific expertise. Besides the increasing number of sustainable jobs there will be the need for start-ups and businesses in this field. Currently, there are already some big firms (e.g. Shell) involved. Several innovative labs have been set up by different stakeholders (Research centre Jülich).

5 Overview of the case studies

Best practice case studies play a key role in knowledge transfer and inspiration in the BioGov.net project and beyond. The objective of Work Package 2 was to collect and assess good practices and case studies in bioeconomy education, training, and skills development. Consortium partners collected relevant and suitable case studies from eight EU regions/countries.

The types and forms of case studies in respective regions differ, as do regional settings. However, it was very important to investigate the effective measures of these case study examples, why they function, how individualised they are and how they interrelate with the target groups they are serving.

It needs to be said that the partners had no initial list of specific criteria available to choose their case studies. Instead, the choices were based on their experience and knowledge of their contexts and realities. The impact of the projects/programmes/initiatives, considered in this document, was not a set of criteria either. Instead, success factors were identified, serving as good examples of functioning approaches. However, they cannot be transplanted to other realities without considering the existing context.

For a detailed methodology on how the collection of case studies was carried out, please consult the 3.1.2 Case Studies Guidelines section of this document.

This collection of case studies was created to provide the BioGov.net project and beyond with inspirational examples of educational formats and to identify key elements of success, and their usage and replicability in a regional context. Local capacities, opportunities, barriers, potentials, responsiveness to bioeconomy goals and bio-system expectations, and specific approaches to address the needs of target groups were taken into account.

Table 9: Overview of the shortlisted case studies collected in BioGov.net

No.	Category of best practice	Partner	Title	Abstract	Target group	Region	The objective of the format
1	Using art to address different learning styles and facilitate the inclusion of marginalised people	FVA	Link Project	"Link" is a project financed in the context of a public call for Italian municipalities wanting to develop innovative projects and actions to address the phenomenon of young NEETs in their local contexts. Over two million young people in Italy, aged 15-29, are not engaged in study, work or training. The Link Cultural Association in the Apulia region was founded in 2003 by a group of young people passionate about their local area but at the same time eager to encourage openness to other cultural contexts and to promote values such as solidarity, active citizenship and intercultural dialogue. At the local level, the Link Association, since its inception, has carried out educational projects as part of the training offer plan in collaboration with various educational entities, addressing the following topics: local history, environmental education and access to culture. In addition, Link has developed projects aimed at learning foreign languages and promoting intercultural education and on-the-job training in high schools. Under the management of the Link Association, since June 2019, the Agorateca community library has acted as a cultural venue where training activities are implemented using different levels and forms of creativity, such as art, music and entertainment, with a strong focus on sustainability and inclusion.	NEETs and young generations to prevent the emergence of new young NEETs	Apulia, Italy	improving the employability of disadvantaged groups

2	Using art to address different learning styles and facilitate the inclusion of marginalised people	FVA	My HandScraft	Migrants Hands and Skills to Create a Future Track is a 30-month project aiming to develop and test an innovative education and training programme, addressed to low-skilled adults and migrants (especially newly arrived migrants, asylum seekers and refugees) to support their social and economic integration into society and the labour market.	Adult migrant learners, adult learners, adult trainers	Italy, UK, Cyprus, Greece, Lithuania	improving the employability of disadvantaged groups
3	Using art to address different learning styles and facilitate the inclusion of marginalised people	QPLAN	Ecumenical workshops for refugees	The Ecumenical Refugee Workshop NAOMI is an urban non-profit organization based in Thessaloniki. It aims to provide humanitarian aid to refugees and activities for their integration into society. In the professionally configured workshop, refugees are also taught tailoring skills. Their goal is to be later able to sew for their family and friends, but also, by finding employment in the textile industry, to be independent and take care of their family. Art and Fashion have always been inspired by different cultural influences. Tailoring for and with people from different cultures and with different fashion styles is in the spirit of NAOMI. In this way, NAOMI promotes the integration of refugees and their career independence. In the workshops, the participants learn not only to reuse clothes but also to incorporate art, creativity and design to create quality products of artistic design.	People with migrant backgrounds, interested in developing skills to work in the textile industry; professionals and non-professional tailors	Thessaloniki, Central Macedonia	improving the employability of disadvantaged groups

4	Using art to communicate messages, inspire people and raise their interest and awareness	BTG	Bio-based Bridge Eindhoven	A bridge is an ideal object to test the properties and possibilities of new materials. The world's first bridge made of 100% biomaterials (biocomposites) was constructed on the campus of TU Eindhoven in 2016. Materials used in the pedestrian biobridge included PLA (poly lactic acid) foam, cork, hemp and flax fibres, and a bio-based epoxy resin. The original bridge was erected by a project partnership of TUD, TU/e, CoE BBE, schools for pre-vocational secondary education (VMBO) in Eindhoven and composite company NPSP. The bridge concept was advanced in the Interreg NW Europe project of Smart Circular Bridges. In 2022, a new bridge design was tested and demonstrated at the world horticulture exhibition Floriade in Almere. Materials used in the construction included 100% natural flax fibres and resin with a 25% bio-based share. Further bridges will be piloted in Ulm (D) and Bergen op Zoom (Netherlands). The EU-funded project is carried out by a partnership of universities, AVANS, seven companies and three municipalities.	The general public (awareness raising); material innovators; students (multiple EQF-levels)	The Netherlands (the cities of Eindhoven, Almere and Bergen op Zoom) and Germany (the city of Ulm)	other

5	Using art to communicate messages, inspire people and raise their interest and awareness	BTG	Bio-based Pop-up and Grow Store	The Bio-based Pop-up and Grow store refers to an integral concept that combines awareness raising, business development, training and education. Pop-up stores are shops, cafés or events that appear in fascinating environments for a limited period. The innovation potential, rather than consumption, takes centre stage in those projects. These spaces provide the setting to experiment with something new and inspiring. Their central part is a temporary exhibition of bio-based products (both quotidian and design products), which was first organised in an empty shop in the Bergen op Zoom city centre in the period 11.11.2016-30.01.2017. The store space was also used to accommodate an artist-in-residence, organise excursions with experiments for school children, and host business meetings and thematic workshops. The city of Bergen op Zoom has a formal policy to support the local bioeconomy, built on five pillars. The city organised the pop-up store to raise public awareness of the prospects that bio-based industries (chemical and agro) offer in terms of jobs, investments, sustainability, and a bright new future.	The general public, school children, SMEs and other businesses, public authorities (local governments from the Noord Brabant region)	Southwest Netherlands	other
6	Using art to communicate messages, inspire people and raise their interest and awareness	LOBA	Zet Gallery - ARTE EM ESPAÇO PÚBLICO & SUSTENTABILIDADE	Zet Gallery promotes sustainability through art by offering a prize “arte em espaço público e sustentabilidade” (art in public places and sustainability). This project also has the support of IB-S, Instituto de Ciência e Inovação para a Bio-sustentabilidade da Universidade do Minho.	Artists, the general public, and higher education institutions	The North Region of Portugal	other

7	Using art to communicate messages, inspire people and raise their interest and awareness	PEDAL	4 živly (4 elements)	The 4 Elements project is focused on education in the field of environmental education presented in a non-traditional form: non-formal education through interactive theatre (with the active involvement of students as the participating audience) and environmental activities carried out live, also through an online application. The project also educates teachers and will provide educational materials and guidelines with ready-to-use activities to be used in class.	Youth, teachers, general public	Slovakia, the Czech Republic, Poland	other
8	Using art to elicit new ways of thinking and develop skills needed in bioeconomy education	CE	Estonian Academy of Arts research centre, Sustainable Design and Materials Lab (DiMa)	The Estonian Academy of Arts is the only public university in Estonia providing higher education in art, design, architecture, media, art history and conservation-restoration. Research centre DiMa connects research and teaching activities with sustainable product development and design practices and brings together two research directions - circular design and bio-based material design. However, DiMa does not compete with the country's more established materials science institutes but creates an opportunity to broaden material research and discussion in a local context.	Individuals interested in sustainable, eco-friendly design bringing together students, researchers, practitioners and companies	Estonia	other
9	Using art to elicit new ways of thinking and develop skills needed in bioeconomy education	FVA	Bioeconomy foresight scenarios towards 2050 (JRC KCB)	The Scenario Exploration System is a board game developed by the Joint Research Centre to facilitate the practical use of scenarios from foresight studies and the application of future systemic thinking to policymaking. The bioeconomy edition is based on four scenarios for future transitions for the bioeconomy towards sustainable development and a climate-neutral economy. Participants take up the roles of different stakeholders (primary producer, consumer, policy maker, businesses, and public opinion) and navigate different scenarios. The tool enables them to develop a long-term perspective and to experience the constraints and opportunities they might face in designing actions towards reaching long-term goals and objectives and when interacting with other	Quadruple helix stakeholders	Europe	other

				stakeholders.			
10	Using art to elicit new ways of thinking and develop skills needed in bioeconomy education	LOBA	Circular Centre Quiz-Jogo Centro Circular	The Centre Region Coordination and Regional Development Commission launched the Circular Centre Quiz, an online game to promote knowledge about the circular economy, aimed at the school community of the Centre Region of Portugal. This is an initiative that uses gamification as a ludic way to develop environmental, circular and sustainable education content, addressed to students and their teachers.	Students and teachers from the 5th to the 9th year of schooling, family and friends of the students, students from other cycles, or other interested players.	The Centre Region of Portugal	other
11	Bioeconomy education, training and retraining and Inclusion of marginalised groups	UNIBO	COpAPS - Cooperative for Productive and Social Activities	COpAPS is an agricultural and social cooperative that integrates people in need. In particular, it accompanies young people with mental disabilities and vulnerable people on their way to education, training, sheltered workshops, and employment inside and outside the company. Relationships are at the heart of COpAPS' work: it offers its beneficiaries personalised, tailor-made pathways to self-esteem and integration. The setting is an agricultural environment with an emphasis on sustainability.	People with disabilities and in need	Emilia-Romagna (Italy)	improving the employability of disadvantaged groups
12	Bioeconomy education, training and retraining and Inclusion of marginalised groups	PEDAL	Aptet	The goal of Aptet is to ensure the integration of vulnerable groups of people (disabled or seniors) via individual and tailored support and their successful entry into the labour market. Those who fail to find work in the open labour market will continue to work for Aptet ISP.	Adults disadvantaged due to lack of education and skills, adults with disabilities, minority groups (ethnic, linguistic, religious), older adults (65+), youth (aged 15-24)	Slovakia, the City of Levice	improving the employability of disadvantaged groups

17	Bioeconomy education, training and retraining and inclusion of marginalised groups	QPLAN	Vamvakies Social Green Project	The Vamvakies Social Green Project is designed by Enel Green Power and Wise Greece, in collaboration with CluBE and the Municipality of Kozani, a city in northern Greece, exclusively for the Prefecture of Kozani and the wider area, to support those interested in empowerment, entrepreneurship and careers in the food industry. The programme is based on two pillars: empowering a small group of women to work at the Enel Green Power photovoltaic park in Kozani, but also providing free training seminars to all Kozani residents to develop their skills.	Women in the photovoltaic park in Polymylos, Kozani; educational programmes for all residents of Kozani	West Macedonia, Greece	entrepreneurship education
13	Bioeconomy education, training and retraining in Entrepreneurial Education	BTG	Blue City Circular Challenge	The Circular Challenges take place at BlueCity, located in a former 12,000m2 subtropical swimming oasis in Rotterdam (NL). BlueCity supports companies and organisations that are active in making their operations more circular. BlueCity is an international icon of the circular economy, a national platform for circular entrepreneurs, and a very visible local accelerator that empowers circular entrepreneurs and inspires citizens. The Circular Challenge is a format for applied training in the circular economy, combining sustainable business modelling with design.	Students and young professionals	The Netherlands	entrepreneurship education
14	Bioeconomy education, training and retraining in Entrepreneurial Education	CE	Master's programme in Biology and Eco-innovation at the University of Tartu (UT)	The curriculum gives students the ability to orient in problems related to global changes and to think eco-innovatively. It gives a comprehensive knowledge of the diversity of Estonian and European nature, and the functioning and protection of ecosystems. In addition, entrepreneurship is developed in solving ecological problems, acquiring the basics of an environmentally sustainable economy, entrepreneurship and innovation.	Students with a bachelor's degree in natural sciences wanting to apply for this master's curriculum, 36 ECTS from the UT's bachelor curricula of biology or substantially similar courses	Estonia	re-qualification of professionals

15	Bioeconomy education, training and retraining in Entrepreneurial Education	PEDAL	CIRCO Training Programme - creating business through circular design	CIRCO is a programme developed by CLICKNL - a consortium for the creative industry - and supported by the Dutch Ministry of Infrastructure and Water Management. With a unique and proven design thinking method, CIRCO helps companies to create circular business propositions in cooperation with their value chain. The method consists of Circular Business Design Tracks for companies/entrepreneurs and Circular Design Classes for creative professionals.	Mainly manufacturing companies and design professionals	several countries, where a CIRCO hub is located; more information here: https://www.circonl.nl/international/hub-network/	entrepreneurship education
16	Bioeconomy education, training and retraining in Entrepreneurial Education	QPLAN	The research project "Center for Sustainable and Circular Bioeconomy and Energy [Aegean_BIOECONOMY]"	The project of the Department of Environment at the University of the Aegean aims to support the insular regions of the North and South Aegean in the transition from a linear to a circular bioeconomy model. The duration of the project is 30 months, and it is co-funded by the European Fund for Regional Development. The holistic approach of Aegean_BIOECONOMY combines the recovery and valorisation of biological resources, promotion of sustainability, and protection of the natural environment. It is organised into four (4) distinctive project activities, which will lead to the development of innovative services and platforms in the regions of interest in the North and South Aegean through the exchange of knowledge and experience, training, as well as interactive workshops and other events. At the same time, the project's activities will contribute to the development of new regional strategies in line with the requirements of the environmental legislation.	Researchers, relevant stakeholders, scientists and experts in the selected areas (e.g., sustainable production and biomass management, recycling of materials into new products, sustainable water resources management and hotel footprinting), producers, consumers	The North and South Aegean, Greece	complementing education for professionals

18	Bioeconomy education, training and retraining in Entrepreneurial Education	UNIBO	FOEBE-Fostering Entrepreneurship for the Bioeconomy	FOEBE's overarching objective is to equip bioeconomy students at Master's and PhD levels with tailor-made sustainable entrepreneurship skills. Its general approach revolves around a blended learning format combining e-learning and face-to-face sessions, emphasising innovative pedagogical practices. Project activities include the design of skills portfolios and curricula for entrepreneurship in the bioeconomy, defining innovative teaching practices, and implementing a digital learning platform to support the development of courses and training materials, building on the partners' expertise.	Master and PhD Students	Austria, Germany, Finland, France, Italy, the Netherlands, Poland	entrepreneurship education
19	Bioeconomy education, training and retraining in Higher Education (HE)	AVANS	Learning Network Biobuilders (Lerend Netwerk Biobouwers)	Lerend Netwerk Biobouwers is committed to the development of an innovative, practice-oriented teaching method for the construction sector. It focuses on wood and biocomposites as examples of biocircular materials and focuses on ecological systems thinking and "21st-century skills" such as problem-solving, leadership and multidisciplinary collaboration. Five Flemish and Dutch partners, together with many stakeholders from the construction sector, worked on this future-proof, innovative teaching method until the end of 2022 as part of an Interreg Vlaanderen-Nederland project. To this end, gaps between supply and demand are being mapped out and cross-border pilots are set up in which new methods are tested. Both bachelor students and professionals will participate in the pilots. The intended result is a roadmap along which relevant study programmes can further develop their existing curricula.	Professionals in the construction sector (focus on middle management positions); bachelor students at universities of applied sciences	Provinces of Noord-Brabant and Zeeland in the Netherlands; the Region of East Flanders in Belgium	other

20	Bioeconomy education, training and retraining in Higher Education (HE)	BSS	Bioeconomy certificate course - Bioeconomy and Sustainability : A practical introduction to the Basics	The certificate course in six modules gives the participants a practical introduction to the basics of the bioeconomy and the challenges and opportunities associated with its implementation. Companies can book the entire course or individual modules for their employees.	Individuals who deal with bioeconomy issues in companies or authorities, e.g. executives, sustainability managers, and site/facility operators.	Germany	entrepreneurship education, complementing education for professionals, re-qualification of professionals
21	Bioeconomy education, training and retraining in Higher Education (HE)	LOBA	Blue Bioeconomy Collaborative Laboratory (B2E CoLAB)	B2E CoLAB works daily to establish the most valuable synergies between academia and industry, and to promote the economic and social value of those sectors by developing added-value bio-based products and services inspired by the ocean and internationalisation processes of national scientific and technological capacity and knowledge.	Academia, non-profit organizations, Industry, policy institutions, higher education institutions	The North Region of Portugal	other
22	Bioeconomy education, training and retraining in Vocational Education and Training (VET)	AVANS	CO3 Campus	CO3 Campus is a networking centre for the sustainable economy and innovation in the technology sector. It boasts a sustainable building with an exemplary function in the region. Demo facilities include: - Water purification system - Suntrackers - Circular coffee area - Circular biobased offices/meeting rooms - Energy neutrality/energy transition They facilitate events, training, workshops and meetings.	All organisations, companies and networks in the North Sea Port region: Zeeland, West Brabant, Oost-Vlaanderen, and West-Vlaanderen	Southwest-Netherlands; Zeeland, East and West Flanders, Belgium	complementing education for professionals

23	Bioeconomy education, training and retraining in Vocational Education and Training (VET)	BSS	Boosting Bioeconomy Knowledge in Schools	This MOOC aims to bridge the gap in education by giving teachers a fresh perspective on the bioeconomy field and its applications in teaching STEM subjects. The course will do so by presenting the BLOOM School Box, a series of lesson plans co-created by twenty pilot teachers in ten European countries, which illustrate how bioeconomy can be introduced in different STEM subjects.	Teachers, professionals	online	complementing education for professionals, re-qualification of professionals
24	Bioeconomy education, training and retraining in Vocational Education and Training (VET)	CE	Bioeconomy, innovation and achieving climate neutrality in the rural economy	The training prepares the advisors to provide practical solutions to those involved in the rural economy on issues related to the different areas of bioeconomy and circular economy, innovation and achieving climate neutrality.	Consultants and advisors involved in the rural economy, wishing to develop the competencies required by the professional standard at levels 5, 6, and 7 and suitable for all specialisations	Estonia	complementing education for professionals
25	Bioeconomy education, training and retraining in Vocational Education and Training (VET)	UNIBO	The Higher Technical Institutes (ITS)	The Higher Technical Institutes are new schools with a high technological specialisation that create two-year post-diploma courses as an alternative to the university to train higher technicians able to enter the strategic sectors of the economic-productive system and to bring highly specialised and innovative capacity. 40% of the total number of course hours are dedicated to internships in companies. Seven foundations, six areas, and forty-two courses only in the Emilia Romagna Region, with many more all over Italy.	High school post-diploma students	All Italian regions	complementing education for professionals

26	Injecting the bioeconomy into design, art, architecture and suchlike professions	BSS	Sustainable design	As part of the Sustainable Design course, designers are trained to create in a meaningful and aesthetic way by placing design in an interdisciplinary context with the ecological, social, cultural and economic challenges of the globalised world. Graduates are equipped with a unique selling point through the focus on sustainable design.	Designers	Cologne, Germany	entrepreneurship education
27	Injecting the bioeconomy into design, art, architecture and other professions	FVA	Sustainable Art Prize	In 2022, the Ca' Foscari University of Venice in collaboration with Artverona announced the fifth edition of the Sustainable Art Prize, dedicated to an artist or a collective of artists working on sustainability issues and, using artistic language, actively disseminating issues related to major global challenges, in line with the 17 objectives of the 2030 Agenda for Sustainable Development promoted by the UN. In the 2022 edition, the Prize saw the collaboration and involvement of other Venetian universities: the IUAV University of Venice, the University of Padua and the University of Verona. The Universities joined the jury and collaborated in the realisation of the project of the winning artist with the participation of female and male students.	Art students, artists, professors, associates	Italy, but the prize is open to international participants	other

6 Main findings and recommendations

There are many remarkable, innovative, and forward-looking case studies which can serve as recommendations and inspiration for the future work of BioGov.net. However, as mentioned before, the bioeconomy as a sector is constantly evolving, which also applies to the world of education.

As we see this deliverable as a source of inspiration for future governance models in bioeconomy education, this section aims to provide an overview of approaches considering the trends in education, rather than conclusive answers.

The project analysed collaborative approaches aimed at fostering innovation, scientific/research activities, linking seemingly unrelated fields (such as bioeconomy and art) and fostering collaboration across sectors and value chains that have proven successful in the bioeconomy, but also broader themes (such as sustainability) to identify models and formats transferable and replicable in the context of BioGov.net.

Considering the changing objectives, functions, actors or structures and formats in the world of education, megatrends and schooling scenarios developed by OECD *(OECD, 2022)* were also considered when analysing the case studies. The OECD publication *Trends Shaping Education 2022* explores megatrends affecting the future of education, from early childhood through to lifelong learning. The areas covered include:

- **Economic growth**: Despite the worldwide rise in living standards, socioeconomic inequalities are widening, and the unsustainable use of resources is straining our environment. The provision of high-quality education, regardless of the age of learners, grows in importance with respect to demographic as well as technological and economic changes. Raising environmental awareness and developing technical and critical thinking skills are increasingly in demand.
- **Knowledge and power,** associated with digital technologies that enable almost endless data and information, but also result in new questions, such as how to deal with abundant, sometimes fake or misleading information in a rapidly changing context. How can education support all individuals to not only access information, but know what to do with it? Is it possible to build inclusive governance, enhance evidence use and quality, and increase public trust?
- **Living and working conditions** also changing, affected by changing socio-economic circumstances, but also technological changes. Robust lifelong learning systems can build adaptability and resilience, but what is the role of education in preparing for life outside of work? What is the role and function of continuous learning beyond the context of formal education?
- **Identity and belonging** Exploring the importance of understanding who we are and where we belong, education should meet the needs of diverse learners and cultivate competencies for the 21st century. It can help students develop common norms and values. Identifying and reducing discrimination and disadvantage is a key first step to ensuring accessible, adaptable and affordable education for all.
- **Our changing nature** impacting various areas of our lives from food production and consumption to digital communications and face-to-face relations. The role of education is key in helping us navigate emerging social and ethical challenges, considering individual as well as collective and planetary well-being.

4 scenarios were developed based on the trends that were considered in the analysis are shown in Table 10:

Table 10: OECD schooling scenarios

Scenario	Goals and functions	Organisation and structures	The teaching workforce	Governance and geopolitics
Scenario 1: Schooling extended	Participation in formal education continues to expand. Academic certificates continue to be the main passports to economic and social success. The curriculum rises to the fore, with countries operating a more common curriculum and assessment tools.	International public-private partnerships powers digital learning environments. Learning resources and data are shared across countries. The organisation of instruction and student-teacher interactions remain mostly unchanged, although there is room for innovation.	More personalized learning alters the nature of teachers' work, with subsequent impact on teacher education and professional development. There is marked division of tasks and greater diversification of professional profiles in school networks, which now benefit from larger economies of scale.	Strong role of traditional public administrations Increased emphasis on partnerships and international collaboration.
Scenario 2: Education outsourced	Driven by greater parental involvement, diverse forms of private and community-based initiatives emerge as alternative to schooling. Choice plays a key role: of those buying educational services and of those, such as employers, giving market value to different learning paths.	As education outsourcing expands, traditional bureaucratic governance and system-wide accountability shrinks. Greater choice in learning programmes (length, scope, cost, etc.) provides learners with flexibility to move at their own pace.	There is greater variety of teaching profiles and working arrangements, with implications for professional and reputational status. Learning networks, such as massive digital learning platforms, bring different human resources together according to perceived needs.	Greater reliance on societal self-organisation. Schooling systems as players in a wider (local, national, international) market.
Scenario 3: Schools as learning hubs	School retain most of their functions, but new forms of competence recognition systems liberate them from pressures of credentialism. Move away from uniformity: Local actors develop their own initiatives to realise the values they consider important.	Experimentation and diversity of pedagogies are the norm. Personalised pathways are strengthened within a framework of collaborative work. Activities are planned in the context of broader learning ecosystems, mapping opportunities across an interconnected network of educational spaces.	Knowledgeable, networked teachers coexist with diverse individual and institutional players offering a variety of skills and expertise. Strong partnerships leverage resources of external institutions, such as museums, libraries, residential centres, technological hubs and more.	Strong focus on decision-making at the local level. Self-organising units in diverse partnerships.
Scenario 4: Learn-as-you-go	Digitisation has made it possible to assess and certify knowledge, skills, and attitudes in a deep and almost instantaneous manner. Learning opportunities are widely available for "free", making the decline of established curriculum structures and dismantling the school system.	Education builds on digital technology and artificial intelligence to leverage collective intelligence and solve real-life problems. Dismantling of schooling systems and repurposing of its infrastructure. Distinctions between education, work, leisure become blurred.	Difficult to envision the role of governments vis-à-vis markets and civil society. Data ownership and its geopolitical implications are key. Traditional teaching professionals vanish as individuals become "prosumers" (professional consumers) of their learning.	Deinstituonalisation of public education, dismantling of schooling. (Global) governance of data and digital technologies potentially key.

Inspired by existing examples of collaborative educational environments and the four OECD Scenarios for the Future of Schooling, the case studies were analysed from 3 perspectives:

- Formats reflecting the need to enhance collaboration in education to respond global challenges in regional contexts
- Formats reflecting the need for flexible and personalised education
- Formats combining art and bioeconomy education

6.1. Formats reflecting the need to enhance collaboration in education to respond to global challenges in regional contexts

Bioeconomy education is best tailored to the specific regional contexts to ensure that it meets local needs and contributes to sustainable global development. However, as BioGov.net seeks to support the establishment of the innovative governance model in bioeconomy training and skills development, we focused on the identification of some remarkable, innovative, and forward-looking case studies which can serve as recommendations and inspiration for others.

Based on these, a list of bioeconomy education models was created, focusing on main objectives and functions. The models can be implemented by different type of training or education providers. For the purposes of this deliverable, the models were simplified, in real life some of the models can be combined. One case study in the overview presented in section 5 can also be a combination of several of the formats described below. For the purposes of this section, case studies have always been assigned to only one model that best describes the approach described in the study.

6.1.1. Bioeconomy Training Centres

Acquiring academic certificates will remain the main passport to a profession. Therefore, the role of institutions providing education leading to full qualifications and preparing individuals to enter a profession remains central in bioeconomy education. However, a shift is expected from standard school institutions providing education and training in traditional formats to more non-formal or informal settings.

As described in the BIObec project Deliverable 2.1 *Best practice cases for Bio-based education Centres*, such a centre can be seen as a construct designed to build and coordinate a community of actors who offer education and training in the bioeconomy and promote knowledge and innovation in the field, integrating various stakeholders, promoting cooperation between them. Bioeconomy or biobased economy is an essential part of their mission, which gives them a leading role in the bioeconomy at the regional, national or international level. This then aids developing education, training, research and innovation strategies, actions and activities for any educational level.

Following the principle of competency-based education and dedicating time to internships in companies, they would serve as institutions with a high level of specialisation that provide courses to train technicians able to enter the strategic sectors and bring highly specialised and innovation-ready capacities.

Bioeconomy Training Centres represent a model that is close to Student or Talent/ Skilled Workforce Hubs (BIObec, 2022), combining functions such as:

- Provision of traditional higher education programmes, especially through undergraduate programmes. It includes the recruitment and education offers for students and mobility programmes, for example in the form of fieldwork, internships or exchange programmes, and the main stakeholders involved are High Education Institutions (HEI). It could include Massive Open Online Courses (MOOCs) or virtual education to widen access for higher education students, modernising and internationalising HEIs.

- Teaching and training with the overall goal of developing a skilled workforce, extending to different types of learning and professional development opportunities directed not only at students but also professionals who seek to update their knowledge, gain new skills and continue their education; those opportunities include lifelong learning. The objectives are to increase the number of skilled workers, contribute to a service and/or knowledge economy, foster economic competitiveness, and improve the quality and relevance of the labour force.

Thanks to this they would be able not only to offer a variety of programs developing skills needed by the industry and other types of employers, but also cultivate the political and economic environments needed for the bioeconomy to flourish.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#25: Higher Technical Institute (Italy)** are new schools with a high technological specialisation that create two-year post-diploma courses as an alternative to university to train higher technicians able to enter the strategic sectors of the economic-productive system and to bring highly specialised and innovative capacity. 40% of the total number of course hours are dedicated to internships in companies.
- **#24: Bioeconomy, innovation and achieving climate neutrality in the rural economy (Estonia)** training prepares advisors, developing specific technical and valorisation competences so that they are able to provide practical solutions to those involved in the rural economy on issues related to the different areas of bioeconomy and circular economy, innovation and achieving climate neutrality.
- **#20 Bioeconomy certificate course - Bioeconomy and sustainability: A practical introduction to the basics (Germany):** is a Blended learning course targeted at people who deal with bioeconomic issues in companies or authorities. It aims to provide a practical introduction to the basics of the bioeconomy and the challenges and opportunities associated with its realization.
- **#22: CO3 Campus (Southwest- Netherlands, Zeeland, East and West Flanders Belgium):** developed a simulation software for the (bio) process industry. The vocational school in the area makes use of software while educating the (bio) process operators of the future. Other companies use the software as a guidebook to look up some theory or use it as a refresher course. The campus facilitates trainings for the Maintenance and Process Industry in the area.

6.1.2. Bioeconomy-informed Sustainable Development Hubs

Institutions **shaping future professionals** in fields such as design, art, architecture, or engineering, who will map out culture and be responsible for the products, services, and structures which will characterise our societies, have a great deal of responsibility resting on their shoulders, in respect of the current and next generations.

Bioeconomy-informed Sustainable Development Hubs, such as the Bezalel's Sustainable Development Hub[7] established by the Bezalel Academy of Arts and Design Jerusalem have the SDGs framework integrated into their DNA.

Responsibility and sustainable constant change are key themes and a creative process is the key approach. Connecting individuals with different backgrounds, developing skills such as systemic and strategic thinking, but also interpersonal skills needed in the team creation process in multidisciplinary teams, encourages learners to take on a leadership role by identifying complex challenges, asking questions, taking on critical standpoints and implementing solutions that take into consideration social, communal and environmental perspectives.

The Hub is characterised by constant efforts to integrate sustainability into their work and develop an academic infrastructure for teaching and research in sustainable development. Collaborations with academic, civilian and business entities on a municipal, national, regional and global level are facilitated.

Individual and group research studies, academic publications, conferences and seminars are the core activities of the Hub.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#8: Estonian Academy of Arts research centre Sustainable Design and Materials Lab (DiMa) (Estonia)** is the only public university in Estonia providing higher education in art, design, architecture, media, art history and conservation-restoration. Research centre DiMa connects research and teaching activities with sustainable product development and design practices and brings together two research directions - circular design and bio-based material design. DiMa creates an opportunity to broaden material research and discussion in a local context.
- **#15: Master's programme in 'Biology and Eco-innovation' at University of Tartu (Estonia)** – the curriculum was created to give the ability to orient in problems related to global changes and to think eco-innovatively. The purpose of the programme is "to educate innovatively thinking people, having good knowledge about nature and its functions. The students learn to understand social and economic processes and challenges in the global change, and eventually will become the leaders of innovation, ecosystem-friendly economy and society in Estonia and Europe.
- **#19: Learning Network Biobuilders (Provinces of Noord-Brabant and Zeeland in the Netherlands; Region of East Flanders in Belgium)** is committed to the development of an innovative, practice-oriented teaching method for the construction sector. It focuses on wood and biocomposites, as

[7] More information available at: https://www.bezalel.ac.il/en/sustainability/about

examples of biocircular materials, and focuses on ecological systems thinking and “21st century skills” such as problem-solving thinking, leadership and multidisciplinary collaboration. The project focused on direct collaboration between current employees of the construction industry and employees of the future (e.g. students). In the project Universities, Universities of applied sciences, and representatives from construction industry were involved.

- **#23: Boosting Bioeconomy Knowledge in Schools (online)** is a MOOC that aims to bridge the gap in education by giving teachers a fresh perspective on the bioeconomy field and its applications in teaching STEM subjects.
- **#26: Sustainable design course (Cologne, Germany)** includes the ecological, economic, social and cultural challenges of our time in the training of tomorrow's designers. As part of the "Sustainable Design" course, designers are trained to create in a meaningful and aesthetic way by placing design in an interdisciplinary context with the ecological, social, cultural and economic challenges of our globalized world.
- **#27: Sustainable Art prize (Italy)** wants also to promote dialogue between art and research, giving artists the unique opportunity of working in a new environment collaborating with the university communities. Students from four Italian universities can participate, the artists work in a new environment collaborating with the university communities - a unique opportunity for dialogue between art and research.

6.1.3. Bio-economy Innovation Laboratories

Bioeconomy Innovation Laboratories, on the other hand, focus on developing ground-breaking initiatives for real-life challenges. A particularly strong focus is put on **developing innovative entrepreneurial thinking**, which needs to be enhanced in order to **find practical solutions to specific challenges raised by a company, industry or regional authority**.

Participants are trained in design thinking, prototyping, story-lining, knowledge sharing in the topic areas where problems are faced, and brainstorming sessions on challenges where ideas are required to be developed. Professional support is provided by experts in the respective fields during the different stages of the development process to develop viable and feasible solutions (prototypes or proposals).

This concept works well in, for example, the Israeli context where art school students meet engineering major peers and work together on addressing pressing issues (for example, limited electricity networks supplying energy to electric vehicles).

While developing innovative solutions in a multi-disciplinary group, and using practical entrepreneurial tools, the support of academia and industry is also available to them. However, unlike in the previous format, the role of academia is more supportive. These types of laboratories can be carried out by consortiums of innovation, research, and entrepreneurship centres, establishing a culture of innovation and entrepreneurship (JLM IMPACT, 2022).

The case studies identified by BioGov.net partners similar to this example are the following:

- **#4: Bio-composite Bridges (The Netherlands (cities of Eindhoven, Almere, and Bergen op Zoom) plus Germany (city of Ulm)** - using biomaterials to build bridges is highly relevant in the Netherlands (and Germany), as there are many

existing bridges that need to be renewed in the near future. The world's first bridge made of 100% biomaterials (biocomposites) was realised on the campus of TU Eindhoven in 2016 by a project partnership of TUD, TU/e, CoE BBE, schools for pre-vocational secondary education (VMBO) in Eindhoven and composite company NPSP. The project included RD&D on a novel construction material, applied in infrastructural objects in the built environment, in which students from different education levels collaborated to realise the pilot bridges.

- **#14: Blue City Circular Challenge (The Netherlands)** is a format for applied training in circular economy, combining sustainable business modelling with design. Teams of students and young professionals are linked to companies that have a waste stream, with the aim to work on designing a circular product. They have six weeks to come up with an idea, make a prototype and pitch a first draft of a business plan. Participants are therefore at the cradle of promising start-ups and promising innovations. The Circular Challenge is supervised by circular pioneers, design thinkers and financial experts.
- **#16: CIRCO Training Programme (several countries where this training is provided)** is particularly suitable for manufacturing companies that are developing or plan to develop a circular business (construction, plastics, consumer goods and manufacturing). During the series of 3 workshops, facilitated by trained and experienced professionals, representatives of companies get acquainted with design tools and circular knowledge applicable in their daily work. Every company prepares a detailed implementation roadmap to bring its circular proposition to the market.

6.1.4. Biohacking citizen's lab

Biohacking citizens' lab is another existing concept - from the **citizen science category** (British Ecological Society, n/a)v- pioneering biohacking space in the first place, which could be replicated.

An eminent example is Genspace, a community biology laboratory in New York. The Genspace mission is to foster a safe and inclusive community where **all people,** regardless of their age, educational background or experience, **can experientially learn, boldly create, and meaningfully grow with the life sciences**. Since 2009, Genspace has served the greater New York area by providing hands-on STEAM education programmes for youth and adults, cultural and outreach events for the public, and a membership programme to support New York's community of creators, researchers, and entrepreneurs. Their programmes demystify scientific processes and provide a platform for innovation (Genspace, n/a).

To give an example, Genspace demonstrates how bacteria communicate and socialise, all this illustrated with sound. A multimedia artist founding this laboratory composes video and live telematic installations, and conducts experiments, thus working at the interface of art, science, and technology. The bacteria grown in Genspace live in colonies and by making decisions as communities they create visually appealing images, frequently influenced by sounds.

This is a marvellous way of involving the public in microbiology research via live performances of the bacteria, raising awareness, but also inspiring and maybe cultivating the next generation of life sciences leaders in emerging global technologies, such as biotechnology, neuroscience, epidemiology, genomics, and many more.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#5: Bio-based Pop-up and Grow Store (Southwest Netherlands)** refers to an integral concept that combines awareness raising, business development, training & education. Pop-up stores are shops, cafés or events that appear in fascinating environments to stay for a limited time period. Central part is a temporary exhibition of bio-based products (everyday products as well as design products. At the centre stage is not only consumption aspects, but also the innovation potential. This format illustrates how a product exhibition space can serve well beyond public awareness raising and can also serve as a platform for business networking, running experiments, presenting art, and training/education/development.

6.1.5. (Social) entrepreneurship education

Social entrepreneurship or entrepreneurship education in general is another concept that can be used to enhance bioeconomy.

Developing a social entrepreneurship / entrepreneurship ecosystem, providing training, coaching and mentoring services, networking and other support services can ensure transformative experience, building "entrepreneurial DNA" in the field of bioeconomy and beyond with a strong focus on giving back to the community.

The goal is not only to equip the many qualified and talented community members with the **skills and spark needed to start a successful business**, but also to develop the **entrepreneurial mindset**, helping individuals, organisations or communities to **identify the opportunities and find ways to take advantage of them in various areas of life**.

Empowering individuals, (social) enterprises and others across the region can help build an **inclusive community-based bio-economy ecosystem**, able to address specific region or community challenges. As described in section 3.1.5. standard educational settings will not fit all individuals. Instead, supporting individuals to take a role in the community and changing their mindset can lead to activation of people from different groups, including marginalised, disadvantaged or vulnerable groups.

The entrepreneurial ecosystem bringing for example new bio-based products to be manufactured in the community or region is not the only advantage. Allowing members of the community to take part in small-scale community activities, social enterprises or other initiatives, and offering them ownership of their bio-based crafts, local agricultural products or just building a community garden is usually part of the inclusion and empowerment processes as well.

The case studies identified by Bio.Gov partners similar to this example are the following:

- **#13: Vamvakies: a Social Green Project (Greece)** began with a small group of women in the photovoltaic park in Polymylos, Kozani, planting herbs in the free spaces of the park, but also under the panels, creating the first series of agricultural products in Europe from a photovoltaic park. The women are supported by a team of advisors and trainers, with the aim of becoming micro-entrepreneurs, marketing these original products and earning a substantial income.
- **#2: My HandScraft (Italy, UK, Cyprus, Greece, Lithuania)** aimed to support social and economic integration of low-skilled adults and migrants into society

and labour market. The programme developed the basic skills and key competences of migrants, focusing on up-skilling and re-skilling in the realms of handicraft, culture and arts, promoting also entrepreneurial initiative towards economic integration.

- **#18: FOEBE - Fostering Entrepreneurship for the Bioeconomy (Austria, Germany, Finland, France, Italy, Netherlands, Poland)** aims to tackle the skills mismatch in entrepreneurship training and become a game-changer for Europe's bioeconomy education. Its overarching objective is to equip bioeconomy students at Masters's and Ph.D. levels with tailor-made sustainable entrepreneurship skills.

6.1.6. Local bioeconomy programs

Local bioeconomy programmes connect learners, local governments and business partners to create bioeconomy-related databases and **work towards policy solutions for sustainability and bioeconomy-related challenges.**

The Local Climate Action Program is based on a simple idea: people love the place where they grow up, play, live, and work and enjoy the idea of leaving a legacy of care and positivity for their children. By creating a programme respecting nature, both ordinary people and bioeconomy actors recognise the fact that anthropogenic sustainability challenges are occurring and affecting their lives and all they hold dear. At the same time, a programme like this promotes actions using quality data collected, spurring them to action (Dingo, H., b), 2023).

Connecting municipalities with private bioeconomy partners, general public and involving them in mapping the local bioeconomy situation, can result in development of an **inventory of bioeconomy-related issues, opportunities and solutions**, as in the case of the Local Climate Action Programme, where climate-forcing emissions sources and quantities were identified. The aim is to identify for example the types of bio-based materials in the region, the sources and quantities of these, types of industry acting in bioeconomy, the value created by the bioeconomy in the region, as well as potential to close the loops in the region and build a sustainable and resilient region. The results can be used in **development or further improvement of bioeconomy strategies or action plans.**

The learners in this case do not necessarily replace the work of professionals, however their research plays a vital role in informing the bio-economy community partners and empowers them in taking strategic steps forward (Dingo, H. a), 2023). Involving the community in the process gives an opportunity to learners to understand how the sector functions, develops, and eventually flourish. The skills developed by this programme are transferable to many sustainability-related positions with both public and private actors.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#17: Research project "Center for Sustainable and Circular Bioeconomy and Energy [Aegean_BIOECONOMY]" (Greece)** is a project of the Department of Environment at the University of the Aegean that aims to support the insular regions of North and South Aegean in the transition from a linear to a circular bioeconomy model. A particular objective of the project is the adoption of the EU Bioeconomy Strategy making sure it reflects the specific conditions of the island regions. Support is provided in the insular regions of North and South Aegean

through the interdisciplinary education and training, knowledge and specialization of scientists, the developing of new technologies, which are expected to result in new regional collaborative planning aligned with the environmental legislation.

- **#11: COpAPS - Cooperative for Productive and Social Activities (Italy)** is an agricultural and social cooperative that integrates people in need. The format corresponds to local needs and the current situation in the region. COpAPS carries out the guided employment of disadvantaged people in different areas, such as agriculture, agritourism restaurant and in the educational farm, green maintenance, management of ecological environmental services, social carpentry workshop. Working closely with main institutional stakeholders are undoubtedly the Emilia-Romagna Region, the cooperative can contribute to local/regional policy development, not only in the field of bioeconomy, but also with respect to the people from a disadvantaged community.
- **#12: APTET (Slovakia)** is represented by 2 entities – a social enterprise and an NGO. The goal is ensuring integration of vulnerable groups of people (disabled, seniors) via individual and tailored support, and a successful entering to the labour market. Complex support, ensured via collaboration with different organizations, through which expert volunteers are recruited to provide mentoring services. Creating opportunities for disabled people via establishing collaboration with regional and national actors (e.g., Profesia, the most popular job portal in Slovakia or regional industrial park - in preparation). Again, identification opportunities for people from vulnerable groups in bioeconomy can feed the policy-making in the region.

6.1.7. Peer learning programmes

Peer learning programmes for bio-economy community leaders and practitioners who are interested in inclusive participatory processes, are another noteworthy example of community-based bio-economy learning.

A programme of this kind is **based on learning by doing** and **peer-to-peer reflection** on bioeconomy practices and aims to **further support individuals already implementing community bioeconomy initiatives**.

Activities such as online and in-person workshops, site visits, peer-to-peer exchanges, mentoring, and more can be included. Through the program, participants are encouraged to deepen their knowledge on bioeconomy practices, build sustainability skill sets and inclusively reflect on their practice together, this way shaping their own bioeconomy-focused behaviours and attitudes. In addition to that, their skills in leading community actions are further improved.

Graduates of such programmes can be considered as bioeconomy community practitioners who are supporting **local citizen-led actions in the field of bioeconomy** and a wider field of sustainability. They are in an exceptional position to support local communities, search for common ground, increase social trust and work with divergent views for a viable bioeconomy and sustainable development.

The approach used in the actual community work can start with bioeconomy asset mapping, enhancing the mobilisation of resources, developing networks of bioeconomy community leaders, fundraising for local actions, building a sense of belonging, all of these having a social inclusion aspect embedded, and using alternative forms of communication (for example, podcasts adapted for people with visual impairment, a

variety of visuals made accessible for people with learning difficulties, and/or community actions in remote areas to include the geographically deprived) (Nadace VIA, n/a).

The case studies identified by BioGov.net partners similar to this example are the following:

- **#1: Link project (Italy)** is a project developed to address the phenomenon of young NEETs in their local contexts. Link Association, implementing the project, aims to stimulate young generations and in particular young NEETs in being engaged in non-formal educational activities, organised in partnership with local schools and associations. Link also supports cultural exchange among generations and facilitates the inclusion of the local community and marginalised groups like migrants or people non-speaking the local language. Through these activities, participants can be involved in a self-development environment, where informal peer-learning activities can be more successful than other traditional formats.
- **#9: Bioeconomy foresight scenarios towards 2050 (JRC KCB)** is a board game developed by the Joint Research Centre to facilitate the practical use of scenarios from foresight studies and the application of futures systemic thinking to policymaking. 88% of attendees confirmed that the workshop helped them develop a strategic perspective on the future of the bioeconomy. While the importance of the tool itself is crucial, interactions with peers can contribute to deepening the knowledge and understanding the constraints and opportunities.

6.2. Formats reflecting the need for flexible and personalised education

As mentioned above, adult education is affected by opportunities associated with technological changes, but also by demand from adult learners for more flexible and tailored educational formats. Some of the major trends together with examples of case studies identified by BioGov.net partners are presented below.

6.2.1. Lifelong learning

Lifelong learning has risen in importance in recent years, as **individuals recognise the need to continuously update their skills and knowledge to stay competitive in the job market**. This trend is driven by changing economic realities, as the nature of work is constantly evolving and workers are increasingly likely to change careers multiple times in their lifetimes.

The majority of case studies identified by BioGov.net partners present examples of various formats of life-long learning, providing opportunities for complementing the education of professionals, re-qualification, entrepreneurial education or other non-formal and even informal educational activities.

6.2.2. Online and blended learning

Online and blended learning has become increasingly popular in recent years, providing **flexibility and convenience for adult learners** who want to pursue their education while balancing work and family obligations. **Online platforms** allow learners to study at their own pace and on their own schedule, while **blended learning** combines online and

face-to-face instruction to provide a more interactive and engaging learning experience. The COVID-19 pandemic has further accelerated this trend, forcing many educational institutions to adapt to remote learning.

The case studies identified by BioGov.net partners implemented in the form of online or blended learning include:

- **#2: My HandScraft project (Italy)**, within which an e-learning platform and e-educational programme were developed, aiming at improving the basic skills and key competencies of migrants, and their up-skilling and re-skilling in the realms of handicraft, culture and arts;
- **#7: 4 elements, (Slovakia)**, a format providing environmental education in a non-traditional form - an interactive theatre (with the active involvement of the participating audience of students), environmental workshops carried out live or through an online application;
- **#10: Circular Centre Quiz- Jogo Centro Circular (Portugal)**, an online board game promoting knowledge about the circular economy, using gamification as a ludic way to develop environmental, circular and sustainable education content;
- **#13: Vamvakies a social Green Project (Greece)** providing educational programmes for all residents of Kozani with the aim of empowering and supporting entrepreneurship. Apart from online seminars, participants are supported by a large team of experienced trainers.
- **#18: FOEBE - Fostering Entrepreneurship for the Bioeconomy (Italy)**, a blended learning format combining e-learning and face-to-face sessions, emphasising innovative pedagogical practices. The objective is to equip bioeconomy students at Master's and PhD levels with tailor-made sustainable entrepreneurship skills.
- **#19: Learning Network Biobuilders (Lerend Netwerk Biobouwers, the Netherlands)**, a programme aiming at the development of innovative methods in the construction sector, as well as 21st-century skills. Learning, working, connecting and collaborating effectively online and offline is an essential part of the programme.
- **#20: Bioeconomy certificate course - Bioeconomy and sustainability: A practical introduction to the basics (Germany)**, offering a blended learning course (self-study and online seminars) in six modules, targeted at individuals who deal with bioeconomic issues in companies or authorities.
- **#23: Boosting Bioeconomy Knowledge in Schools (online)**, a MOOC that aims to bridge the gap in education by giving teachers a fresh perspective on the bioeconomy field and its applications in teaching STEM subjects. The course will do so by presenting the BLOOM School Box, a series of lesson plans co-created by twenty pilot teachers in ten European countries, which illustrate how bioeconomy can be introduced in different STEM subjects.

6.2.3. Competency-based education

Competency-based education is an approach to learning that **focuses on developing practical skills and competencies**. Rather than simply acquiring knowledge, learners work to demonstrate mastery of specific skills or competencies, which can be more immediately applicable in the workplace.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#12: APTET (Slovakia)**, whose mission is to facilitate the integration of people with disabilities into the labour market. Based on the initial interview, the potential of each individual is assessed and an individual development plan is prepared. The main objective of support provided by Aptet is to enter the open labour market. The organisation can also provide employment to those who fail to find a job in the open labour market.
- **#13: Vamvakies a social Green Project (Greece)**. The main objective of this education format is to empower and support female entrepreneurship. The participants not only gain knowledge about the food industry but, with the support of mentors and advisors, receive tailored support in developing entrepreneurial skills.
- **#14: Blue City Circular Challenge (Netherlands)** a format for applied training in the circular economy, combining sustainable business modelling with design. Teams of students and young professionals are linked to companies that have a waste stream. The young circular brains work with the waste, aiming to design a circular product. The Circular Challenge is supervised by circular pioneers, design thinkers and financial experts.
- **#16: CIRCO Training Programme - Creating business through circular design (several countries),** helping companies to create circular business propositions in cooperation with their value chain. CIRCO has expanded an academic framework, explaining five circular business models and six circular design strategies with tools and insights, which makes it useful and relevant to businesses. The participants' efforts result in a concrete implementation roadmap.
- **#18: FOEBE - Fostering Entrepreneurship for the Bioeconomy (Italy)** aiming to tackle the skills mismatch in entrepreneurship training and become a game-changer for Europe's bioeconomy education. The project is expected to equip bioeconomy students at Master's and PhD levels with tailor-made sustainable entrepreneurship skills.
- **#22: CO3 Campus (Netherlands),** offering training and re-training of the (biobased) process operator. CO3 Campus developed simulation software for the (bio) process industry. The vocational school in the area makes use of their software while educating the (bio) process operators of the future. Other companies use the software as a guidebook to find a theory or use it as a refresher course. In addition to that, CO3 Campus trains approximately 6000 employees in the region per year for their Compliance training.
- **#24: Bioeconomy, innovation and achieving climate neutrality in the rural economy (Estonia)** a training programme preparing the advisor to provide practical solutions to those involved in the rural economy on issues related to the different areas of bioeconomy and circular economy, innovation, and achieving climate neutrality. The training consists of three modules: the first two modules include visiting enterprises and engaging in individual and group work.
- **#25: The Higher Technical Institutes (Italy)**, new schools with a high technological specialisation, providing two-year post-diploma courses as an alternative to university to train higher technicians able to enter the strategic sectors of the economic-productive system and to bring highly specialised and

innovative capacity. The courses are usually divided into four semesters (1,800/2,000 hours) and can last up to six semesters. They are structured by skills rather than by subjects. Learning-by-doing, project work, problem-solving and design thinking are just some of the teaching approaches most used by ITS.

6.2.4. Personalisation

Personalisation is becoming **increasingly important** in adult education, as learners have unique needs and preferences. Educational programmes are increasingly focused on **tailoring the learning experience to meet those needs**, whether through adaptive learning technologies, individualised coaching and mentoring, or other personalised approaches. This trend is driven by a growing recognition that one-size-fits-all approaches to education are not effective for adult learners. Personalisation plays a specific role in educational/development programmes tailored to the needs of people from marginalised, disadvantaged, or vulnerable groups.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#1: Link Project (Italy)**, implemented by Link Association, aiming to stimulate young generations, and in particular young NEETs, to engage in non-formal educational activities, organised in partnership with local schools and associations. Informal training activities are designed specifically to identify, activate and bring out inactive young people in order to address the complex and varied phenomenon of NEETs in targeted and differentiated ways.
- **#3: Ecumenical workshops for refugees (Greece)** addressing the significant lack of access to training, counselling, fair employment, and income for professional and non-professional tailors from migrant backgrounds. The holistic Academy Program alongside training on sewing skills provides career counselling, Greek language, soft skills, and environmental awareness, and thus empowers the attendants to participate in social and economic life and to be creative by using art in their activities.
- **#11: COpAPS - Cooperative for Productive and Social Activities (Italy)** an agricultural and social cooperative that integrates people in need. In particular, it accompanies young people with mental disabilities and other vulnerable individuals on their way to education, training, sheltered workshops, and employment inside and outside the company. Relationships are at the heart of COPAPS' work: it offers its beneficiaries personalised, tailor-made pathways to self-esteem and integration. The setting is an agricultural environment with an emphasis on sustainability.
- **#12: APTET (Slovakia)** focusing on increasing readiness for entering the labour market - from changing the mindset and motivation, through creating basic habits and developing soft skills, to developing specific technical skills. It is a long-term process, tailored to the specific needs of each individual. The support takes place through multiple pathways.
- **#13: Vamvakies a social Green Project (Greece):** a social Green Project (Greece): The main objective of this education format is to empower and support female entrepreneurship. The participants get support from mentors and advisors helping them in every professional step in developing a business.

- **#14: Blue City Circular Challenge (Netherlands)** Blue City Circular Challenge (the Netherlands), a format for applied training in the circular economy provided by BlueCity, an international icon of circular economy, a national platform for circular entrepreneurs, and a very visible local accelerator that empowers circular entrepreneurs and inspires citizens. Within the format, teams of students and young professionals are linked to companies that have a waste stream. They work with the waste to design a circular product and have six weeks to think of an idea, make a prototype, and pitch a first draft of their business plan. The teams are supported by circular pioneers, design thinkers and financial experts.

6.2.5. Microlearning

Microlearning **involves breaking down educational content into small, easily digestible chunks** that can be **learned in short bursts of time**. It allows learners to fit learning into their busy schedules and can improve the retention of information. Microlearning also provides opportunities for just-in-time learning, allowing learners to quickly acquire the specific skills and knowledge they need when they need it. Microlearning is often delivered through mobile devices or other digital platforms, making it accessible to learners on the go.

The case studies identified by BioGov.net partners similar to this example are the following:

- **#19: Learning Network Biobuilders (Lerend Netwerk Biobouwers, Netherlands)**, an innovative programme being developed in the Netherlands. One of the recommendations for the development of the curricula is to look into the possibility of working with microcredentials (especially concerning Lifelong Learning).
- **#20: Bioeconomy certificate course - Bioeconomy and sustainability: A practical introduction to the basics (Germany)**. The certificate course in six modules gives the participants a practical introduction to the basics of the bioeconomy and the challenges and opportunities associated with its implementation. Companies can book the entire course or individual modules for their employees.

6.3. Formats combining art and bioeconomy education

6.3.1. Using art to elicit new ways of thinking and develop skills needed in bioeconomy education

The case studies identified by BioGov.net partners similar to this example are the following:

- **#8: Estonian Academy of Arts research centre Sustainable Design and Materials Lab (DiMa)**. The Estonian Academy of Arts is the only public university in Estonia providing higher education in art, design, architecture, media, art history and conservation-restoration. Research centre DiMa connects research and teaching activities with sustainable product development and design practices, and brings together two research directions: circular design and bio-based material design.

- **#9: Bioeconomy foresight scenarios towards 2050 (Europe)** a board game developed by the Joint Research Centre to facilitate the practical use of scenarios from foresight studies and the application of future systemic thinking to policymaking. The bioeconomy edition is based on four scenarios for future transitions in the bioeconomy towards sustainable development and a climate-neutral economy developed in a previous foresight study. Participants adopt the roles of different stakeholders (primary producer, consumer, policy maker, businesses, and public opinion) and navigate different scenarios. The tool enables them to develop a long-term perspective and to experience the constraints and opportunities they might face in designing actions towards reaching long-term goals and objectives and when interacting with other stakeholders.
- **#10: Circular Centre Quiz - Jogo Centro Circular (Portugal),** an online board game launched by the Centre Region Coordination and Regional Development Commission (CCDRC) aiming to promote environmental, circular and sustainable education in the school community. The game tests the players' knowledge in five areas: Water Efficiency; Energy Efficiency; Material Efficiency; Design and Production; and Acquisition and Consumption. The game aims to be appealing and can be used in a classroom context or remotely.

6.3.2. Using art to address different learning styles and facilitate inclusion of marginalized people

The case studies identified by Bio.Gov partners similar to this example are the following:

- **#1: Link Project (Italy)** Link Project (Italy), providing informal training activities, which represent an important way to exchange knowledge and experiences, therefore meeting the national strategic dimension (the reduction of the young NEET rate is a target of the 2030 UN Agenda) and territorial needs to engage the local community. The objective is to identify, activate and bring out inactive young people in order to address the complex and varied phenomenon of NEETs in targeted and differentiated ways. The success of the format builds on the strength of the collaboration with local education providers, including informal and non-formal education. Finally, all the activities are very practical and experiential, facilitating contact with art, culture and nature.
- **#2: My HandScraft (Italy)** a format using art and handicrafts to facilitate migrants' employment, which is generally identified (together with the language) as the primary integration obstacle in a new country.
- **#3: Ecumenical workshops for refugees (Greece)** providing sewing and tailoring workshops to refugees, especially women, in a safe and friendly space. The workshop participants not only learn how to reuse clothes or develop skills enabling them to find work in the textile industry in Greece, but also to incorporate art, creativity and design to create quality products of artistic design.

6.3.3. Using art to communicate messages, inspire people and raise their interest and awareness.

The case studies identified by Bio.Gov partners similar to this example are the following:

- **#5: Bio-based Bridge Eindhoven (Netherlands)**. A bridge is an ideal object to test the properties and possibilities of new materials. The world's first bridge made of 100% biomaterials (biocomposites) was constructed on the campus of TU Eindhoven in 2016. Besides the professionals and students from different education levels collaborating to realise the pilot bridges, the object itself

contributes to raising the awareness of the general public. referring to an integral concept that combines awareness raising, business development, training and education. Pop-up stores are shops, cafés or events that appear in fascinating environments for a limited period. The innovation potential, rather than consumption, takes centre stage. These spaces provide the environment to experiment with something new and inspiring. A 'bio-based pop-up store' is an ideal space to show novel and sustainable bio-based products. Self-evidently, the link to the larger sustainability debate should not be missing. A bio-based pop-up store can help bring the innovative potential of the bioeconomy to life for many local residents.

- **#6: Zet Gallery - ARTE EM ESPAÇO PÚBLICO & SUSTENTABILIDADE (Portugal)** challenging artists to create works of art from industrial waste for the public space of the city of Braga, in an initiative to support contemporary artistic creation and production in the field of plastic and visual arts, allied to the concepts of sustainability and circular economy. The artworks were exhibited in public spaces and the prize-winning piece in Zet Gallery, contributing to raising the awareness of wide audiences.
- **#7: 4 elements (Slovakia)** created to stimulate students' interest in nature and the environment through the artistic experience of theatre. It aims not only to make pupils aware of current environmental issues and climate change, but also to disseminate examples of positive environmental practice and to inspire the young generation to take individual action. The project includes an interactive theatre production, an educational online application, and a methodological guide aimed especially at teachers of science and art subjects as a means of creating innovative forms of teaching.

6.3.4. Injecting the bioeconomy in design, art, architecture, and other professions

The case studies identified by Bio.Gov partners similar to this example are the following:

- **#26: Sustainable design (Germany)** a course in which designers are trained to create in a meaningful and aesthetic way by placing their design in an interdisciplinary context with the ecological, social, cultural and economic challenges of the globalised world. Graduates receive a unique selling point through the focus on sustainable design.
- **#27: Sustainable Art Prize (Italy)** focusing on the development of contents and visions related to one or more of the 17 Sustainable Development Goals of the Agenda 2030. The competition entails the construction of an installation, an exhibition or a performance relating to sustainability. The construction of the project in 2023 will involve students from four universities, while the artists will work in a new environment, collaborating with the university communities - a unique opportunity for dialogue between art and research.

7 Conclusions

Designing effective and successful bioeconomy education programmes is a significant challenge due to the multidisciplinary nature of the field, the rapidly evolving nature of the sector, the need to develop a variety of skills beyond scientific or technical expertise, the requirement for effective collaborative working environments, and the lack of a well-defined framework for bioeconomy education programmes.

In addition, regional contexts, including the availability of biological resources, the existing infrastructure, and the socio-economic and cultural factors need to be considered when offering education, particularly bio-economy education, to meet the needs of the local industry and society and contribute to sustainable development.

Moreover, the trends in adult education are reshaping the landscape of the field, providing new opportunities and challenges for adult learners, educators, and policymakers. A specific group to be targeted by bioeconomy education are adults from marginalised, disadvantaged or vulnerable groups. Depending on the specific situation of each individual, the formats could provide mostly vocational, technical, and professional skills, but also a certain level of transversal competencies to adults who have limited access to education and training opportunities.

Addressing these challenges requires a collaborative effort from industry, academia, and policymakers to design education programs that can equip learners with the skills and knowledge required to succeed in the bioeconomy.

However, as it is clear from the case studies presented in this deliverable, successful and inspiring approaches can be identified in the EU member states and beyond. As a specific dimension of the BioGov.net project, the role of art in bioeconomy education has been analysed, providing inspirational examples of how art can address several of the abovementioned challenges.

8 Appendix

Annex 1: Scoping document

Annex 2: Case study guidelines

Annex 3: Questionnaire 1

Annex 4: Questionnaire 2

Annex 5: Case study template - step 1

Annex 6: Case study - step 2

Annex 7: Case studies

Annex 1: Scoping document

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

WP2: Collection and assessment of good practices and case studies related to EU and regional training initiatives in bioeconomy

Task 2.1: Methodology for regional data assessment

Scoping document

Draft version of 20 January 2023

Consortium

CIVITTA · Q-PLAN INTERNATIONAL · LOBA · PEDAL CONSULTING · FVA NEW MEDIA RESEARCH · ZVT · Centre of Expertise Biobased Economy · btg · WILA Bonn

Funded by the European Union

PURPOSE

This document provides background information on key aspects to be considered in the regional implementation of the BioGov.net project. It seeks to help consortium partners focus project activities on their respective regions, taking into consideration regional specifics.

Index of Contents

INTRODUCTION

The BioGov.net proposal / Grant Agreement does not contain a clear description of the project scope. It does not specify which regions, bioeconomy (sub-)sectors, types and levels of education, types of skills etc. will be targeted or prioritised. Without such scope, "anything goes" and the project activities in any given country, and overall, risk becoming ineffective.

Countries and regions have different bioeconomy potentials and are at different stages of transition from a fossil economy to a bioeconomy[8]. Depending on their level of advancement in this transition, they may benefit from other types of expert guidance and support. This should be reflected in the BioGov.net approach. See textbox.

NATIONAL TRANSITION LEVELS

Based on a recent JRC study[1], PEDAL and BTG propose using a three-level scale system to express the current level of transition of a country/region. The classification methodology applied in the JRC study yields the following country distribution:

- Basic - 5 partners countries (Portugal, Greece, Czech Republic, Slovakia, and Estonia)
- More advanced – only 2 countries (Germany and Italy)
- Most Experienced - only 1 country (The Netherlands)

The higher the current transition level, the more targeted the support can and should be. Knowledge transfer is most likely to occur (a) between regions/countries at same level (b) from regions/countries at a higher level to those that are at a lower level.

At the same time, **co-creation** is at the centre of the BioGov.net approach, implying that regional stakeholders are key drivers in determining the scope. Co-creation and a systemic approach are key to ensure collaboration between bio-system actors, academia, and governments to reach a tailor-made solution that is effective in a particular region. If the common aim is to reach modern, responsive governance and decision-making processes that follows the local needs, but also respects European Green Deal goals, feedback loops from society to policy makers are needed. The diversity within Europe in terms of maturity level and smart specialisation related to bioeconomy is as major obstacle to have a singular common approach, especially for the Central and Eastern European regions that still need to develop viable national bioeconomy strategies and action plans[9].

In line with the bottom-up philosophy and co-creation approach adopted in BioGov.net **regional partners have the responsibility to narrow the scope in their respective regions**.

[8] For recent overviews of the state of the bioeconomy strategies in EU countries and regions, see Bioeconomy strategy development in EU regions and EU Bioeconomy Strategy Progress Report.
[9] This section is derived from project proposal text.

1 DIMENSION 1: GEOGRAPHICAL AND THEMATIC ORIENTATION

1.1. COUNTRIES AND REGIONS

Background: Regional settings and regional skills are at the core of BioGov.net. However, the Grant Agreement (GA) does not specify which specific regions will be targeted or prioritised.

Considerations: A logical starting point would be to focus on the regions where the consortium partners are based and/or have (working) relationships with, as this will give the best starting position. However, in some countries (i.e., Italy & Netherlands) there are two project partners, based in different regions. Furthermore, for maximum impact and efficient use of resources (e.g., data, knowledge, contacts, networks etc. available from e.g., earlier or ongoing projects and initiatives) it may make sense to prioritise another region, or to focus on the whole of the country. **The partners are best informed and equipped to make the selection**.

In summer 2022 (as part of the initial T2.1 questionnaire) consortium partners have already indicated at what regions in their respective countries they think BioGov.net should focus.

Concrete proposal/s:

It is proposed that the respective (individual, or pairs of) project partners focus on the following regions:

1. Southwest Netherlands (AVANS & BTG)
2. The whole of Italy (FVA & UNIBO)
3. Central Macedonia, Greece (Q-PLAN)
4. North region, Portugal (LOBA)
5. Zilina region, Slovakia (PEDAL)
6. The whole of Czech Republic (ART)
7. The whole of Estonia (CIVITTA)
8. Rhenish mining area (*Rheinisches Revier*) in Germany (BSS)

Regarding Italy, it is the idea of FVA and UNIBO to approach the whole country as a single region and to work with sub-groups related to the different regions, depending on the evolution of the project and the commitment of the stakeholders.

1.2. BIO-ECONOMY (SUB-)SECTORS AND/OR SPECIFIC VALUE CHAINS

Background: “Bioeconomy” is at the core of the BioGov.net project. However, the GA does not further specify what (sub-)sectors of the bioeconomy or value chains in the bioeconomy will be prioritised.

Short description: There are multiple definitions of bioeconomy. According to the European Commission (EC), the bioeconomy includes the production of renewable biological resources (also called “biomass”), and the conversion of these resources and waste streams into value

added products, such as food, feed, bio-based products, and bioenergy[10]. Or, in short, the term bioeconomy describes everything that we produce with renewable biomass.

The EC distinguishes ten potential areas for exploitation within the bioeconomy: 1. Agriculture, 2. Forestry, 3. Fishing and aquaculture, 4. Food, beverages, and other agro-manufacturing, 5. Bio-based textiles, 6. Wood products and furniture, 7. Paper, 8. Bio-based chemicals and pharmaceuticals, plastics, and rubber 9. Liquid biofuels and 10. Bioelectricity.

Considerations: At the Oct 2022 project meeting in Brussels, consortium partners provided a first shot at sectors and value chains of most relevance for their country/ region. They indicated that the following areas and (sub-)sectors could be of relevance for their respective regions:

1. Southwest Netherlands	Chemical sector, Bio-based construction
2. The whole of Italy	Agrifood, Marine (blue bioeconomy)[11]
3. The whole of Greece	Agrifood, Biowaste, Circular economy
4. North region, Portugal	Agriculture, Fisheries
5. Zilina region, Slovakia	Forestry, Wood processing, Bio-based construction
6. The whole of Czech Republic	…
7. The whole of Estonia[12]	Agrifood, Forestry, Marine, Biotech, Mining
8. Rheinisches Revier	Agriculture, Natural Resources

In some cases, the indicated economic sectors are still very wide ("agrifood") which does little to narrow the project scope. Also, respondents gave their suggestions from the top of their heads, and these may not be based on targeted prior research.

Norbert/BSS suggested adding the topic" knowledge transfer from academia into practice" and to also focus on "structural change / just transition regions".

Further assessment:

- The feedback given by regional partners seems to mainly reflect the national availability of biomasses. However, this parameter should not be the single one to base the focal sectors on.
- Certain sectors mentioned (e.g., "agrifood") are still wide ranging, and this has limited value to delignate the project scope
- Specific value chains have yet to be considered
- With the currently available data it is too early to decide what bioeconomy sub-sectors /value chains to focus on. A systematic approach is needed to better define these.
- The final selection at the country/region level can be based on *inter alia*:
    - Country priority areas in bioeconomy
    - Regions' priorities and future trends in bioeconomy[13].
- When making a final selection at the overall project level, facilitating knowledge spill-over (transfer) between sectors and between regions shall also be considered.

[10]EC (2012) Innovating for Sustainable Growth: A Bioeconomy for Europe, https://ec.europa.eu/research/bioeconomy/pdf/official-strategy_en.pdf
[11] This sub-sector in Italy is targeted in BioGov,net's sister project Engage4Bio.
[12] Estonia's priority areas in bioeconomy: (1) smart specialisation, (2) revival of bioeconomy sectors with high added value and (3) spillover of new technologies and ideas up and down the business value chains.
[13] The priorities of both countries and (in particular) regions can be cross-sectoral, interdisciplinary. See For recent overviews of the state of the bioeconomy strategies in EU countries and regions, see Bioeconomy strategy development in EU regions and EU Bioeconomy Strategy Progress Report.

Concrete proposal/s:

- (Some) desk research and interviewing key stakeholders is recommended
- In the follow-up Task 2.1 questionnaire the Task Leader will integrate questions to help thematic scoping in the respective countries/regions
- Consortium partners shall research which specific bioeconomy areas/(sub)sectors/value chains they will focus on in their country/region. With a view to maximise the impact of BioGov.net it is strongly recommended that the higher the current transition level of a region, the narrower the scoping of the targeted economic sectors shall be.
- The idea to use “structural change / just transition regions” as a starting point is worth exploring further. Also considering that in various EU countries (e.g., Germany, Italy) governments are targeting the transition from old industries (e.g., brown coal mining) or old industrial sites (brown sites) to bio-based industries and industrial sites. **The partners shall decide if and how to investigate this topic further.**

2 DIMENSION 2: GOVERNANCE, EDUCATION LEVELS AND SKILL TYPES

2.1. GOVERNANCE STRUCTURE

Background: Taking into account the project focus on adult education, additional aspect related to the governance structure of adult education/development in BioGov.net regions shall be considered.

Considerations: While school/formal education tends to be centralized, in the case of adult education the systems tend to be more diverse (e.g., involving various education/development activities providers, governed by different authorities, using various sources of funding) and can differ considerably between countries and even within a specific country.

Concrete proposals:

Use the follow-up Task 2.1 questionnaire to also collect data about the governance structure of adult education programmes in the target region[14]

- existing policies/strategic documents in (adult) education on (circular) bioeconomy, or on the wider topic of sustainability
- how the sector is governed (e.g., the role of national, regional, and local institutions and actors)
- main stakeholders, e.g., policymakers / decision-makers, main activities providers (including business support organisations, companies, NGOs, etc…), funding providers, and other stakeholders)
- how education is organized.

2.2. LEVELS AND FORMATS OF EDUCATION

Background: Education, training and skills development in general and adult training, retraining, and lifelong learning, in particular, are at the core of the BioGov.net project. However, the GA does not further specify in any way what types/levels / formats of training and education shall be prioritised.

Considerations: Han/AVANS suggested at the Oct 2022 Brussels meeting, to build a categorisation based on EQF levels. By choosing the European Qualifications Framework system as basis, it is transferable to all EU countries, as all Member States work with the EQF-levels. A description of the eight EQF-levels is provided here. These EGF levels can be translated to the educational system as well as to Lifelong Learning. See also Annex 2.

Concrete proposal/s:

A key role of the Communities of Practice (CoP's) in BioGov.net can be to determine which EQF-levels are the most important for the targeted sub-sectors/value chains in their region/country. It is envisaged that the most advanced countries will focus on EQF levels 3 to 6. These levels have a strong link to the operational activities in the industry. Countries that

[14] The more advanced the region/country is (see the introduction of this scoping document), the narrower the thematic focus of this exercise can/shall be.

are less advanced in their transition from fossil-based to bio-based may decide to address a wider range of EQF levels.

Education formats and delivery mechanisms: Another key question to be answered (by the CoP) is how to put education into practise, and of use in the "work" environment. Different formats for the delivery of formal and non-formal education and vocational education shall be considered. It is envisaged that modular formats ("module-based" approach; shorter duration) will be prioritised.

2.3. TYPES OF SKILLS

Background: Education, training and skills development in general and adult training, retraining, and lifelong learning in particular are at the core of the BioGov.net project. However, the GA does not further specify in any way what types and levels of training and education shall be prioritised (as this is directly linked to specific industry needs and country priority areas).

Short description: The question what skills are needed to support new and emerging bioeconomy approaches is addressed by an increasing number of European initiatives, including several projects (to be) developed in response to Action 2.4 of the 2018 EC Bioeconomy Strategy that addresses the promotion of education, training and skills. The CSA project LIFT (May 2019 – April 2020) produced a factsheet on Education that explored relevant initiatives, including the projects UrBIOfuture, BLOOM, BioVoices, ABBEE and the European Bioeconomy Stakeholder Panel. The recently completed BIOSKILLS tender analysed emerging skills demand and existing skills provision in the bioeconomy[15] .
Zooming in on bio-based industries, of relevance at EU level are the Strategic Research and Innovation Agenda (SRIA) issued recently by the Circular Bio-Based Europe Joint Undertaking (CBE JU)[16] and the new initiative of Nelo Emerencia (Bio-Based Industries Consortium – BIC) to form a network of human resource directors of BIC industry members to survey and assess the skills they need in 2030 and 2050.

Efforts to assess the skills needed in the bioeconomy are also found at national, regional, and cross-border level. Recent examples of such studies include:

- De professional van de toekomst in de Biobased Economy. Marktconsultatie Grenzeloos Biobased Onderwijs (GBO)[17].
- Bioökonomie: Potenziale im Rheinischen Revier – Wissen und Bildung[18].
- Forschungs- und Wissenslandschaft der Bioökonomie im Mitteldeutschen Revier und im Lausitzer Revier[19]

[15] Promoting education, training and skills across the bioeconomy. Final report. https://op.europa.eu/en/publication-detail/-/publication/6a5f6dd4-3312-11ed-975d-01aa75ed71a1/language-en/format-PDF/source-search

[16] https://www.cbe.europa.eu/media/92/download?attachment=

[17] Report in Dutch prepared by SPK Vlaanderen. See https://www.bioeconomy-library.eu/wp-content/uploads/2019/11/GBO-Marktconsultatie.pdf

[18] Report in German prepared by Institut Arbeit und Technik (iAT). See https://www.biooekonomierevier.de/Studienserie_Biooekonomiepotenziale_im_Rheinischen_Revier

[19] Report in German prepared by DBFZ Deutsches Biomasseforschungszentrum gemeinnützige GmbH. See: https://www.dbfz.de/fileadmin/morebio/Veroeffentlichungen/Sektorstudie_Forschungs-_und_Wissenslandschaft_final.pdf

The listed studies make a distinction in different categories of skills/competencies. For example:

- **Technical competencies:** these relate to the substantive competencies that are specifically connected to the bio(-based) economy.
- **Valorisation competencies:** these include all competencies required to turn the technical substantive knowledge effectively into values: economic and social competencies, competencies related to information management and competencies related to health and the environment.
- **Transversal competencies** contribute to the development of the individual. They have to do with communication skills, with relational capacities and especially with the sharpening of a sense of responsibility.

TECHNICAL COMPETENCIES (extracted from the GBO executive summary):

The technical competencies relate to the substantive competencies that are specifically linked to the biobased economy. To further subdivide these competencies, the value chain of the BBE is followed: from biomass production via conversion processes to applications of biobased products

VALORISATION SKILLS/COMPETENCIES

Economic competencies include e.g., assessing economic viability, assessing risks, calculating costs prices, identifying business opportunities, conducting market research, developing new business models, developing strategy and vision

Social competencies include e.g., assessing sustainability, system thinking and solving complex systems. The latter two require a holistic view of the system to be studied, with a critical, analytical, and creative attitude.

Further competencies, at the crossroad of company and society, include e.g., Sustainable business models, Environmental footprint, Life cycle analysis, Stakeholder management and Ecodesign.

TRANSVERSAL SKILLS/COMPETENCIES are defined by UNESCO as “Skills that are typically considered as not specifically related to a particular job, task, academic discipline or area of knowledge and that can be used in a wide variety of situations and work settings”. Examples: Analysis and problem solving; Communicating; Delivering quality and results; Learning and development; Prioritising and organising; Resilience; Working with others; Leadership.

Considerations: Companies operating in the bioeconomy depend on many of the same skills as companies operating in the food and food ingredients industry, the chemical industry, or the materials processing industry, since these industries make use of highly automated processing equipment, the production is process-oriented, and the industries process biomass into products and materials. Overall, among the most important skills needed in these bioeconomy industries are the ability to think systematically and take an initiative; to identify and implement solutions; and to monitor and steer a technical process.

For industrial-scale production, the bioeconomy makes use of technologies and systems that integrate digital interfaces for monitoring and control as well as automated technologies for processing of the biomass. This is a very similar set-up to the system used in the food industry.

The bio-based industry anticipates that the needed skills for the future will be different at vocational levels (the new generation of professional operators) and at university levels (the new generation of researchers, engineers and management members). For all levels, industry sees a need for educational institutes to develop multidisciplinary curricula and a modular approach to enable efficient work and stimulate innovation in diverse teams.

In the listed projects and studies, there is agreement that a good balance is needed between hard skills and soft skills, with soft skills such as problem-solving, collaboration, entrepreneurship, holistic/systemic thinking, critical thinking repeatedly mentioned[20].

Concrete proposals:

- It is proposed to start in BioGov.net with a focus on either valorisation skills/competencies (VS) or transversal skills/competencies (TS)
- When looking at learning styles (see Section 3.2 below) the technical competencies will also be considered
- Because VS and TS are rather broad categories, further zooming in and prioritisation will be needed, so that we can start working with the VS and the TS with the highest priorities.
- To do so effectively, it is worth investigating which VS and TS are already developed in current educational frameworks
- One option is to extend the classic business economics course with systems thinking, the critical analysis of current, unsustainable systems and the search for alternatives.

[20] https://bloom-bioeconomy.eu/2019/10/31/promote-education-training-skills-across-bioeconomy/

3 DIMENSION 3: GOVERNANCE, THE ARTS AND BIO-ECONOMY EDUCATION

3.1. LINKING ARTS AND BIO-ECONOMY EDUCATION

Background: considering the wording of call topic HORIZON-CL6-2021-GOVERNANCE-01-08, the BioGov.net project shall pay specific attention to the role of arts, design and culture and involving the creative industries – CCI[21].

"**Arts in education**" is an expanding field of educational research and practice informed by investigations into learning through arts experiences. In this context, the arts can include Performing arts education (dance, drama, music), literature and poetry, storytelling, Visual arts education in film, craft, design, digital arts, media, and photography. It is distinguished from art education by being not so much about teaching art, but focused on:

- how to improve learning through the arts
- how to transfer learning in and through the arts to other disciplines
- discovering and creating understanding of human behaviour, thinking, potential, and learning especially through the close observation of works of art and various forms of involvement in arts experiences[22]

Considerations: There are several ways in which arts and bioeconomy can "interact":

1. Art to elicit new ways of thinking and develop skills needed in bioeconomy education. The objective is:
    - To define educational programmes which stimulate:
        - **Systemic vision**
        - **Circular and sustainable mindset**
        - **Structural change (biotransition)**
        - **Transversal competencies and skills**
        - **Divergent thinking**
    - "To co-design innovative business models and methodologies for integration of humanities/art/design/culture and social innovation" (from the GA)
2. Art to address different learning styles and facilitate inclusion of marginalized people. The objective is:
    - To define educational programmes which facilitates use of arts in various ways to better address **different learning styles** people have/prefer
    - **Reach marginalized people** using artistic means
3. Art to communicate messages, inspire people and raise their interest and awareness. The objective is:

[21] The creative industries refer to a range of economic activities which are concerned with the generation or exploitation of knowledge and information. They may variously also be referred to as the cultural industries or the creative economy. UNESCO has published a memo on definitions of the Cultural and Creative Industries (CCI) here: https://en.unesco.org/creativity/sites/creativity/files/digital-library/What%20Do%20We%20Mean%20by%20CCI.PDF

[22] https://en.wikipedia.org/wiki/Arts_in_education

- "To integrate the opportunities created by the human-centric principles, offered by art, culture and (eco)-design, in respect to the bio-based feedstocks, including traditional and novel biological materials" (from the GA)
- Leverage the "Nespresso marketing model" to link beauty and good (Art and Bioeconomy)

4. Inject the bioeconomy in design, art, architecture, etc. professions. The objective is:
   - To engage students and professionals in artistic careers with the bioeconomy

Concrete proposal/s and next steps

- BioGov.net partners to collect examples of education in which art concepts (4 dimensions) are applied, with education focusing on bioeconomy or on a wider related topic such as circular economy, sustainability, etc., and addressing different target groups (including marginalized people), providing information about:
  - providers, target groups, objective, the way how art is used.

4 DIMENSION 4: TARGET GROUPS AND BENEFICIARIES

4.1. TARGET GROUPS

Background: Section 2.1.3 of the BioGov.net proposal describes the Target Groups. Depending on the specific target group, different communication messages and channels will be used to address/engage them.

1. Research and higher education organisations
2. Vocational education organisations
3. Bio-systems stakeholders as whole
4. Industry
5. Businesses (SMEs)
6. Policy makers and administrations
7. Non-governmental organisations (NGOs)
8. Wider society

Considerations:

The Grant Agreement (GA) is quite specific that all the mentioned groups shall be targeted. Nonetheless it may make sense to prioritise certain target groups, depending on the activities that BioGov.net implements and the messages that it wishes to convey. The discussion which is the prime target group for BioGov remains to be concluded.[23]

4.2. MARGINALIZED, DISADVANTAGED, AND MINORITY GROUPS

Background: The Commission does not want to leave anybody behind. This is reflected in the set-up of Horizon Europe in general, and in the HORIZON-CL6-2021-GOVERNANCE-01-08 call topic in particular. BioGov.net shall ensure inclusiveness and engagement of all actors, in particular of marginalized groups, such as: women, ethnic and religious minorities, migrants and refugees, the LGBTIQ community, disabled persons, youth and the elderly, etc.

Short description: Social exclusion or social marginalisation is the social disadvantage and relegation to the fringe of society. Social exclusion is the process in which individuals are blocked from (or denied full access to) various rights, opportunities and resources that are normally available to members of a different group, and which are fundamental to social integration and observance of human rights within that particular group (e.g., housing, employment, healthcare, civic engagement, democratic participation, and due process). The outcome of social exclusion is that affected individuals or communities are prevented from participating fully in the economic, social, and political life of the society in which they live.

Social exclusion at the individual level results in an individual's exclusion from meaningful participation in society. Many communities experience social exclusion, such as racial (e.g., black), caste (e.g., untouchables in India), and economic (e.g. Romani) communities.

[23] At the SC meeting in January 2023 FVA argued that the education providers are the key client of BioGov.net, whereas CIVITTA suggested that the industry in general is the end beneficiary of BioGov activities.

Considerations: After consulting his colleague Henk Spies, research leader on the topic of marginalized groups, Han/AVANS suggested not to focus on a specific target marginalized group. Mr. Spies suggests using a specific methodology to work with marginalized groups. The approach discussed below is taken from (Sirovátka and Spies, 2017).[24] It is a results of the FP7 project CITISPYCE which focused on policies targeting disadvantaged young people and, among other things, has uncovered a range of initiatives undertaken by and for disadvantaged young people to help tackle their inequalities.

The model assumes that neither marginalized groups in general, nor members of one category, are homogeneous, therefore no intervention will work effectively with all individuals. The inability of social policies to tackle inequalities is oftentimes the inadequacy in the approach of social policies addressing disadvantaged young people, e.g., educational activities in a traditional sense (teacher talking to a class, coach talking to a client) fit only some individuals. For some groups, alternative forms of education, e.g., informal education, peer-to-peer learning, or innovative approaches using arts will be more suitable.

The model (see Figure 1) proposes to seek a strong intervention logic based on the **specific characteristics** of an individual and adopt **different strategies** to address different individuals (no matter what marginalized group). It is for example necessary to see how people see their situation, the way how the individuals see themselves (ambitions) and their competencies (abilities) can be used to identify the best strategy for their development.

- Based on these characteristics, individuals can be divided into four archetypes, applying the two dimensions ability and ambition parameters **conformist people** are "close to normal". The only thing lacking in social inclusion is probably an opportunity. They feel they belong, they conform to rules and norms, and any debts are manageable.
    - **They have the ambition and also the ability to further develop themselves**
- **dependent people** seem to be stuck, lacking the ability to move. They need other people to help them get ahead
    - **They have the ambition, but do not have the ability to use the existing opportunities**
- **survivors** – people in survival mode who live day by day, try to make ends meet, and solve problems today by creating even bigger problems for tomorrow, taking opportunities as they come along whether they be criminal activities, shadow economy jobs or regular, temporary jobs.
    - **This group is characterized by a low (or no) level of ambition and ability**
- **entrepreneurs** are people who are different, whose ambitions do not correspond to mainstream society's view of 'normal'. Different can mean both deviant and innovative. They can be criminals (the 'big guys', the organizers, as opposed to those who are often caught first by the police, to be found among the survivors). They can also become innovative entrepreneurs in the normal economic sense. Or they can be people with alternative (non-conformist) values and ambitions for social participation.
    - **These people have the ability, but their ambitions differ from the "normal"**

[24] Effective Interventions for Unemployed Young People in Europe - Social Innovation or Paradigm Shift? Edited by Tomáš Sirovátka and Henk Spies, 2017, ISBN9781315279138, DOI https://doi.org/10.4324/9781315279138.

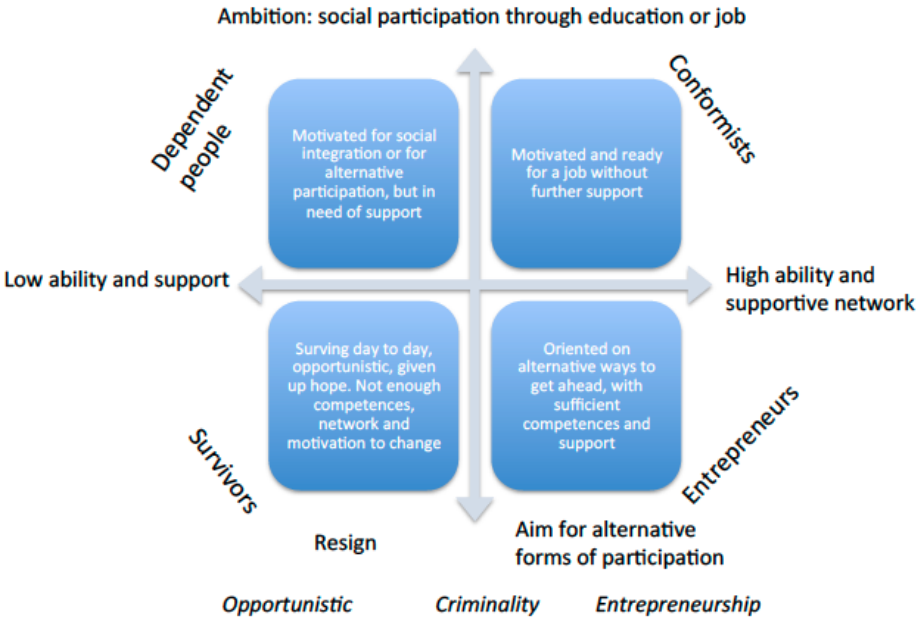


Figure 1: Individual strategies and views of people

Interventions can have varying degrees of complexity and focus on different areas of marginalized groups' inclusion. The interventions can be implemented at micro-, meso- or macro-level:

- **Micro-level**: **interventions addressing an individual's skills, competencies, and motivation**: including building (self)confidence, developing competencies through training and work experience, changing people's way of thinking through cognitive interventions and removing barriers through compensating actions.
- **Meso-level relates to interventions targeting the social surroundings of an individual (or a group of individuals). These interventions can be distinguished into two types**:
  - **building social capital** by supporting people in **bridging distances to employers and institutions** and by **developing individuals' social networks**
  - and strengthening human and social capital by **creating communities that enable people to develop a positive identity** – especially those who feel different often equate being different with lower social value
- **Macro-level: interventions addressing the issue of opportunities:** e.g., creating and offering opportunities through stimulating general job growth and positive action, among others through wage subsidies, social return agreements to stimulate employers to take on people on benefits in return for a government contract, individual job hunting to find job openings for people without placing them in competition with others (to avoid discriminatory selection processes), and provision of micro credits for start-ups of businesses.

The above illustrates that interventions to work with marginalized persons can go (well) beyond pure educational activities targeting individuals. Interventions can have varying degrees of complexity and focus on different areas of marginalized groups' inclusion.

Matching people's characteristics of and types of interventions:

1. **Conformists:** people motivated to attend a training/are able to complete it -> access to education will be enhanced for example by the provision of scholarships (bridging distances to institutions)
2. **Dependent people:** motivated, but lack the skills to learn - e.g., have not completed a secondary school -> they get support in preparation for the training, such as some introduction to the topic, potential development activities, support in selecting the activity, some learning strategies, guidance on how to complete assignments, pass exams, etc., support also in the application process
3. **Survivors:** people with no motivation, no skills -> these people can be involved in the activities of social enterprises or local initiatives, providing on-the-spot training, and support from a social worker as a supervisor on the spot
4. **Entrepreneurs:** the interventions can include activities focused on the development of “green” business ideas, combined with entrepreneurship skills development and building networks; Or involving the people in co-creation ideas on how to use the local potential

Concrete proposal/s:

- Not focus on one or more specific marginalized groups, but rather on different types and views of individuals
- Widen the definition of ‘education’ to ‘development’
- Develop guidelines along all four categories described in the model above.
    - Taking into account the focus of the project on bioeconomy education, more generic guidelines can be provided for all four categories.
    - More detailed guidelines can be provided for the groups on the right side of the model (conformists and entrepreneurs) as we assume that the other 2 groups require more support in the form of social work?

Annex 1: Learning outcomes relevant to EQF levels

Source: Official Journal of the European Union, C189/15, 15.06.2017, URL: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017H0615(01)

EQF	Knowledge	Skills	Responsibility and autonomy
	In the context of EQF, knowledge is described as theoretical and/or factual.	*In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive, and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).*	*In the context of the EQF responsibility and autonomy is described as the ability of the learner to apply knowledge and skills autonomously and with responsibility*
1	basic general knowledge	basic skills required to carry out simple tasks	work or study under direct supervision in a structured context
2	basic factual knowledge of a field of work or study	basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	work or study under direct supervision in a structured context
3	knowledge of facts, principles, processes, and general concepts, in a field of work or study	a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials, and information	take responsibility for completion of tasks in work or study adapt own behaviour to circumstances in solving problems
4	factual and theoretical knowledge in broad contexts within a field of work or study	a range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
5	comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	exercise management and supervision in contexts of work or study activities where there is unpredictable change review and develop performance of self and others

6	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts take responsibility for managing professional development of individuals and groups
7	highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research critical awareness of knowledge issues in a field and at the interface between different fields	specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
8	knowledge at the most advanced frontier of a field of work or study and at the interface between fields	the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

Annex 2: Further information on the CITYSPICE social intervention model

The CITISPYCE model was developed for the context of social inclusion, with an emphasis on work, education and income. Translated to a context of BioGov.net, the ideal types distinguished in the model can be described as:

- **'I am able and willing to participate in "bioeconomic initiatives", but I lack opportunities to do so' (resources, access, means)**. These people experience a problem of opportunities. Interventions to help people with this mindset ahead, focus on creating opportunities for them (positive action). In an educational context, these people would need opportunities to experience these bioeconomic practices in order to develop new knowledge and means to invest in such practices.
    - **Example**: We give people tools with which they can work in a community garden. The intervention itself does not offer specific educational activities. However, thanks to the fact the person gets involved, some new skills and competencies are built, such as communication skills (there are several people working and collaboration is needed), or organizational skills (there is an opportunity to take more responsibility and become a coordinator of activities), etc.
- **'I want to participate in "bioeconomic initiatives", but I don't feel able'**. These people experience a competence problem. Interventions should therefore focus on developing competencies. In an educational context, these people would need advice, training, and guidance to help them develop the competencies they need; role models, good examples, small steps and experiences of success could work well.
    - **Example**: We teach people skills, so they know how to work in a community garden (or we teach them how to organize a community garden themselves)
- **'I have too much on my mind to care about your policies. Just get me a better house and cheaper energy please'.** These people probably wouldn't mind if we improve things for them. In an educational context, helping people with changes in their lifestyle would require intensive, practical follow-up (intensive coaching in real-life situations), offering quick wins and tit-for-tat policies.
    - Example: We hire a gardener who tells people what they have to do to maintain the garden and grow crops, and who supervises their work
- **'I have different plans for a more sustainable world.** These people experience a problem with a different motivation. Interventions could take the shape of co-creation or design sessions that take the ambitions and abilities of people as a point of departure and see how this can be linked to the resources and goals of BioGov.net.
    - Example: We reserve a space in the community garden for people to fill in with creative ideas linked to the garden (maybe selling seeds, a meeting place with organic coffee – an idea that strengthens the idea of the community garden and helps to pay the costs
- In addition to the model, a fifth ideal type can be distinguished, characterized by people who are not interested in the goals of BioGov.net at all. If these people are required to nevertheless change their behaviour, financial benefits and fines or legal sanctions might be the last resort.

In reality, interventions can have varying degrees of complexity and focus on different areas of marginalized groups' inclusion. The interventions can be implemented at different scales:

- **Micro-level**: **interventions addressing an individual's skills, competencies, and motivation**: including building (self)confidence, developing competencies through training and work experience, changing people's way of thinking through cognitive interventions and removing barriers through compensating actions.

- **Meso-level relates to interventions targeting the social surroundings of an individual (or a group of individuals). These interventions can be distinguished into two types**:
    - **building social capital** by supporting people in **bridging distances to employers and institutions** and by **developing individuals' social networks**
    - and strengthening human and social capital by **creating communities that enable people to develop a positive identity** – especially those who feel different often equate being different with lower social value
- **Macro-level: interventions addressing the issue of opportunities:** e.g., creating and offering opportunities through stimulating general job growth and positive action, among others through wage subsidies, social return agreements to stimulate employers to take on people on benefits in return for a government contract, individual job hunting to find job openings for people without placing them in competition with others (to avoid discriminatory selection processes), and provision of micro credits for start-ups of businesses.

The example of the community garden represents an intervention at the micro-level, meaning the intervention targets individuals on a one-on-one basis.

Example 1 (macro level):

A region having problems with air quality, because of using waste and low-quality solid fuel by excluded communities for heating

- The region decided to set up a social enterprise producing wood/wooden products that can be used for heating and start some activities that should help improve the air quality, e.g., planting greenery

1. Conformists (motivated and having the skills): Some people can get a job in a social enterprise – opportunity or take part in a local initiative, e.g., planting the greenery
2. Dependent people (motivated/ no skills): people are trained and either got a job in the enterprise or take care of the greenery in the municipality, e.g., taking care of the greenery in the community or processing fruits from the existing trees
3. Survivors (no motivation/no ability): people can get involved in some community activities or in the social enterprise under the guidance of a supervisor
4. Entrepreneurs: Some people can co-create solutions for improving air quality, selling local products, etc.

Example 2 (macro level):

1. Conformists (motivated and having the skills): Subsidizing production and access to high-quality energy (e.g., subsidies provided to businesses, which can lead to job creation or also grants to households to install solutions using renewable energy sources)
1. Dependent people (motivated/ no skills): Develop a training program targeting the whole population to raise awareness and to develop a green lifestyle
2. Survivors (no motivation/no ability): Ban low-quality energy combined with intensive pedagogic enforcement
3. Entrepreneurs: Stimulate start-ups (e.g., provide micro-credits or non-financial support via mentoring, etc.) and possibilities to co-create with innovative green ideas

Example 3 (meso-level):

Educational/development activities for marginalized groups in a rural region with strong agricultural potential, a high number of long-term unemployed people, lower education, and big Roma communities.

- The region developed a strategy aimed at strengthening selected agricultural sectors. Among others, the region plans to support local entrepreneurs and establish some social enterprises and similar initiatives, thus creating opportunities for marginalized groups.

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Consortium

CIVITTA

Q-PLAN INTERNATIONAL

LOBA CUSTOMER EXPERIENCE DESIGN

PEDAL
GET YOUR BUSINESS SPINNING

ZVT Agricultural Research, Ltd. Trebotov

CoE BBE Centre of Expertise Biobased Economy

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

FVA NEW MEDIA RESEARCH

WILA Bonn

Funded by
the European Union

@biogovnet
info@biogov.net www.biogov.net

Annex 2: Case studies guideline

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

WP2: Collection and assessment of good practices and case studies related to EU and regional training initiatives in bioeconomy

Task 2.1: Methodology for regional data assessment

Case Studies Guideline

Version of 20 January 2023

Consortium

CIVITTA · Q-PLAN · LOBA · PEDAL CONSULTING · ZVT · btg · WILA Bonn

Funded by the European Union

PURPOSE

Best practice case studies play a central role in knowledge transfer and inspiration in the BioGov.net project. This document seeks to provide consortium partners guidance on identifying, developing & validating relevant and suitable best practice case studies.

Index of Contents

Introduction

The BioGov.net project objective is to provide validated guidelines for the set-up of regional bioeconomy training and mentoring frameworks based on case studies from 8 EU regions.

- **SUB-OBJECTIVE 1:** Collection and assessment of good practices and case studies in education, training, and skills development. Collections of such practices and studies help to identify key elements of success, its usage and replicability in a regional context by taking into account local capacities, opportunities, barriers, potentials, responsiveness to bioeconomy goals and bio-systems expectations.
- **EXPECTED OUTCOME:** identified good practices and case studies

Best practice case studies (BPCS) are thus central in BioGov.net but the GA is not clear on the exact scope of these case studies nor on the targeted number.

BPCS can serve multiple purposes regarding knowledge transfer and inspiration. For internal use, they can shed light on inspiring examples and help steer the further scoping of the project. For external use, they can be showcases for knowledge transfer.

1 Case study categories, selection criteria and approach

1.1. Case study categories

Considering (a) the overall goal of the project, (b) the requirements expressed in the call text, (c) the discussions held at project meetings to date, it is proposed to develop VPCS in three different categories i.e.

1. Bioeconomy education, training and retraining at one of the levels (a) **Higher Education** - HE, **(b) Vocational Education and Training** – VET or (c) **Entrepreneurial Education**
2. Bioeconomy education, training and retraining and **Art Education**
3. Bioeconomy education, training and retraining and **Inclusion of marginalised groups**

Re. **Higher Education, Vocational Education and Training and Entrepreneurial Education**: As explained in the scoping document, the focus of BioGov.net will be put less on traditional/adacemic learning, and more on adult training, retraining, and lifelong learning, in particular at European Qualifications Framework (EQF) levels 3 to 5. Relevant case studies cover innovative examples of such education in relation to (circular) bioeconomy, or the wider topic of sustainability.

Art Education refers to the expanding field of educational research and practice informed by investigations into learning through arts experiences. In this context, the arts can include performing arts education, literature and poetry, storytelling, and visual arts education. In the context of BioGov.net, "art" shall be understood as design and culture and used first and foremost to ensure the inclusiveness of all actors. There are various dimensions how BioGov.net can connect Art & Bioeconomy (see FVA presentation dated 10/01/2023).

The call text suggests that **marginalised, disadvantaged, and minority groups** could refer to e.g**.,** women, ethnic and religious minorities, migrants and refugees, the LGBTIQ community, disabled persons, youth and the elderly. As explained in the scoping document, it is proposed not to focus on a specific target marginalised group in BioGov (but to work with different types of people including a) conformists b) dependent people, c) survivors and d) entrepreneurs.)

See the separate scoping document for additional background information.

1.2. Selection criteria

It is envisaged that finding good examples may require quite a bit of effort of the BioGov partners. Therefore, no ranking system is being proposed to assess the relevance of case studies "*a priori*". Instead, the following approach is suggested.

The BPCS in the three (3) categories shall preferably be drawn from the BioGov. partner regions. When no relevant experiences can be identified related to bioeconomy or bio-based economy in a partner country, the scope of the BPCS may be widened to consider (also) broader terms such as sustainability, circular economy, green development and the like. When

even with the widened scope no BPCS can be identified in the partner country, the BPCS can be selected from another country/region. Combined, the case studies shall offer a broad spectrum of suitable and replicable education formats.

1.3. Approach

The process to develop BioGov.net case studies is described below. The following shall be considered:

- To use project resources efficiently, the case studies will be developed step-by-step
- All 10 BioGov.net consortium partners shall contribute to the development of case studies
- PEDAL, supported by BTG, will supervise the case study development process,
- LOBA, as communications partner, will take care of visually attractive editing of the final set of case studies
- (Examples of) best practices can be drawn from work implemented in other EU-funded programmes (e.g., H2020, Erasmus^{+}), projects (e.g., BIOBEC) and studies (e.g., BIOSKILLS tender). When this is done, the BioGov.net partner should seek to expand the information covered in the case study (i.e., duplication-only if prior work is not encouraged)

The development process involves two phases. The development process in the first phase is described in some detail below.

2 Development phases

2.1. First development phase (Step 1)

The first development phase involves the following 4 steps:

1. Inventory of candidate BPCS
2. Initial development of BPCS
3. Refinement and final development of BPCS
4. Final editing of the BPCS

Step 1: Inventory of candidate BPCS

The first step is about identifying prospective case studies (BPCS). The availability of suitable BPCS candidates will vary between BPCS categories and partner countries. (Therefore, when availability appears low or non-existent in someone's region, the scope may be widened, as explained above).

Each of the 10 BioGov.net partners shall identify prospective BPCS in at least 4 of 8 bulleted sub- categories. The individual BioGov.net partner can decide herself/himself which of the sub-categories (s)he wishes to cover.

1. Higher Education
2. Vocational Education & Training
3. Entrepreneurial Education
4. Art to elicit new ways of thinking and develop skills needed in bioeconomy education
5. Art to address different learning styles and facilitate inclusion of marginalized people
6. Art to communicate messages, inspire people and raise their interest and awareness
7. Inject the bioeconomy in design, art, architecture, etc. professions
8. Marginalised, disadvantaged, and minority groups

The combined efforts of the 10 BioGov.net partners shall thus yield a minimum of **40** prospective BPCS.

PEDAL with the support of BTG will provide a mini template that partners shall use to describe the candidate BPCS. The template will include just a handful of data fields, for example:

- Case study (sub-)category (drop-down menu with the above **8** options)
- Title
- Abstract
- Target group
- Scope and context of the education format

PEDAL with support of BTG will put together an overview (list) of candidate BPCS, based on the partner contributions. In case there are obvious overlaps or clear gaps in BPCS coverage, they will support BioGov.net partners to rectify this situation.

Step 1 will thus yield:

- A short template to identify candidate BPCS.
- Min. of **40** completed mini templates identifying candidate BPCS (min **4** per BioGov.net partner).
- An initial overview (list) of candidate BPCS.

Step 2: Initial development of BPCS

The second step concerns the initial elaboration of at least 50% (min. of **20**) candidate BPCS. Using desk research each of the 10 BioGov.net partners shall elaborate its own set of BPCS. Their combined efforts shall thus yield a minimum of **20** initially developed BPCS.

PEDAL/BTG will provide an expanded template that partners shall use to describe the BPCS.

In the process, BioGov.net partners may experience that for a given candidate BPCS they cannot source sufficient data through desk research to complete the BPCS template. Minor gaps in data coverage are acceptable, as long as the missing data is not key to a proper understanding of the BPCS. In case of significant data gaps, a remedy needs to be put into place. As the first remedy, the BioGov.net partner shall establish direct contact with a BPCS representative, to help fill data gaps. A second remedy (of last resort) is to replace the BPCS with another one. PEDAL/ BTG will support BioGov.net partners that face the above issue, also to ensure that any replacement BPCS is suitable.

Step 2 will thus yield:

- An extended template to elaborate BPCS.
- Min. of **20** completed templates describing BPCS (min. **2** per BioGov.net partner).
- An updated overview (list) of BPCS *("longlist").*

Step 3: Refinement and final development of BPCS

The third step involves the refinement, validation, and final development of at least 50% (min. of **10**) of shortlisted BPCS, split over the BPCS categories. PEDAL/BTG will organise a meeting with the BioGov.net partners to discuss which of BPCS shall be covered. Each BioGov.net partner shall be responsible to refine and validate (at least) **1** BPCS.

Building on their earlier desk research, the BioGov.net partner will engage with representative/s of "their" BPCS with a view to (a) update the BPCS data (b) complement BPCS data, in case of any data gaps (c) their validation of the refined BPCS.

In the process, BioGov.net partners may experience that for "their" BPCS they cannot engage a BPCS representative. Should this be the case, an ad hoc solution will be developed. A remedy (of last resort) is to replace the BPCS with another one. PEDAL/ BTG will support BioGov.net partners that face the above issue, also to ensure that any replacement BPCS is suitable.

Step 3 will thus yield:

- A (probably modestly) refined template.
- Min. of **10** validated BPCS (min. **1** per BioGov.net partner).
- An updated overview (list) of validated BPCS *("shortlist").*

Step 4: Final editing of the BPCS

The BPCS refined in Step 3 (the shortlist) are considered showcases for knowledge transfer. LOBA will take care of visually attractive editing of these BPCS. They will liaise with the respective developers of the BPCS case study as needed, e.g., for clarifications and/or for proofreading. PEDAL/BTG will also support LOBA where needed.

BPCS developed in Step 2 (the longlist) but not selected for refinement etc. in Step 3 (the shortlist) will be documented in BioGov.net Deliverable D2.1. For this purpose, no further editing of these BCPS is deemed necessary.

Step 4 will yield:

- A series of (at least **10**) finally edited BPCS

2.2. Second development phase (Step 2)

Based on the still to be expressed needs of the various Communities of Practice, that are currently being set-up in 8 regions under the umbrella of the BioGov.net project, the development of a second series of best practice case studies (BPCS) is foreseen.

The approach to developing further BPCS will be decided later at a later stage, after experience has been gained:

- In the first phase of case study development
- with the initial operation of the Communities of Practice in the 8 BioGov.net partner regions

Support available

PEDAL with the assistance of BTG will guide the BPCS development process, as outlined above. They will organise a dedicated meeting/session at the start of the process to answer any questions BioGov.net partners may have. Further support will be available through email or through further (ad hoc) meetings, as considered necessary

2.3. Planning

First development phase

As a minimum, the results of steps 1 and 2 of the first development phase are to be included in D2.1, which is due in May 2023 (M12). This leads to the following indicative timetable:

When	What	Expected result
Jan 2023 (M8):	Kick-off	Dedicated meeting explaining BPCS development
Feb 2023 (M9):	Step 1 completed	(at least **40**) Candidate BPCS identified
April 2023 (M11):	Step 2 completed	(at least **20**) non-edited BPCS ready *(longlist)*
June 2023 (M13):	Step 3 completed	(at least **10**) non-edited BPCS ready *(shortlist)*
Sep 2023 (M16):	Step 4 completed	(at least **10**) finally edited BPCS ready

Second development phase

The scope and number of best practice case studies and the approach to their development in the second development phase will be decided on at a later stage

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Consortium

CIVITTA

Q-PLAN INTERNATIONAL

LOBA CUSTOMER EXPERIENCE DESIGN

PEDAL
GET YOUR BUSINESS SPINNING

ZVT Agricultural Research, Ltd. Trebnje

CoE BBE Centre of Expertise Biobased Economy

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

FVA NEW MEDIA RESEARCH

WILA Bonn

Funded by
the European Union

@biogovnet
info@biogov.net www.biogov.net

Annex 3: Initial questionnaire template

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

EU Biogov.net Task 2.1.1.

Initial questionnaire template

1. Introduction

In WP2, T2.1 ("Methodology for regional data assessment") a methodology is developed for assessing regional data on the bioeconomy in a region (T2.1.1), and good practices/case studies in a region (T2.1.2). This document is about an approach for T2.1.1.

A two-step approach was defined to develop this methodology, in response to the feedback from the Biogov.net, as follows:

Step 1: Select region and check information

- Partner actions:
  1. Select your region.
  2. For your selected region:
     - Collect and report "what data is already there"
     - Briefly map/describe the assessed data
- BTG actions
  - Set-up guidelines on what information should be collected ('data acquisition form")

Step 2: Develop methodology

- BTG action
  - Develop template based on step 1 information
- Partner actions:
  - Fill out the template

The next pages (2-5) describe the "data acquisition form". This form is about the second part of Step 1, namely BTG providing guidelines on what to collect.

BTG would like to receive from regional partners a document of a maximum of 4 pages. This document should contain not the information itself, but if it can be obtained and if yes from where.

On the last page short guidance on region selection are presented.

2. Guidelines on what to collect

The following content is envisaged:

1. **Region selected**

   Geographical description of the region that is selected. A map is helpful.

- *To be filled in by Biogov.net partner responsible for the region -*

2. **Relevant stakeholder overview**

   Overviews of the main stakeholders, such as:

   - Governments: Which provinces, which municipalities
   - Industry: Key bio-based industries based in the region
   - Education: Main providers of education (especially informal education)
   - Arts and Culture: Main providers (theaters, museums, exhibition centers, festivals and other events)
   - Associations with focus on bio-economy (Chambers of Commerce, industry trade associations)
   - Networks: Existing bio-based clusters and networks
   - Environmental NGOs (non-governmental organizations)

- *To be filled in by Biogov.net partner responsible for the region -*

3. Bioeconomy strategy

Is there a bioeconomy strategy for the country? Or any are other strategic document that also includes bioeconomy? If yes:

- What are the priorities (for example Green Feedstock, Green Building Blocks, Green Chemicals, Sustainable Process Industries, Biorefineries)
- Are any concrete actions included?
- Does it address education and training?

- *To be filled in by Biogov.net partner responsible for the region -*

Is there a bioeconomy strategy for the region? Or any are other strategic document that also includes bioeconomy? If yes:

- What are the regional priorities (for example Green Feedstock, Green Building Blocks, Green Chemicals, Sustainable Process Industries, Biorefineries)
- Are any concrete actions included?
- Does it address education and training?

Note that the JRC Knowledge Centre on the Bioeconomy has published an updated overview on regional bioeconomy strategies[25].

- *To be filled in by Biogov.net partner responsible for the region -*

4. General overview bioeconomy in the region

Overview can contain information on e.g.

- Biomass types and quantities
- Typical bioeconomy processes in the region
- Typical products

- *To be filled in by Biogov.net partner responsible for the region -*

25 https://publications.jrc.ec.europa.eu/repository/bitstream/JRC128740/bioeconomy_strategy_eu_regions_fr_v7_final_online_hr_right_cover.pdf

5. **Funding and interesting initiatives**
    - Is public funding available for bioeconomy projects? This can include schemes providing funding to "green" projects in general, as well as schemes supporting bioeconomy.
    - Indicate any relevant scheme

- *To be filled in by Biogov.net partner responsible for the region -*

    - Are there already interesting initiatives on the bio-economy on-going in the region? Mention a maximum of 5

- *To be filled in by Biogov.net partner responsible for the region -*

Timing

Please return the completed document to BTG by mid-August 2022.

Final remarks

- If you do not foresee that you can obtain certain information, indicate that by listing “no information available”.
- Note that the information does not have to be available in English per se.
- Guidance on selection of a region is given in Annex A.

Annex A: Guidance on selection of a region

1) Size and location of your “region” can be selected as suits your purpose:

- No minimum or maximum size prescribed
- Enough candidate representatives from Quadruple Helix (Government, Industry, Education, NGO)
- Can be a combination of administrative divisions (the geographical areas into which a state is divided)

2) Existing framework

- Some existing commitment to bioeconomy
- Some existing engagement between Triple/Quadruple Helix partners (Government, Industry, Education, NGO)

3) Presence of existing communities and/or active stakeholders that can make a contribution to furthering the regional bioeconomy

It will be convenient (not a must) that the BIOGOV.NET partner is based in the region.

Should it turn out - after the exploratory research- that the “conditions” are not met it is recommended to reconsider the region selection.

Annex 4: Template of the Follow-up Questionnaire

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

WP2: Collection and assessment of good practices and case studies related to EU and regional training initiatives in bioeconomy

Task 2.1: Methodology for regional data assessment

Follow-up WP2 Questionnaire

Version of 20 January 2023

Consortium

CIVITTA Q-PLAN LOBA PEDAL

Funded by the European Union

INTRODUCTION

The first WP2 questionnaire (summer 2022) covered regional data on the bioeconomy in a region.

This follow-up questionnaire serves the following purposes:

- Help you as a regional partner to focus the project and its activities in your region
- Initiate/continue data collection about bioeconomy in your region
- Identify:
    - the offer and gaps in bioeconomy education in your region
    - opportunities to inject arts into bioeconomy education
    - opportunities for the inclusion of marginalised, disadvantaged, and minority groups
- Line up for the CoP to be established in your region

The questionnaire covers a dozen or so questions, in five (5) parts:

- Part 1: Thematic orientation
- Part 2: Governance, education levels and skill types
- Part 3: Linking arts and bio-economy education
- Part 4: Marginalised, disadvantaged, and minority groups
- Part 5: Identification of stakeholders

Background information on these dimensions is provided in a separate **scoping document.**

QUESTIONS

Part 1: Thematic orientation

- Q1: What are currently key **sub-sectors / value chains** in the bioeconomy in your region? *(Try to be as specific as possible, rather than using broad/general terms such as "Agrifood")*

- *To be filled in by Biogov.net partner responsible for the region -*

- Q2: What are the **key trends** in your region that have an influence on innovations/new technologies?

- *To be filled in by Biogov.net partner responsible for the region -*

- Q3: By 2030, what are the expected key **sub-sectors / value chains** in the bioeconomy in your region?

- *To be filled in by Biogov.net partner responsible for the region -*

- Q4: Considering the trends, key sub-sectors, and value chains in the bioeconomy your region, what **opportunities for personal advancement** (e.g., career advancement, getting paid jobs, own enterprise, etc.) are there in the region?

- *To be filled in by Biogov.net partner responsible for the region -*

Part 2: Governance, education levels and skill types

- Q5: Please describe the governance structure in adult education on (circular) bioeconomy, or on the wider topic of sustainability in your region. Please consider the focus on vocational education and training (VET), higher education (HE), or entrepreneurial education and the preferred EQF levels 3-6. Provide information about:
    - existing policies/strategic documents in (adult) education on (circular) bioeconomy, or on the wider topic of sustainability
    - how the sector is governed (e.g., the role of national, regional and local institutions and actors) and how it is funded (e.g., national, regional, other sources)
    - Is the education regulated by a special law or regulation?

- *To be filled in by Biogov.net partner responsible for the region -*

- Q6: How is the adult training, retraining, and lifelong learning organised? Please consider the focus on re-qualification of professionals, complementing education for professionals or entrepreneurship education and the preferred EQF levels 3-6. Provide information about:
    - who are the main providers (e.g., organizations founded by the state[26], a body authorized by the state, industry, …)?
    - who develops the curricula (e.g., an external authority, provider, etc.?
    - what is the duration of the programmes and format and learning forms (e.g., dual[27], part-time, distance)?
    - are any elements of work-based learning[28] provided?
    - other – are there any entry requirements, fees, etc.?

- *To be filled in by Biogov.net partner responsible for the region -*

- Q7: To your knowledge, has some targeted research (recently) been conducted regarding the **levels/formats of bioeconomy education** most needed in your region?

- *To be filled in by Biogov.net partner responsible for the region -*

[26] Including any other territorial units charged with the organisation of education.
[27] Dual education combines apprenticeships in a company and vocational education at a vocational school in one course.
[28] Work-based learning (WBL) is an educational strategy that provides students with real-life work experiences where they can apply academic and technical skills and develop their employability. URL: http://www.dpi.state.nc.us/cte/curriculum/work-based. For a discussion on the growing importance of work-based learning, see: UNESCO: Level-setting and recognition of learning outcomes, p. 115

- Q8: Please describe the **(main) adult training, retraining, and lifelong learning** offered on (circular) bioeconomy, or on the wider topic of sustainability, considering your region's bioeconomy trends, key sub-sectors, and value chains
    - For each (main) item, please give a short description (provider, target group, objectives, and outcomes)

- *To be filled in by Biogov.net partner responsible for the region -*

- Q9: To your knowledge, has some targeted research (recently) been conducted regarding the **bioeconomy skills** most needed in your region?

- *To be filled in by Biogov.net partner responsible for the region -*

In case the answer to Q9 is **NO**, please answer question Q10 too:

- Q10: Please describe the **skills most (urgently) needed** in your region, considering your region's bioeconomy trends, key sub-sectors, and value chains

- *To be filled in by Biogov.net partner responsible for the region -*

Part 3: Linking arts and bio-economy education

- Q11: This question concerns education in which art concepts are applied, with education focusing on bioeconomy or on a wider related topic such as circular economy, sustainability, etc. Please search for applications in your own region.
  - Please try to provide an example for each of the four dimensions mentioned below (detailing the education provider, the target group, and the way in which art is used).

    - Dimension 1: Art to stimulate the bioeconomy needed skills:

- *To be filled in by Biogov.net partner responsible for the region -*

    - Dimension 2: Art to address different learning styles and facilitate inclusion of marginalized people:

- *To be filled in by Biogov.net partner responsible for the region -*

    - Dimension 3: Inspirational case studies and formats from art and design to educate in the bioeconomy:

- *To be filled in by Biogov.net partner responsible for the region -*

    - Dimension 4: Injecting the bioeconomy in design, art, architecture, etc. professions

- *To be filled in by Biogov.net partner responsible for the region -*

Part 4: Marginalised, disadvantaged, and minority groups

- Q12: Working with which **marginalised, disadvantaged, minority groups** is prioritised in your region?

- *To be filled in by Biogov.net partner responsible for the region -*

- Q13: What are **relevant jobs or other opportunities for inclusion** for individuals (from the marginalised, disadvantaged, minority groups) in the bioeconomy in your region? *(also linked to the job profiles and case studies in WP2)*

- *To be filled in by Biogov.net partner responsible for the region -*

- Q14: What are the main **needs** of individuals (from the marginalised, disadvantaged, minority groups) integrating them into the bioeconomy in your region?

- *To be filled in by Biogov.net partner responsible for the region -*

- Q15: Are there any **educational/development activities** addressing the main needs of individuals (from the marginalised/disadvantaged/minority groups) and integrating them into the bioeconomy in your region? Please provide information about:
  - who are the main providers (e.g., organizations founded by the state[29], a body authorized by the state, industry, NGO, …)?
  - who develops the activity?
  - short description of the activity and its objectives?
  - what is the duration and the format of the activity?
  - other

- *To be filled in by Biogov.net partner responsible for the region -*

[29] Including any other territorial units charged with the organisation of education.

Part 5: Identification of stakeholders

- Q16: Which **bioeconomy stakeholders** in the following categories are key in your region? If possible, do not only identify organisations but also their representatives:
    - Stakeholder category A: **Education providers**
        - Research and higher educational organizations
        - Vocational education organizations
        - Other education providers (e.g., entrepreneurial education,..)
    - Stakeholder category B: **Economic actors** (from across key sub-sectors/value chains)
        - Large industries (including multinationals)
        - Small businesses (SMEs, scale-ups, start-ups, etc.)
        - Industry trade associations, networks, clusters
    - Stakeholder category C: **Policymakers & administrations**
        - Local/regional governments
        - Local/regional employment offices
        - Local/regional public agencies
    - Stakeholder category D: **Arts sector**
        - Art creators
        - Art exhibitors
    - Stakeholder category E: **Funding agencies** (local, regional, national, international)
    - Stakeholder category F: **Wider society**
        - Organizations working with marginalized/disadvantaged/minority groups
        - Social and environmental NGOs
        - Other representatives of) Citizens & Wider Society

- *To be filled in by Biogov.net partner responsible for the region -*

Annex 5: Case study template, short version (step 1)

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

"Mobilizing european communities of practice in bio-based systems for better governance and skills development networks in bioeconomy"

(Grant Agreement 101000788)

Case study template - step 1

Task 2.1

Case study category (drop down menu)	
Title	
Abstract	*(Short description of the case study, adressing e.g. the education format, the education content, and in which context the format was developed*
Target group/s	*(e.g., professionals in specific occupations, specific marginalised groups, etc.*
Scope and context of the education format	*(e.g., type of educational institution/s, topics and areas of development within the format, context in which it was developed (e.g. national/EU project; response to industry need/request)*
Data sources	
· Online resources:	*(include main URL, if any)*
· Resource persons:	*(include key resource persons, if any)*
· Other sources, if any:	
Factsheet **author**/s	*(BioGov.net person/s, organisation/s)*
Date of last change (DD-MM-YYYY)	

Annex 6: Case study template, full version (step 2)

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

"Mobilizing european communities of practice in bio-based systems for better governance and skills development networks in bioeconomy"

(Grant Agreement 101000788)

Case study template - step 2

Task 2.1

Title	
Abstract	*(Short description of the case study, adressing e.g. the education format, the education content, and in which context the format was developed*
Target group/s	*(e.g., professionals in specific occupations, specific marginalised groups, etc.*
Case study category (drop down menu)	
Training provider	
Region	*(preferrably BioGov region selected in T2.1 or BioGov.net country)*
Language	*(language(s) in which the format is implemented)*
Objective/s of the education format	*re-qualification of professionals*
	if other, please specify
Final objective of the education format	
Scope and context of the education format	*(e.g., type of educational institution/s, topics and areas of development within the format, context in which it was developed (e.g. national/EU project; response to industry need/request)*
Type/s of skills/competencies addressed	*Please indicate one or more options:* *Technical competencies* *Valorisation competencies* *Transversal competencies*
Specific skills and competencies addressed	
European Qualification Framework level/s	*Please indicate one or more options:* *Level 1* *Level 2* *Level 3* *Level 4* *Level 5* *Level 6* *Level 7* *Level 8*
What is the main benefit for the participant (w.r.t. certificate or qualification acquired)	*(e.g. a certificate or other document that can be used to enhance your CV and/or enable you to change/get a job in the bioeconomy)*
Investment made	*(indication or assessment of resources spent on developing the format and/or implementing the best practice. Resources spent include for example person hours of different staff categories, use of existing infrastructure, out-of-pocket costs etc.*
Importance and impact (w.r.t. participants)	*(indication or assessment of e.g., how many stakeholders or other key persons have been (re-)educated, (re-) trained or otherwise engaged to date*
Relevance (of the format)	*(indication or assessment of how does the format correspond to local needs and current situation in the region - e.g., what feedstock or value chain, infrastructure, capacities is it related to, if the format has a particular focus on engaging marginalised groups etc.)*
Uniqueness (of the format)	*(indication or assessment of how common or special the education format is in the region)*
Usability and replicability in BioGov	*(indication or -subjective- assessment if and how the format described in the case study could be used/replicated in the context of BioGov.net)*
Data sources	
· Online resources:	*(include main URL, if any)*
· Resource persons:	*(include key resource persons, if any)*
· Other sources, if any:	
Factsheet **author/s**	*(BioGov.net person/s, organisation/s)*
Date of last change (DD-MM-YYYY)	

EQF		Knowledge	Skills	Knowledge Skills Responsibility and autonomy
		In the context of EQF, knowledge is described as theoretical and/or factual.	In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).	In the context of the EQF responsibility and autonomy is described as the ability of the learner to apply knowledge and skills autonomously and with responsibility
Level 1	The learning outcomes relevant to Level 1 are	basic general knowledge	basic skills required to carry out simple tasks	work or study under direct supervision in a structured context
Level 2	The learning outcomes relevant to Level 2 are	basic factual knowledge of a field of work or study	basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	work or study under direct supervision in a structured context
Level 3	The learning outcomes relevant to Level 3 are	knowledge of facts, principles, processes and general concepts, in a field of work or study	a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	take responsibility for completion of tasks in work or study adapt own behaviour to circumstances in solving problems
Level 4	The learning outcomes relevant to Level 4 are	factual and theoretical knowledge in broad contexts within a field of work or study	a range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
Level 5	The learning outcomes relevant to Level 5 are	comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	exercise management and supervision in contexts of work or study activities where there is unpredictable change review and develop performance of self and others
Level 6	The learning outcomes relevant to Level 6 are	advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts take responsibility for managing professional development of individuals and groups
Level 7	The learning outcomes relevant to Level 7 are	highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research critical awareness of knowledge issues in a field and at the interface between different fields	specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
Level 8	The learning outcomes relevant to Level 8 are	knowledge at the most advanced frontier of a field of work or study and at the interface between fields	the most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

Source: Official Journal of the Europeam Union, C189/15, 15.06.2017 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017H0615(01)

Bioeconomy education, training and retraining in **Higher Education (HE)**
Bioeconomy education, training and retraining in **Vocational Education and Training (VET)**
Bioeconomy education, training and retraining in **Entrepreneurial Education**
Art to elicit new ways of thinking and develop skills needed in bioeconomy education
Art to address different learning styles and facilitate inclusion of marginalized people
Art to communicate messages, inspire people and raise their interest and awareness
Inject the bioeconomy in design, art, architecture, etc. professions
Bioeconomy education, training and retraining and **Inclusion of marginalised groups**

re-qualification of professionals
complementing education for professionals
improving the employability of disadvantaged groups
entrepreneurship education
other

Please indicate one or more options:
Technical competences
Valorisation competences
Transversal competences

Please indicate one or more options:
Level 1
Level 2
Level 3
Level 4
Level 5
Level 6
Level 7
Level 8

Annex 7: Case studies collected in BioGov.net

#1: Link Project

#2: My HandScraft

#3: Ecumenical workshops for refugees

#4: Bio-based Bridge Eindhoven

#5: Bio-based Pop-up and Grow Store

#6: Zet Gallery - ARTE EM ESPAÇO PÚBLICO & SUSTENTABILIDADE

#7: 4 živly (4 elements)

#8: Estonian Academy of Arts research centre, Sustainable Design and Materials Lab (DiMa)

#9: Bioeconomy foresight scenarios towards 2050 (JRC KCB)

#10: Circular Centre Quiz- Jogo Centro Circular

#11: COpAPS - Cooperative for Productive and Social Activities

#12: Aptet

#13: Vamvakies Social Green Project

#14: Blue City Circular Challenge

#15: Master's programme in Biology and Eco-innovation at the University of Tartu

#16: CIRCO Training Programme - creating business through circular design

#17: The research project "Center for Sustainable and Circular Bioeconomy and Energy #[Aegean_BIOECONOMY]"

#18: FOEBE-Fostering Entrepreneurship for the Bioeconomy

#19: Learning Network Biobuilders (Lerend Netwerk Biobouwers)

#20: Bioeconomy certificate course - Bioeconomy and Sustainability: A practical introduction to the Basics

#21: Blue Bioeconomy Collaborative Laboratory (B2E CoLAB)

#22: CO3 Campus

#23: Boosting Bioeconomy Knowledge in Schools

#24: Bioeconomy, innovation and achieving climate neutrality in the rural economy

#25: The Higher Technical Institutes (ITS)

#26: Sustainable design

#27: Sustainable Art Prize

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Link Association (stemming from Link project)

Apulia, Italy

FVA

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#1: Link Association (stemming from Link project)

Abstract

"Link" is a project financed in the context of a public call for Italian municipalities wanting to develop innovative projects and actions to address the phenomenon of young NEETs in their local contexts. Over two million young people in Italy, aged 15-29, are not engaged in study, work or training. The Link Cultural Association in the Apulia region was founded in 2003 by a group of young people passionate about their local area but at the same time eager to encourage openness to other cultural contexts and to promote values such as solidarity, active citizenship and intercultural dialogue.

At the local level, the Link Association, since its inception, has carried out educational projects as part of the training offer plan in collaboration with various educational entities, addressing the following topics: local history, environmental education and access to culture. In addition, Link has developed projects aimed at learning foreign languages and promoting intercultural education and on-the-job training in high schools.

Under the management of the Link Association, since June 2019, the Agorateca community library has acted as a cultural venue where training activities are implemented using different levels and forms of creativity, such as art, music and entertainment, with a strong focus on sustainability and inclusion.

Target Groups

NEETs, young generations to prevent the emergence of new young NEETs.

Case Study Category

Art to address different learning styles and facilitate inclusion of marginalized people.

Training Provider

For the implementation of training projects, info-education activities and other initiatives aimed at involving young people, NEETs and adults, the Link Association collaborated with the Apulia Region, the ARTI (Regional Agency for Technology and Innovation of the Apulia Region), the Fitzcarraldo Foundation, various Urban Laboratories (Bollenti Spiriti Program of the Apulia Region), Volunteering services, Eurodesk and Europe Direct networks, and with some municipalities of Apulia and Basilicata regions.

Region

Apulia, Italy.

Language

Italian, English.

Objectives of the education Format

Improving the employability of disadvantaged groups.

Final objective of the education format

These informal training activities represent an important way to exchange knowledge and experiences, therefore meeting the national strategic dimension (the reduction of the young NEET rate is a target of the 2030 UN Agenda) and territorial needs to engage the local community. The objective is to identify, activate and bring out inactive young people in order to address in targeted and differentiated ways a complex and varied phenomenon such as that of NEETs.

Scope and context of the education format

The Agorateca managed by Link Association, in addition to the library services, offers workshops with a wide range of activities, graphic design courses, digital storytelling, audio-video production workshops, language workshops, music and listening education courses, concerts, exhibitions, youth exchanges and European training courses, horticultural therapy and gardening activities. On March 2023 they organised in partnership with local associations the workshop "Do it together #OSMA - Open-Source Material Archive" focused on the co-design and biofabrication of biomaterials from local biological residues. This helped introducing the topics of circular and sustainable bioeconomy among the training offer of the association, using a hands-on experience and an artistic approach to engage the participants.

With its work, Link Association aims to stimulate young generations and in particular young NEETs in being engaged in non-formal educational activities, organised in partnership with local schools and associations. Link also organizes local and international workshops to support cultural exchange among generations and to facilitate the inclusion of the local community and marginalised groups like migrants or people non-speaking the local language

Specific Skills and competencies addressed

Technical competencies: basic competences related to the different topics of the workshops and training activities organised (e.g., knowledge in graphic design, digital storytelling, audio-video production, music and listening, fabrication of biomaterials).

Valorisation competencies: knowledge of the local culture and system, personal training and career development, knowledge of the local language.

Transversal competencies: critical thinking and problem solving, communication, relationship skills, entrepreneurial competences, passion for the work, patience, courage, curiosity, accuracy, time management.

European Qualification Framework level/s

Level 4, Level 5.

Main benefit of the participant

These activities can serve as motivational drivers, since NEETS are typically not keen on taking responsibilities/be involved in any activities or jobs. Therefore, involving them in creative/artistic experiences and in non-formal educational activities can help find motivation to take a concrete action, also stimulating their interest in different topics (specifically art, sustainability, bioeconomy).

Importance and impact

In almost 20 years of activity, Link has built a network of youth organisations, entities, and other initiatives active in over 30 European countries, has sent around 3,000 young people

to projects abroad and has supported around 2,000 local projects in partnership with numerous organizations in Apulia and Basilicata regions, engaging the local communities.

Relevance (of the format)

The format is highly relevant as it wants to engage young NEETs in non-formal activities in order to support their inclusion and stimulate their engagement and motivation. Moreover, since Link Association is strictly connected to the local communities in small cities of Apulia and Basilicata regions, this help to reach people living in rural areas which are often difficult to engage and tend to be marginalised.

Data sources

Online resources:
https://www.linkyouth.org/
https://www.agorateca.it/
Resource persons: Dario Sette, Giuseppe Creanza - info@agorateca.it
Other sources, if any:
https://www.anci.it/al-via-il-bando-link-connettiamo-i-giovani-al-futuro-interventi-locali-sui-giovani-neet/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Link Association (stemming from Link project)

Apulia, Italy

FVA

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#2: My HandScraft

Abstract

Migrants Hands and Skills to Create a Future Track is a 30-month project aiming to develop and test an innovative education and training programme, addressed to low-skilled adults and migrants (especially newly arrived migrants, asylum seekers and refugees) to support their social and economic integration into society and the labour market.

Target Groups

Adult migrant learners, Adult learners, Adult trainers.

Case Study Category

Art to address different learning styles and facilitate inclusion of marginalized people.

Training Provider

CESIE (Italy) – Coordinator, in collaboration with Dacorum Council for Voluntary Service LTD (UK), GrantXpert Consulting LTD (Cyprus), Active Citizens Partnership (Greece), Social innovation Fund (Lithuania).

Region

Italy, UK, Cyprus, Greece, Lithuania.

Language

English, Italian, Greek, Lithuanian.

Objectives of the education Format

Improving the employability of disadvantaged groups.

Final objective of the education format

Develop and test an innovative education & training programme addressed to low-skilled adults with migrant background in order to support their social and economic integration into society and labour market.

Scope and context of the education format

Within the project, the following products were developed:

- A collaborative e-learning platform, which incorporates the following components:
  - E-education Programme
  - Handbook for Adult Educators
  - Digital Guide for handcrafters
  - Participant PORTFOLIOS
  - Interactive platform of communication
  - Regular updates with articles, photos, videos of the Local Workshops (and of other key project activities)

    - MyHandScraft Film
- An e-educational programme, aiming at improving the basic skills and key competences of migrants, and their up-skilling and re-skilling in the realms of handicraft, culture and arts. The EEP encompasses 3 training packages:
    - Enhance Basic Skills, Key Competences, Social Integration and Cohesion towards non-formal education & intangible heritage transmission
    - Facilitate the exchange of knowledge and skills related to handicraft traditions, with reference to different technics, products, materials and working procedures
    - Promote entrepreneurial initiative towards economic integration
- A handbook to support adult educators working with migrants
- MyHandScraft Forums & festivals in each Country, an international Festival in Lithuania and of a joint staff training event with trainers from all partner Countries.

Specific Skills and competencies addressed

Technical competences to work in the handicraft sector.

Transversal competencies: critical thinking and problem solving, communication, relationship skills, marketing competences, entrepreneurial competences, passion for the work, patience, courage, curiosity, accuracy, time management.

Valorisation competencies: knowledge of the local language, knowledge of the local culture and system, personal training and career development.

European Qualification Framework level/s

Level 4, Level 5.

Main benefit of the participant

Improvement of basic skills and key competences of migrants, up-skilling and re-skilling in the realms of handicraft, boosting cooperation and networking among and between local handcrafters, artists, migrants and refugees.

Importance and impact

Engagement of at least 250 stakeholders in the project.

Relevance (of the format)

The format is highly relevant, as it facilitates through art handcraft migrants employment, which is generally identified (together with the language) as the primary integration obstacle in a new country. There is no particular focus on bioeconomy.

Data sources

Online resources: http://www.myhandscraft.eu/
Resource persons: https://cesie.org/; http://www.myhandscraft.eu/contact-us/
Other sources, if any: http://myhandscraft.eu/resources/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Ecumenical workshops for refugees

Thessaloniki, Central Makedonia

Q-PLAN

Funded by the European Union

info@biogov.net www.biogov.net

#3: Ecumenical workshops for refugees

Abstract

The Ecumenical Refugee Workshop NAOMI is an urban non-profit organization based in Thessaloniki. It aims to provide humanitarian aid to refugees and activities for their integration into society. In the professionally configured workshop, refugees are also taught tailoring skills.

Their goal is to be later able to sew for their family and friends, but also, by finding employment in the textile industry, to be independent and take care of their family. Art and Fashion have always been inspired by different cultural influences. Tailoring for and with people from different cultures and with different fashion styles is in the spirit of NAOMI. In this way, NAOMI promotes the integration of refugees and their career independence. In the workshops, the participants learn not only to reuse clothes but also to incorporate art, creativity and design to create quality products of artistic design.

Professionals with long experience in the field of art, fashion, designers and tailors, refugees from Syria, work on these models and oversee their modern design. The reuse of waste blankets also has a purpose ecological message against the "disposable" society. From the workshop, the participants learn not only to reuse clothes but also to incorporate art, creativity and design to create quality products of artistic design.

Target Groups

Naomi represents all women and single mothers, the most unprotected, who have to leave their country and build a new life abroad. Professionals get trained and prepared for a new labour market boosting the Greek textile industry, in need of skilled workers. Non-professionals learn to be able to work for their own needs and in the best case generate an income by sewing for others. The Textile Academy, part of the NAOMI Ecumenical Workshop for marginalized groups such as Refugees, is closely connected with its Emergency Aid and the NAOMI Textile Production with refugee employees.

Case Study Category

Art to address different learning styles and facilitate inclusion of marginalized people.

Training Provider

NAOMI Team: Elke Wollschläger (full-time textile engineer), Mieke Sellin (teacher for textile and fashion design, trainee), Sonia Savoulidou (cut) and Zoi Keskinidou (art & design).

Region

Thessaloniki, Central Makedonia.

Language

Greek/English.

Objectives of the education Format

Improving the employability of disadvantaged groups.

Final objective of the education format

Professional from among refugees get trained and prepared for a new labour market boosting the Greek textile industry, in need of skilled workers. Non-professionals learn to be able to work for their own needs and in the best case generate an income by sewing for others.

Scope and context of the education format

In the context of the ongoing weaknesses in socioeconomic integration measures for asylum seekers and refugees in Greece, Naomi's projects specifically addresses the significant lack of access to training, counselling, fair jobs, and income for professional and non-professional sewers who belong to the above social groups. The holistic Academy Program alongside training on sewing skills provides career counselling, Greek language, soft skills, and environmental awareness and thus empowers the attendants to participate in social and economic life and also to be creative by using art in their activities.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies

The Training providers typically need a degree to enter the occupation, creative candidates who have technical knowledge of the production processes for clothing, accessories, or footwear. No specific skills are needed for the participants.

European Qualification Framework level/s

Level 5, Level 6.

Main benefit of the participant

Sewing skills provides career counselling, Greek language, soft skills, and environmental awareness and thus empowers the attendants to participate in social and economic life and also to be creative by using art in their activities (creating fashionable clothes).

Importance and impact

The team of the ecumenical workshop NAOMI has set up an emergency aid program for families with children and for vulnerable people. They work with donations so that they can provide medicine and food. Moreover, the sewing and tailoring workshop employs refugees especially women, in a safe and friendly space. Refugees are valued and welcomed there, they can develop their own skills and learn. Meeting people of different backgrounds and mindsets is a good training ground for their integration into a new environment. The upheavals and conflicts that arise from time to time are effectively dealt with. Both, volunteers and refugee workers see themselves as learners in this partnership, exchange experiences and learn together.

The workshop currently has 10 workstations with sewing machines and a place with a linking machine, as well as a large cutting table. An electric cutting machine was also purchased. Elke Wollschläger leads the courses and is supported by volunteers.

So far more than 2,500 different kind of products such as jackets, cardigans, aprons, bags etc have been made, some of which have been given to refugees and many more have been

given to activists and supporters. Moreover, cardigans and coats are produced from cleaned and disinfected blankets of Camp Idomeni.

Relevance (of the format)

The format correspond to local needs and current situation in the region as it has a particular focus on engaging marginalised groups(refugees). Efforts are being made by Naomi team, to support the refugees in creating their own small production company with normal working conditions. A company that markets household products is envisioned, where sales and advertising should be professionally designed.

Data sources

Online resources: https://naomi.gr
Resource persons: Zoi Keskinidou, E: zoikeskinidou@naomi.gr
Other sources, if any: Refugee Day Center Alkyone, https://www.ottopermillevaldese.org/

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Bio-composite Bridges

The Netherlands (cities of Eindhoven, Almere, and Bergen op Zoom) plus Germany (city of Ulm)

BTG

Funded by
the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#4: Bio-composite Bridges

Abstract

A bridge is an ideal object to test the properties and possibilities of new materials. The world's first bridge made of 100% biomaterials (biocomposites) was constructed on the campus of TU Eindhoven in 2016. Materials used in the pedestrian biobridge included PLA (poly lactic acid) foam, cork, hemp and flax fibres, and a bio-based epoxy resin. The original bridge was erected by a project partnership of TUD, TU/e, CoE BBE, schools for pre-vocational secondary education (VMBO) in Eindhoven and composite company NPSP. The bridge concept was advanced in the Interreg NW Europe project of Smart Circular Bridges. In 2022, a new bridge design was tested and demonstrated at the world horticulture exhibition Floriade in Almere. Materials used in the construction included 100% natural flax fibres and resin with a 25% bio-based share. Further bridges will be piloted in Ulm (D) and Bergen op Zoom (NL). The EU-funded project is carried out by a partnership of universities, AVANS, seven companies and three municipalities.

Target Groups

General public (awareness raising). Material innovators. Students (multiple EQF-levels).

Case Study Category

Art to communicate messages, inspire people and raise their interest and awareness.

Training Provider

TU/e, TUD, Hogeschool Avans, Koning Willem 1 College and Bossche Vakschool (for example, 2 Research Universities, a collaboration of 2 Universities of Applied Science, and 2 vocational training providers).

Region

The Netherlands (cities of Eindhoven, Almere, and Bergen op Zoom) plus Germany (city of Ulm).

Language

English and Dutch.

Objectives of the education Format

Other.

General public (awareness raising).

Material innovators, Students, involvement in R&D activities.

Scope and context of the education format

RD&D on a novel construction material, applied in infrastructural objects in the built environment. Students from different education levels collaborated to realise the pilot bridges.

Specific Skills and competencies addressed

No exclusive focus on technical, valorisation or transversal competencies. The first category may be of the highest relevance.

Aspects of various competencies came together in the students' involvement:

Technical competencies e.g., material research

Valorisation competencies e.g., conducting lifecycle assessment

Transversal competencies: working together in teams

European Qualification Framework level/s

A range of EGF levels (students of 4 different educational levels, from University towards vocational training, were involved).

Main benefit of the participant

Direct input/contribution to the design, production and testing of a (publicly accessible) demo bio-based pedestrian bridge.

Importance and impact

Many enthusiastic students of 4 different educational levels, from University towards vocational training, were involved in the 1st project. They were involved during bridge design (to optimise the designs, to test materials on strength and stiffness and to model the material behaviour), production and assembly.

Relevance (of the format)

Using biomaterials to build bridges is highly relevant in the Netherlands (and Germany). There are many existing bridges that need to be renewed in the near future. Dutch municipalities maintain over 12.000 pedestrian and cyclist bridges. 41% are in a poor to very bad shape. Germany shows similar figures.

Data sources

Online resources:
https://www.4tu.nl/bouw/Projects/Bio%20Based%20Bridge/
https://www.restructgroup-tudelft.nl/biobased-composite-footbridge
https://www.nweurope.eu/projects/project-search/smart-circular-bridge-scb-for-pedestrians-and-cyclists-in-a-circular-built-environment/
https://www.nweurope.eu/programme-2014-2020/nwe-making-an-impact/smart-circular-bridge-making-infrastructure-circular-with-biomaterials/
Resource persons: Prof. Dr.-Ing. Patrick Teuffel, Chair of Innovative Structural Design (ISD), Faculty of the Built Environment, TU Eindhoven

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Bio-based Pop-up and Grow Store

Southwest Netherlands

BTG

Funded by
the European Union

info@biogov.net www.biogov.net

#5: Bio-based Pop-up and Grow Store

Abstract

The Bio-based Pop-up and Grow store refers to an integral concept that combines awareness raising, business development, training and education.

Pop-up stores are shops, cafés or events that appear in fascinating environments for a limited period. The innovation potential, rather than consumption, takes centre stage in those projects. These spaces provide the setting to experiment with something new and inspiring. Their central part is a temporary exhibition of bio-based products (both quotidian and design products), which was first organised in an empty shop in the Bergen op Zoom city centre in the period 11.11.2016-30.01.2017. The store space was also used to accommodate an artist-in-residence, organise excursions with experiments for school children, and host business meetings and thematic workshops.

The city of Bergen op Zoom has a formal policy to support the local bioeconomy, built on five pillars. The city organised the pop-up store to raise public awareness of the prospects that bio-based industries (chemical and agro) offer in terms of jobs, investments, sustainability, and a bright new future.

Target Groups

General public, school children, SMEs and other businesses, public authorities (local governments from the Noord Brabant region).

Case Study Category

Art to communicate messages, inspire people and raise their interest and awareness.

Training Provider

Municipality of Bergen op Zoom.

Region

Southwest Netherlands.

Language

Dutch.

Objectives of the education Format

Awareness raising about biobased economy

Final objective of the education format

Create awareness about the Biobased Economy. Showcase bio-based products in everyday life. Create a platform for SME's. Example for other municipalities.

Scope and context of the education format

To mitigate the economic consequences of the closure of a cigarettes production plant, the region SW Netherlands (Zeeland & Noord-Brabant) adopted the Action Plan Economic Structural Strengthening 'Delta Region in Top Gear' and the municipality of Bergen op Zoom adopted the Action Plan Bio-based Economy. The latter Action Plan is built on 5 pillars:

1. Geen Chemistry Campus,
2. Education,
3. Creative Bio-based,
4. Municipal operational management and procurement,
5. Urban planning and public space.

The organisation of the bio-based pop-up store is linked with pillars 2 and 3.

Specific Skills and competencies addressed

N/A.

European Qualification Framework level/s

A broad range of EQF levels is addressed.

Main benefit of the participant

This depends on the actual engagement format (conducting an experiment for children, participation in a thematic workshop, joining a networking event, etc.). In general, being better informed on the innovative potential and the job opportunities of the local bioeconomy.

Importance and impact

Importance/impact differs per participant category:

- General public, including youngsters and their parents: awareness raising
- Economic actors, including SMEs: business networking
- Participants in workshops: training / education / development.

Relevance (of the format)

Products on display were sourced (from companies) from the direct region and from elsewhere in the country.

Data sources

Online resources:
https://www.greenchemistrycampus.com/nieuws/eerste-biobased-pop-up-store-van-nederland-opent-in-bergen-op-zoom
https://www.akvstjoost.nl/nieuws/biobased-pop-up-store-bergen-op-zoom
https://www.youtube.com/watch?v=B4a0VmdbfwE
https://www.youtube.com/watch?v=oBMisoQbZe4
Resource persons: Dietmar Lemmens, Project Manager Economic Affairs at Bergen op Zoom Municipality

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Zet Gallery – ART IN PUBLIC SPACE & SUSTAINABILITY

North Region of Portugal

LOBA

Funded by the European Union

info@biogov.net www.biogov.net

#6: Zet Gallery – ART IN PUBLIC SPACE & SUSTAINABILITY

Abstract

Zet Gallery promotes sustainability through art by offering a prize “arte em espaço público e sustentabilidade” (art in public places and sustainability). This project also has the support of IB-S, Instituto de Ciência e Inovação para a Bio-sustentabilidade da Universidade do Minho.

Target Groups

Artists, general public and higher education institutions.

Case Study Category

Art to communicate messages, inspire people and raise their interest and awareness.

Training Provider

Zet Gallery.

Region

North Region of Portugal.

Language

Portuguese and English.

Objectives of the education Format

Other – Promote sustainability through art.

Final objective of the education format

Encourage sustainability through the circular economy, democratise access to art and encourage contemporary artistic creation.

Scope and context of the education format

The project challenged artists to create works of art for the public space of the city of Braga, from industrial waste, in an initiative to support contemporary artistic creation and production in the field of plastic and visual arts, allied to the concepts of sustainability and circular economy. Then afterwards the art was exhibited in public spaces and the awarded piece in their space (Zet Gallery).

Specific Skills and competencies addressed

Valorisation competencies. Transversal competencies
Sustainability, circular economy and art.

European Qualification Framework level/s

Level 1.

Main benefit of the participant

The winning participant is awarded a prize, and afterwards their piece is exhibited in public spaces in the city of Braga and is showcase in the Zet Gallery.

Importance and impact

Engaging artists in bioeconomy and the general public in the dimensions of art and bioeconomy.

Relevance (of the format)

This format can be an effective way to engage and educate people about the importance of bioeconomy. They can inspire creative thinking and encourage individuals to explore new ideas and concepts related to bio-based solutions. This format also helps to bring attention to the beauty and value of nature and the important role it plays in our lives.

Data sources

Online resources:
https://zet.gallery/blog/pt/open-call-3a-edicao-premio-arte-espaco-publico-sustentabilidade/
https://zet.gallery/blog/pt/
https://zet.gallery/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: 4 elements

Slovakia, Žilina region

PEDAL

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#7: 4 elements

Abstract

The 4 ELEMENTS project is focused on education in the field of environmental education presented in a non-traditional form: non-formal education through interactive theatre (with the active involvement of students as the participating audience) and environmental activities carried out live, also through an online application. The project also educates teachers and will provide educational materials and guidelines with ready-to-use activities to be used in class.

Target Groups

Youth, teachers, general public.

Case Study Category

Art to communicate messages, inspire people and raise their interest and awareness.

Training Provider

Divadelné centrum.

Region

Slovakia, Žilina region.

Language

English, Slovak, Czech, Polish.

Objectives of the education Format

Other – communicate environmental issues through art.

Final objective of the education format

The project was created to stimulate pupils' interest in nature and the environment through the artistic experience of theatre. It aims not only to make pupils aware of current environmental issues and climate change, but also to disseminate examples of positive environmental practice and to inspire the young generation to take individual action.

Scope and context of the education format

The project includes an interactive theatre production, an educational online application and a methodological guide especially for teachers of science and art-educational subjects as a means of creating non-traditional innovative forms of teaching. The comprehensive art-educational material for teaching environmental education will be freely disseminated and available for all schools within the EU countries in 4 languages (SK, CZ, PL, EN)

Specific Skills and competencies addressed

Transversal competencies.
Various transversal skills, mainly: Communication, Teamwork, Problem-solving, Critical-thinking, Creativity, Innovation, Being initiative, Curiosity...

European Qualification Framework level/s

N/A.

Main benefit of the participant

No certificate acquired. Development of transversal skills, understanding of environmental challenges in wider perspective. For teachers - materials to be used in classes.

Importance and impact

To date 250 pupils and teachers in each of the 3 countries (Slovakia, Czech republic, Poland).

Relevance (of the format)

In an artistic way, in the form of a story where nature is represented by the four elements (fire, water, earth and air), the project allows the audience to get to know these characters and the problems they face on Earth and educates about the importance of changing behaviour towards greater responsibility, care for the environment and sustainability. The following workshops use games and hands-on demonstrations through which participants experience concrete phenomena (e.g., global warming in a tent), discussions, and provide inspiration for their own youth activities.

Data sources

Online resources: https://www.divadelnecentrum.sk/4-zivly
Resource persons: Veronika Bieliková, Divadelné centrum
Other sources, if any: project website and application in development

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Estonian Academy of Arts research centre Sustainable Design and Materials Lab (DiMa)

Estonia

CE

Funded by the European Union

info@biogov.net www.biogov.net

#8: Estonian Academy of Arts research centre Sustainable Design and Materials Lab (DiMa)

Abstract

The Estonian Academy of Arts is the only public university in Estonia providing higher education in art, design, architecture, media, art history and conservation-restoration. Research centre DiMa connects research and teaching activities with sustainable product development and design practises and brings together two research directions - circular design and bio-based material design. However, DiMa does not compete with the country's more established materials science institutes but creates an opportunity to broaden material research and discussion in a local context.

Target Groups

People interested in sustainable, eco-friendly design bringing together students, researchers, practitioners and companies.

Case Study Category

Art to elicit new ways of thinking and develop skills needed in bioeconomy education.

Training Provider

Estonian Academy of Arts.

Region

Estonia.

Language

Estonian/ English.

Objectives of the education Format

Other – It is a research centre that links research and teaching with sustainable product design.

Final objective of the education format

The objective of the DiMa resonates with the goals of the circular design and circular economy: development of sustainable materials, including enhancement of the value of bio-based materials and residual materials for local conditions. As a result of the activities to this point, bio-composite materials based on local raw materials have been produced, by using microorganisms, materials have been grown (microbacterial cellulose and composites derived from mycelium) and materials have been developed to enhance the value of waste generated by the oil shale industry. The objective is for the process to yield new, locally relevant and globally salient materials with real use.

Scope and context of the education format

DiMa deals with circular economy and the development of circular products and services, material design and research, relying on EKA's previous research and teaching experience in this field. DiMa has a lot of initiatives, and organises different exhibitions related to bio-

design. For instance, bio-integrated design intensive course. There is a designers collective studio called Studio Aine, which is a materials design and development studio, whose research is focused on environmentally sensitive materials, materials awareness and cross-domain networking. Moreover, many innovative designers have graduated EKA.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies. Transversal competencies

Some technical competencies include: sustainable design principles and practices (recycling, upcycling); research methods and techniques; product design and development.

Some valorisation competencies: entrepreneurship and innovation.

Transversal competencies: collaboration and teamwork; creativity and innovation; critical thinking and analysis.

European Qualification Framework level/s

Level 6. Level 7. Level 8.

Main benefit of the participant

As it is a research centre, one can be a part of it, participate in the activities and projects. Outputs are, for example, new products/materials, exhibitions or publications.

Importance and impact

Exhibitions and publications reach numerous people. Through projects also a lot of people are involved. Each year there are students who get involved in DiMa's activities as well.

Relevance (of the format)

The format is highly relevant, as sustainable design, recycling etc are getting more and more attention and coming into every day life of people. People are being more interested in sustainability, upcycling, recycling.

Data sources

Online resources: https://dima.artun.ee/en
Resource persons: Reet Aus, Kärt Ojavee
Other sources, if any: LinkedIn: https://www.linkedin.com/company/sustainable-design-and-material-lab-eka/

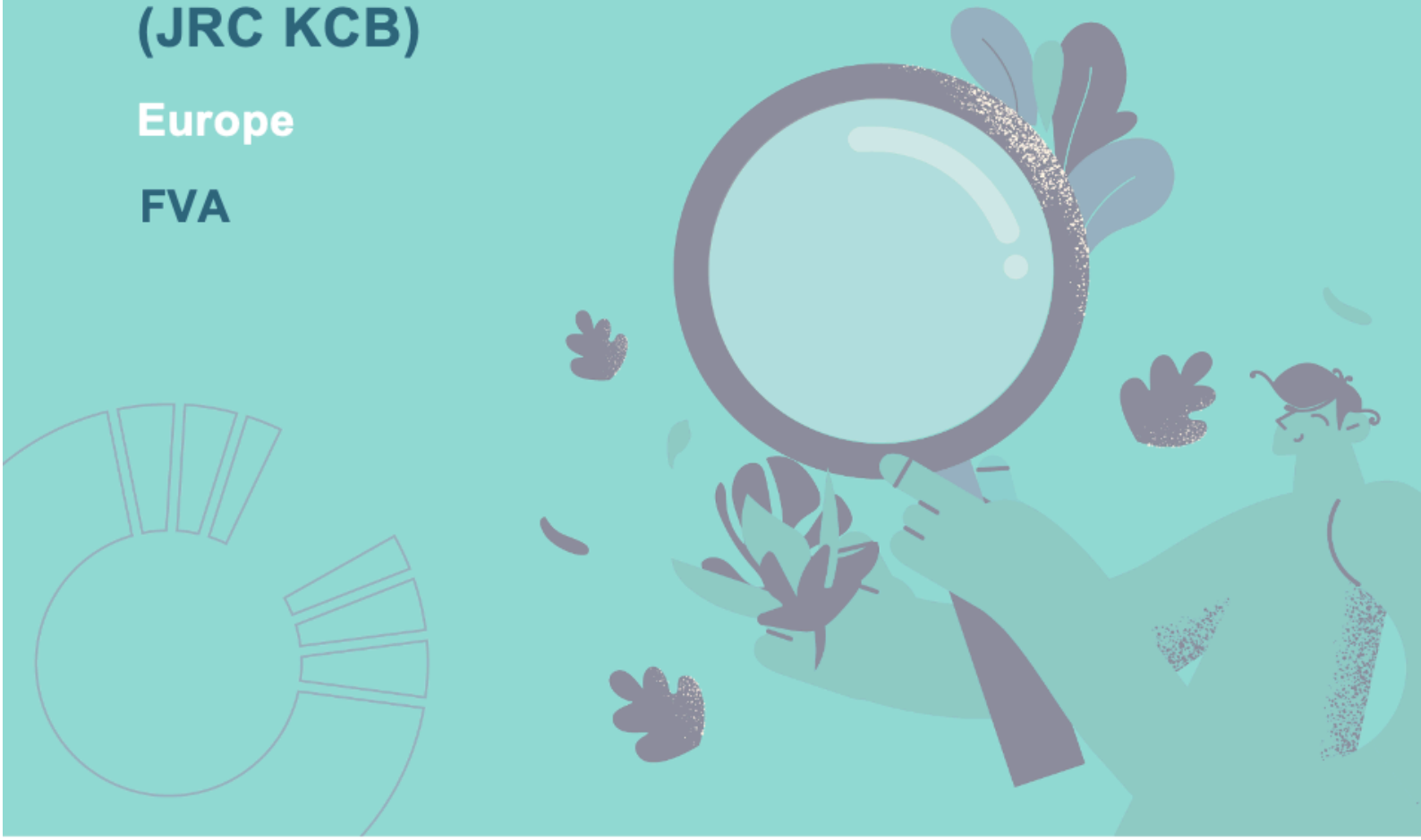
BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Bioeconomy foresight scenarios towards 2050 (JRC KCB)

Europe

FVA



Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#9: Bioeconomy foresight scenarios towards 2050 (JRC KCB)

Abstract

The Scenario Exploration System is a board game developed by the Joint Research Centre to facilitate the practical use of scenarios from foresight studies and the application of future systemic thinking to policymaking. The bioeconomy edition is based on four scenarios for future transitions for the bioeconomy towards sustainable development and a climate-neutral economy. Participants take up the roles of different stakeholders (primary producer, consumer, policy maker, businesses, and public opinion) and navigate different scenarios. The tool enables them to develop a long-term perspective and to experience the constraints and opportunities they might face in designing actions towards reaching long-term goals and objectives and when interacting with other stakeholders.

Target Groups

Quadruple helix stakeholders.

Case Study Category

Art to elicit new ways of thinking and develop skills needed in bioeconomy education.

Training Provider

EC Joint Research Centre - Knowledge Centre for Bioeconomy.

Region

Europe.

Language

English.

Objectives of the education Format

Other – Improving systemic thinking in stakeholders interested in bioeconomy.

Final objective of the education format

Although the foresight exercise was designed to involve experts and actors in a systemic reflection with a long-term perspective, it has an intrinsic potential for education bridging bioeconomy and art (gamified experience).

Each participant assumes a specific stakeholder role in the bioeconomy. The exercise stimulates discussion and engagement and opens the minds of stakeholders, who can bring new perspectives into their activities.

Scope and context of the education format

In December 2019, the European Commission had setup an ad-hoc network of external experts, to contribute to the Commission's Knowledge Centre for Bioeconomy with forward-looking analysis. As part of this work, the experts contributed to a foresight exercise, organised in collaboration with the EC Competence Centre on Foresight, with the participation of external bioeconomy stakeholders, from within and outside the Commission

services. The results of the foresight phase included the development of four scenarios of how the EU bioeconomy could evolve by 2050 (as the long-term time horizon) addressing the question: “How can the EU bioeconomy best contribute to specific Sustainable Development Goals and to the transition towards a climate-neutral economy by 2050?”

The scenarios describe plausible alternative narratives of the bioeconomy in 2050, based on the multiple drivers that can affect its future, and their interplay, and depending on the realisation of specific boundary conditions. Each scenario describes the world, Europe and the bioeconomy in 2050 and to what extent each scenario would contribute to the objectives of the EU Bioeconomy Strategy and to selected United Nations Sustainable Development Goals (SDGs).

Scenario 1: Do it for us - proactive policy, Paris target nearly achieved (2 °C global temperature increase by 2100), no societal change (Business As Usual trend for consumption);

Scenario 2: Do it together – integrative policy, Paris target fully achieved (1.5 °C global temp. increase by 2100), fundamental societal change (towards sustainable consumption);

Scenario 3: Do it ourselves - societal action, Paris target missed (global temperature increase 2.5 °C by 2100), fundamental societal change (towards sustainable consumption);

Scenario 4: Do what is unavoidable - reactive policy, Paris target clearly missed (3.5 °C global temperature increase by 2100), no societal change (Business As Usual trend for consumption).

Specific Skills and competencies addressed

Valorisation competencies: assessing risks, assessing sustainability, system thinking and solving complex systems, holistic view of the system to be studied, with a critical, analytical, and creative attitude.

Transversal competencies: critical thinking and problem solving, communication, team work, prioritising and organising, entrepreneurial competences, curiosity, accuracy, time management, strategic thinking.

European Qualification Framework level/s

Level 6. Level 7.

Main benefit of the participant

Participants move through the scenarios by implementing actions to pursue their objectives and goals, considering the specific context of each of the 4 scenarios.

88% of attendees confirmed that the workshop helped them develop a strategic perspective on the future of the bioeconomy. Moreover, playing with this board game participants acquire specific competences that can be transferred to their practices, specifically for foresight and systemic thinking.

Importance and impact

2 workshops already organised with a focus on the bioeconomy, 90 stakeholders from 17 European countries engaged.

In general, the actions of the participants are all directed towards the pursuit of sustainable objectives, even if the scenarios do not report favourable conditions.

Next workshop will focus on Central-Eastern Europe.

Relevance (of the format)

The format is highly relevant as it provides a tool to elicit the systemic thinking through a gamified experience. The development of scenarios is one of the techniques used in foresight. It identifies the relevant drivers of change of the system being considered and analyses the interplay between the respective drivers. This helps to develop a deep understanding of the logic of various possible future developments.

Data sources

Online resources: https://publications.jrc.ec.europa.eu/repository/handle/JRC123532

Resource persons: BORZACCHIELLO Maria Teresa; SANCHEZ LOPEZ Javier; AVRAAMIDES Marios - JRC KCB

Other sources, if any: JRC Publications Repository - Scenario Exploration System - Future transitions for the bioeconomy towards sustainable development and a climate-neutral economy (europa.eu)

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Circular Centre Quiz – Jogo Centro Circular

Centre Region of Portugal

LOBA

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#10: Circular Centre Quiz – Jogo Centro Circular

Abstract

The Centre Region Coordination and Regional Development Commission launched the Circular Centre Quiz, an online game to promote knowledge about the circular economy, aimed at the school community of the Centre Region of Portugal.

This is an initiative that uses gamification as a ludic way to develop environmental, circular and sustainable education content, addressed to students from the 2nd and 3rd cycles and their teachers.

Target Groups

Students and teachers from the 5th to the 9th year of schooling, attending any school in the Centre Region of Portugal. Family and friends of the students, students from other cycles or other interested players.

Case Study Category

Art to communicate messages, inspire people and raise their interest and awareness.

Training Provider

Centre Region Coordination and Regional Development Commission

Region

Centre Region of Portugal.

Language

Portuguese.

Objectives of the education Format

Other.

Final objective of the education format

Raise awareness to the bioeconomy among students from the 5th to 9th of schooling in Portuguese schools from the Centre Region of the country.

Scope and context of the education format

The Circular Centre Quiz aims to promote environmental, circular and sustainable education in the school community.

It is an online board game that tests players' knowledge in five areas: Water Efficiency; Energy Efficiency; Material Efficiency; Design and Production; and Acquisition and Consumption. The game aims to be appealing and can be used in a classroom context or remotely. The players can be students from the 5th year of schooling to the students from the 9th year, can also be the teachers. It's a game and a competition so at the end the players with better score achieve a prize (there´s a prize for students and teachers with the top scores).

Specific Skills and competencies addressed

Transversal competencies

Competences in Water Efficiency; Energy Efficiency; Material Efficiency; Design and Production; and Acquisition and Consumption.

European Qualification Framework level/s

Level 1. Level 2.

Main benefit of the participant

Certificate of participation and prize.

Importance and impact

Educational games can have a significant impact on children's understanding of the bioeconomy. This educational game made learning about bioeconomy fun for the students, it fostered critical thinking skills and problem-solving skills, as well encouraged collaboration and teamwork. This game reached 2855 students, 128 professors and 97 schools in the centre region of Portugal.

Relevance (of the format)

The format is highly relevant, as it targets future potential bioeconomy students.

Data sources

Online resources:
https://agendacircular.ccdrc.pt/jogo-centro-circular/
https://www.centrocircular.pt/pt/regras
https://www.centrocircular.pt/

BioGov.net
Governance & Upskilling for a **Stronger Bioeconomy**

Case Studies in Bioeconomy education, training and skills development

Case study sample: COpAPS – A Case Study in Social Agriculture

Emilia-Romagna (ITALY)

UNIBO

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#11: COpAPS – A Case Study in Social Agriculture

Abstract

COpAPS is an agricultural and social cooperative that integrates people in need.

In particular, it accompanies young people with mental disabilities and vulnerable people on their way to education, training, sheltered workshops, and employment inside and outside the company. Relationships are at the heart of COpAPS' work: it offers its beneficiaries personalised, tailor-made pathways to self-esteem and integration. The setting is an agricultural environment with an emphasis on sustainability.

Target Groups

People with disabilities and in need.

Case Study Category

Bioeconomy education, training and retraining and Inclusion of marginalised groups.

Training Provider

COpAPS.

Region

Emilia-Romagna (ITALY).

Language

Italian.

Objectives of the education Format

Improving the employability of disadvantaged groups.

Final objective of the education format

Employment and placement of young people with disabilities.

Scope and context of the education format

Inclusion of disadvantaged people through the management of educational services, of training and job transition paths, of sheltered workshops, and integrated orientation paths with secondary school.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies. Transversal competencies

Organizational and time management skills; communication skills; adaptive skills; teamwork; creativity.

European Qualification Framework level/s

Level 2. Level 3. Level 4.

Main benefit of the participant

Participating in social cooperative activities can have numerous benefits for individuals, including improved social support, skill development, sense of purpose, self-esteem, networking opportunities, social capital, and community engagement.

Importance and impact

The cooperative's main institutional stakeholders are undoubtedly the Emilia-Romagna Region, the metropolitan city of Bologna, the National Health Service, the Personal Services Companies, and private companies. On 31/12/2022 there were 97 employees in the cooperative, of which 25 are disadvantaged people.

Relevance (of the format)

The format corresponds to local needs and the current situation in the region.

COpAPS carries out the guided employment of disadvantaged people in different areas:

- in agriculture (organic agricultural and horticultural production, direct sale of the products themselves),
- in the agritourism restaurant and in the educational farm,
- in green maintenance,
- in the management of ecological environmental services,
- in the social carpentry workshop.

Data sources

Online resources: https://www.copaps.it/
Resource persons: Lorenzo Sandri (COpAPS), Stefano Argentero (COpAPS)

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: APTET

Slovakia, City of Levice

PEDAL

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#12: APTET

Abstract

The goal of Aptet is to ensure the integration of vulnerable groups of people (disabled or seniors) via individual and tailored support and their successful entry into the labour market. Those who fail to find work in the open labour market will continue to work for Aptet ISP.

Target Groups

Adults with disabilities, Mothers, Roma, Older adults, Youth (aged 15-24).

Case Study Category

Bioeconomy education, training and retraining and Inclusion of marginalised groups.

Training Provider

APTET.

Region

Slovakia, City of Levice.

Language

Slovak.

Objectives of the education Format

Improving the employability of disadvantaged groups.

Final objective of the education format

The mission of APTET is to facilitate people with disabilities into the labour market. Based on initial interview, the potential of each individual is assessed, and an individual development plan is prepared. The main objective of support provided by APTET is to enter open labour market. The organization can also provide employment to people who fail to find a job on the open labour market.

Scope and context of the education format

In general, APTET focuses on increasing readiness for entering the labour market - from changing mindset, motivation, creating basic habits, to developing soft skills, to developing specific technical skills. It is a long-term process, tailored to the specific needs of each individual. The support takes place through multiple pathways. An individual can get a job in a social enterprise, where part of the working time is dedicated to an agreed job description, and part is dedicated to the development of the employee according to his/her specific needs. If the individual is not ready for employment, he or she first receives support in the form of development of basic skills, habits and motivation. Development is provided within internal capacities (e.g., internal mentoring focused on mindset change, motivation, soft skills) as well as external sources (mentors as volunteers, focusing on specific technical skills).

Specific Skills and competencies addressed

Technical competences. Valorisation competences

Transversal skills, e.g., Communication, Teamwork, Problem-solving, Time management, Decision-making, Organizational, Stress management Adaptability, Conflict management, Creativity, Resourcefulness, etc. Technical skills: according to the needs of the individual.

European Qualification Framework level/s

EQF level 4, no certificate is issued, the skills/competences acquired, and the beneficiaries are able to apply, corresponds to this level.

Main benefit of the participant

The skills and competencies acquired complement the CV of an employee, increasing the chances to succeed on labour market.

Importance and impact

APTET provides support in different ways. To date, the organization or it's itself employs 6 people, with another 3 working in the Youth Internship and Volunteering project. Number of people worked with after Covid >50 in the framework of Counselling + Support Groups services. The number of participants who took part in the training/counselling > 700 (500 long-term unemployed from the Levice district took part in the National project - collaboration with local labour offices, where the team members acted as counsellors).

Relevance (of the format)

Individual and tailored approach to skills development of vulnerable people based on understanding their potential, as well as needs. Complex support, ensured via collaboration with different organizations, e.g., LEAF or Growni, through which expert volunteers are recruited. Creating opportunities for disabled people via establishing collaboration with regional and national actors (e.g., Profesia, the most popular job portal in Slovakia or regional industrial park - in preparation)

Data sources

Online resources: https://www.aptet.sk/
Resource persons: Stanislav Lorincz, APTET
Other sources, if any: https://www.adult-learning.eu/en/good-practices/integrational-social-enteprise/

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Vamvakies a social Green Project

West Macedonia, Greece

Q-PLAN

Funded by the European Union

info@biogov.net www.biogov.net

#13: Vamvakies a social Green Project

Abstract

The Vamvakies Social Green Project is designed by Enel Green Power and Wise Greece, in collaboration with CluBE and the Municipality of Kozani, a city in northern Greece, exclusively for the Prefecture of Kozani and the wider area, to support those interested in empowerment, entrepreneurship and careers in the food industry. The programme is based on two pillars: empowering a small group of women to work at the Enel Green Power photovoltaic park in Kozani, but also providing free training seminars to all Kozani residents to develop their skills.

Target Groups

The idea began with a small group of women in the photovoltaic park in Polymylos, Kozani, planting herbs in the free spaces of the park, but also under the panels, with the ultimate goal of creating the first series of agricultural products in Europe from a photovoltaic park!

At the same time, the women are supported by a team of advisors and trainers, with the aim of becoming micro-entrepreneurs, marketing these original products and earning a substantial income. Furthermore, Wise Greece organizes educational programs for all citizens of Kozani with the aim of empowering and supporting entrepreneurship. The seminars are held online once a month and are supported by a large team of experienced trainers who are next to the participants at whatever stage of their business journey they are.

Case Study Category

Bioeconomy education, training and retraining in Entrepreneurial Education.

Training Provider

Enel and Wise Greece, in collaboration with CluBE.

Region

West Macedonia, Greece.

Language

Greek.

Objectives of the education Format

Improving the employability of disadvantaged groups.

Final objective of the education format

The main objective of the education format is to empower and support entrepreneurship. Women get trained to work at the Enel Green Power and also to become micro-entrepreneurs generate a sustainable income.

Scope and context of the education format

The participants gain knowledge about the food industry. They also meet mentors and advisors who are able to help them in every professional step and they are trained on very important entrepreneurship topics such as business plan preparation, production and promotion of products, effective communication, development of a network of customers and partners, digital marketing and many more.

Specific Skills and competencies addressed

Transversal competencies.

European Qualification Framework level/s

Level 7.

Main benefit of the participant

The participants benefits are not only that gain new knowledge but also they have the opportunity to work with experts who will be able to help them in every professional step and trained them on topics such as business plan preparation, production and promotion of products, effective communication, and digital marketing.

Importance and impact

A small group of women is already in the photovoltaic park in Polymylos, Kozani, planting herbs in the free spaces of the park, but also under the panels, with the ultimate goal of creating the first series of agricultural products in Europe in from a photovoltaic park.

Relevance (of the format)

Since a lot of women (especially young mothers) in Greece are unemployed there is a great need of format like these in our region.

Data sources

Online resources: https://vamvakiesproject.com/
Resource persons: info@wisegreece.com
Other sources, if any:
https://clube.gr/vamvakies-a-social-green-project-i-idea-pou-egine-praksi/
https://www.wisegreece.com/oi-draseis-mas/ekpaideftika-programmata/vamvakies-a-social-green-project/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Blue City Circular Challenge

Netherlands

BTG

Funded by the European Union

info@biogov.net www.biogov.net

#14: Blue City Circular Challenge

Abstract

The Circular Challenges take place at BlueCity, located in a former 12,000m2 subtropical swimming oasis in Rotterdam (NL). BlueCity supports companies and organisations that are active in making their operations more circular. BlueCity is an international icon of the circular economy, a national platform for circular entrepreneurs, and a very visible local accelerator that empowers circular entrepreneurs and inspires citizens. The Circular Challenge is a format for applied training in the circular economy, combining sustainable business modelling with design.

Target Groups

Students and young professionals.

Case Study Category

Bioeconomy education, training and retraining in Entrepreneurial Education.

Training Provider

Blue City (Rotterdam).

Region

Netherlands.

Language

Dutch.

Objectives of the education Format

Entrepreneurship education.

Final objective of the education format

For the students: acquiring a variety of competencies, gain experience, etc.

For the companies: getting a design for a circular product, sparring with students and circular frontrunners, to put a transition into motion.

Scope and context of the education format

The Circular Challenges take place at BlueCity, located in a former 12,000 m2 subtropical swimming oasis in Rotterdam (NL). BlueCity supports companies and organisations that are active in making their operations more circular. BlueCity is an international icon of circular economy, a national platform for circular entrepreneurs, and a very visible local accelerator that empowers circular entrepreneurs and inspires citizens.

BlueCity is an incubator space in a former swimming pool, which caters for ‘innovative companies looking to exchange their residual materials’. Started in 2015 when the Tropicana building was bought by impact investor Wouter Veer, it focuses on waste and the concept of

outputs from one company forming inputs for another. BlueCity offers start-up entrepreneurs space and networks to develop their ideas. The space is known locally and used as an attraction for visitors and companies from all over the world, a circular biolab where prototyping and experimenting can take place, a provider of applied training in circular economy for students, an international resource sharing hub and an accelerator where entrepreneurs from the City and region can be connected to large companies and international businesses.

Specific Skills and competencies addressed

No exclusive focus on technical, valorisation or transversal competencies. The first category may be of the highest relevance. Aspects of various competencies came together in the involvement of students and young professionals.

European Qualification Framework level/s

A range of EQF levels (University of Applied Sciences or higher i.e., EQF 6 and higher).

Main benefit of the participant

A nice opportunity to gain experience, develop a network in the sustainability field and set up their own start-up company.

Importance and impact

Since the first edition in 2015, a dozen or so of Circular Challenges have been organised (several per year) and two are ongoing or to be started. To date, >50 companies participated and >50 product prototypes were developed.

Relevance (of the format)

The relevance of the format is very high, as it is based on very concrete, ”useless” waste streams (biogenic or otherwise) which are converted into prototypes of valuable circular products. In principle, it is straightforward to copy the format to other regions/settings.

Data sources

Online resources:
circularchallenge.nl
https://www.bluecity.nl/circular-challenge/
https://www.milieu-magazine.nl/wp-content/uploads/2022/06/Van-reststromen-naar-waardevol-producten.pdf
https://www.bluecity.nl/about-bluecity/

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Master's programme in 'Biology and Eco-innovation' at University of Tartu

Estonia

CE

Funded by
the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#15: Master's programme in 'Biology and Eco-innovation' at University of Tartu

Abstract

The curriculum gives students the ability to orient in problems related to global changes and to think eco-innovatively. It gives a comprehensive knowledge of the diversity of Estonian and European nature, and the functioning and protection of ecosystems. In addition, entrepreneurship is developed in solving ecological problems, acquiring the basics of an environmentally sustainable economy, entrepreneurship, and innovation.

Target Groups

This curriculum is aimed at students with a bachelor's degree in natural sciences to enable an education that incorporates socio-economic processes in general and entrepreneurship in particular. The curriculum is in Estonian. First requirement is bachelor's degree or equivalent level of education in a foreign country. Secondly, to apply for this master curricula, 36 ECTS from the UT's bachelor curricula of biology or substantially similar courses must be passed, which can also be acquired in several other universities in Estonia.

Case Study Category

Bioeconomy education, training and retraining in Entrepreneurial Education.

Training Provider

University of Tartu.

Region

Estonia.

Language

Estonian.

Objectives of the education Format

Re-qualification of professionals.

Final objective of the education format

The curriculum focuses on the functioning of the natural environment of Estonia and Europe and on the relationship between innovative enterprise and technology. Hence, it combines knowledge about nature on the one hand as well as society and the economy on the other. The purpose of the programme is "to educate innovatively thinking people, having good knowledge about nature and its functions. The students will learn to understand social and economic processes and challenges in the global change, and eventually will become the leaders of innovation, ecosystem-friendly economy and society in Estonia and Europe.

Scope and context of the education format

The programme trains for leading an enterprise or advising local governments, public-sector organisations, and academic institutions. In terms of entrepreneurship, intended learning outcomes include “responsibility and initiation as well as leadership and teamwork”. It has been pointed out that there is a greater need for graduates of physical natural sciences and biology in environmental management and protection. Combined study paths are appreciated by employers, but the structure of the study in the field does not encourage a change of major in master's studies. Therefore, this curriculum is one of the opportunities for students.

Specific Skills and competencies addressed

Technical competencies, Valorisation competencies, Transversal competencies

Main skills or competencies acquired from the programme: Advanced knowledge of biology, research skills, interdisciplinary thinking, sustainability, communication skills. In addition, entrepreneurship is developed in solving ecological problems, acquiring the basics of environmentally sustainable economy, entrepreneurship, and innovation. Also, transversal skills are included: problem solving, adaptability, collaboration, and communication.

European Qualification Framework level/s

Level 7.

Main benefit of the participant

Master's degree diploma after the successful thesis defence.

Importance and impact

The Institute has offered the study programme since 2019, which means that in summer 2023 the third cohort of graduates finishes the programme. Every year, up to 15 students join the programme. After graduation, the graduates have found jobs as specialists and experts in laboratories and governmental agencies, such as the Environmental Board, the Environmental Agency and local authorities, as well as in environmental assessment companies and NGOs, including the Estonian Nature Foundation. Some of the graduates have set up spin-off companies providing eco-innovative environmental services.

Relevance (of the format)

The format is relevant, as it targets people interested in bioeconomy. There aren't limitations for marginalised groups (unless they don't speak Estonian).

Data sources

Online resources:
https://ut.ee/et/oppekavad/bioloogia-ja-okoinnovatsioon
https://ois2.ut.ee/#/curricula/205725/details
Resource persons: Kersti Riibak, Programme Director

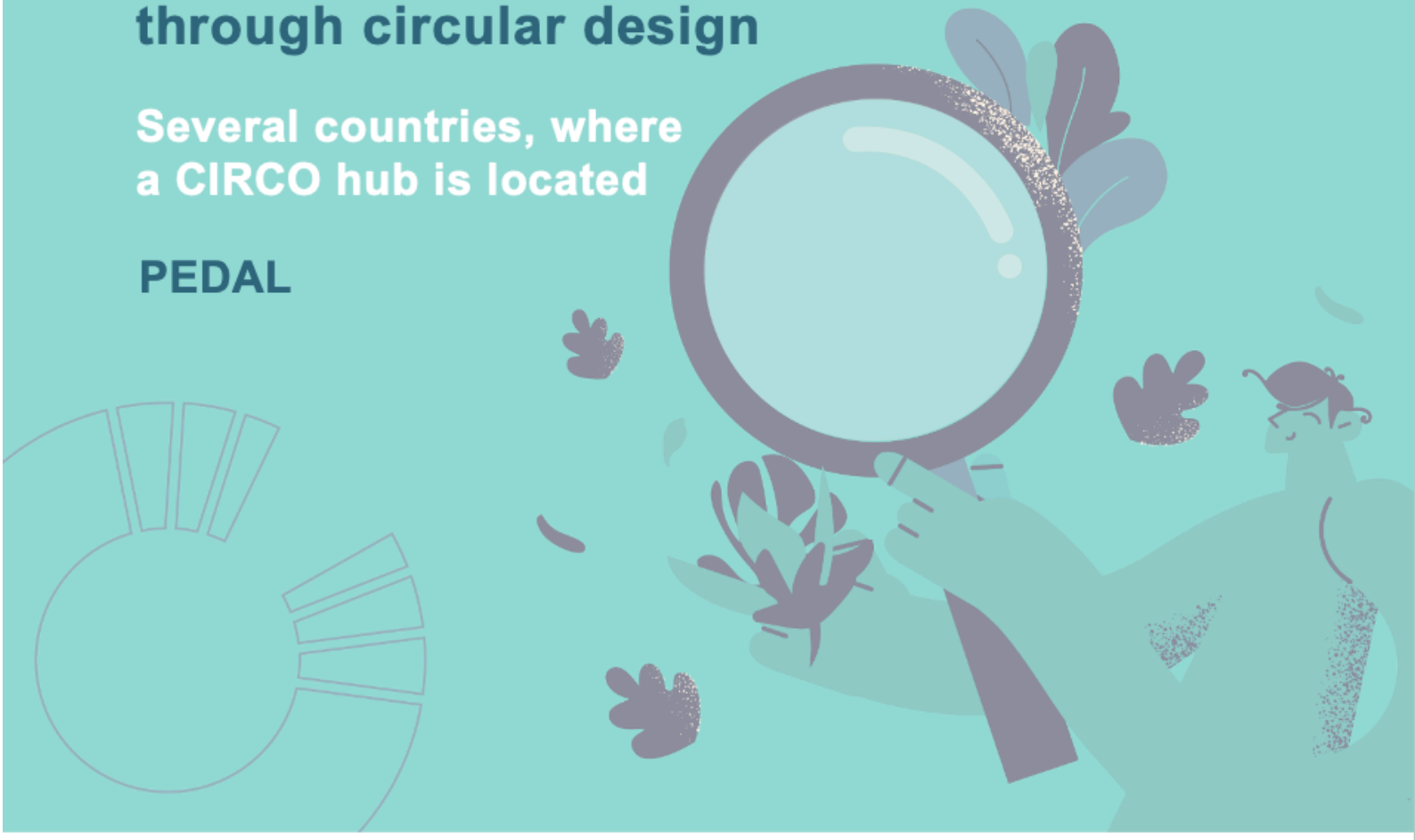
BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: CIRCO Training Programme - Creating business through circular design

Several countries, where a CIRCO hub is located

PEDAL



Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#16: CIRCO Training Programme - Creating business through circular design

Abstract

CIRCO is a programme developed by CLICKNL - a consortium for the creative industry - and supported by the Dutch Ministry of Infrastructure and Water Management.

With a unique and proven design thinking method, CIRCO helps companies to create circular business propositions in cooperation with their value chain.

The method consists of Circular Business Design Tracks for companies/entrepreneurs and Circular Design Classes for creative professionals.

Target Groups

The CIRCO method is applicable to both companies and design professionals. The training is particularly suitable for manufacturing companies that are developing or plan to develop a circular business (construction, plastics, consumer goods and manufacturing). Companies are invited to participate in a workshop Track that consists of three group sessions, whereas design professionals can follow a 1-day Class, allowing them to play their part in the circular transition as a circular change agent.

Case Study Category

Bioeconomy education, training and retraining in Entrepreneurial Education.

Training Provider

CIRCO hubs in different countries. Circular Slovakia as implementing partner in Slovakia and member of the consortium of 11 international CIRCOs hubs around the world brings CIRCO training.

Region

Several countries, where a CIRCO hub is located. More information here: https://www.circonl.nl/international/hub-network/

Language

Several languages.

Objectives of the education format

Entrepreneurship education

Final objective of the education format

CIRCO helps companies with creating circular business propositions in cooperation with their value chain.

Every company prepares an implementation roadmap to bring its circular proposition to the market. All material processed during the Track is documented in a Circular Business Canvas.

Scope and context of the education format

In the 3-day training, representatives of companies get acquainted with design tools and circular knowledge applicable in their daily work. Companies go through the following process:

1. Initiate: This part delves deeper into the (design) principles for the circular economy. The value destruction in the current linear chain is mapped out and the resulting circular business opportunities are identified and selected for each company.
2. Ideate: The most interesting circular proposition from the first part is elaborated on, using circular design strategies and business models. This results in a circular customer proposition with a business model, product (re)design and additional services.
3. Implement: Development of an implementation roadmap to bring its circular proposition to the market, defining what, when, with whom to realize the required changes. A Circular Business Canvas is prepared, after which participants conclude with a short pitch.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies

The CIRCO method is based on an academic framework of the Technical University of Delft. It is called ‘Products that last’ and it is written by C. Bakker & M. den Hollander, e.a. This framework explains five circular business models and six circular design strategies. CIRCO expanded this framework with tools and insights, so it is useful and relevant for businesses. Participants explore circular design and identify business opportunities. They also use circular design strategies to redesign their own propositions, products, services and business models. The participant's efforts result in a concrete implementation roadmap.

European Qualification Framework level/s

Level 5, Level 6 - no certificate is issued, the background required, and skills acquired correspond to the level.

Main benefit of the participant

The participant's efforts result in a concrete implementation roadmap. The peer interaction with other entrepreneurs, designers, and industry professionals, is highly valued and cooperation between companies is triggered almost every time.

Importance and impact

Since 2015, CIRCO has supported over 500 companies to create circular businesses and trained 400 designers to play their role as circular change agents. It has provided training for 1000+ participants, reached 220 000 people, and runs 32 Tracks per year. Research shows that 66% of participants have implemented their new circular plans.

Relevance (of the format)

The circular economy does not arise by itself. CIRCO activates – with support from the Dutch government – entrepreneurs and creative professionals to (re) design products, services and business models in order to subsequently do circular business.

Data sources

Online resources: https://www.circonl.nl/international/methodology/
Resource persons: contact in Slovakia: Denisa Rášová
Other sources, if any: https://circular-slovakia.sk/circo-trening/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Research project "Center for Sustainable and Circular Bioeconomy and Energy [Aegean_BIOECONOMY]"

North and South Aegean

Q-PLAN

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#17: Research project "Center for Sustainable and Circular Bioeconomy and Energy [Aegean_BIOECONOMY]"

Abstract

The project of the Department of Environment at the University of the Aegean aims to support the insular regions of the North and South Aegean in the transition from a linear to a circular bioeconomy model. The duration of the project is 30 months, and it is co-funded by the European Fund for Regional Development. The holistic approach of Aegean_BIOECONOMY combines the recovery and valorisation of biological resources, promotion of sustainability, and protection of the natural environment. It is organised into four (4) distinctive project activities, which will lead to the development of innovative services and platforms in the regions of interest in the North and South Aegean through the exchange of knowledge and experience, training, as well as interactive workshops and other events.

1. Bio_mass Sustainable production and management of biomass
2. Nature4water Sustainable water resources and soil management using nature-based solutions
3. RE_ Product Recycling of materials and production of new products
4. Hotel_ Footprinting Reduction of the environmental footprint in the tourism industry

At the same time, the project's activities will contribute to the development of new regional strategies in line with the requirements of the environmental legislation.

Target Groups

The project focus on groups of researchers, relevant stakeholders, scientists and experts in the following areas: Sustainable production and Biomass Management , reproduction| recycling of materials into new products, sustainable water resources management with nature\based solutions and Hotel footprinting - reduction of environmental footprint in the tourism sectors private sector - producers as well as consumers - end-users of innovative bioprocesses and/or bio-based products on the private sector.

Case Study Category

Bioeconomy education, training and retraining in Entrepreneurial Education.

Training Provider

Department of Environment at the University of the Aegean.

Region

North and South Aegean.

Language

Greek.

Objectives of the education Format

Complementing education for professionals.

Final objective of the education format

A particular objective of the project is the adoption of the EU Bioeconomy Strategy making sure it reflects the specific conditions of the island regions. This can lead to new jobs, contribution to achieving carbon neutrality, shift to the circular economy model, harnessing of healthy natural ecosystem as well as modernisation and strengthening of the industry.

Scope and context of the education format

The support of Sustainable and Circular Bioeconomy in the insular regions of North and South Aegean through: knowledge and specialization of scientists, the development of new technologies, the interdisciplinary education and training, the national and international networks of the University of the Aegean and the new regional planning aligned with the environmental legislation.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies. Transversal competencies

The project provides new job opportunities as well as training in new technologies.

European Qualification Framework level/s

Level 7.

Main benefit of the participant

The transition to a circular bioeconomy will be further reinforced through the development and uptake of innovative technologies as well as the training of scientists and researchers through the collaborative ecosystem at the national and international levels.

Importance and impact

With more than 20 partners and 8 laboratories participated, a lot of interesting events based on that project. Some of them are the Aegean BIOECONOMY Open Day event or Circular economy and green transition in Aegean region.

Relevance (of the format)

The format is highly relevant, as it is targets bioeconomy stakeholders and addresses a range of EQF-levels.

Data sources

Online resources: https://bioeconomy.aegean.gr/en
Resource persons: bioeconomy@aegean.gr

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: FOEBE- FOSTERING ENTREPRENEURSHIP FOR THE BIOECONOMY

AT, DE, FI, FR, IT, NL, PL

UNIBO

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#18: FOEBE - Fostering Entrepreneurship for the Bioeconomy

Abstract

FOEBE's overarching objective is to equip bioeconomy students at Master's and PhD levels with tailor-made sustainable entrepreneurship skills. Its general approach revolves around a blended learning format combining e-learning and face-to-face sessions, emphasising innovative pedagogical practices. Project activities include the design of skills portfolios and curricula for entrepreneurship in the bioeconomy, defining innovative teaching practices, and implementing a digital learning platform to support the development of courses and training materials, building on the partners' expertise.

Target Groups

Master's and Ph.D. students.

Case Study Category

Bioeconomy education, training and retraining in Entrepreneurial Education.

Training Provider

AgroParicTech (FR).

Region

Austria, Germany, Finland, France, Italy, Netherlands, Poland.

Language

English.

Objectives of the education Format

Entrepreneurship education.

Final objective of the education format

FOEBE is expected to leverage the potential of graduate students to innovate and foster the transfer of their ideas to the market.

Scope and context of the education format

FOEBE is funded by the Erasmus+ Program of the EU. FOEBE aims to tackle the skills mismatch in entrepreneurship training and become a game-changer for Europe's bioeconomy education. The general approach of FOEBE revolves around a blended learning format combining e-learning and face-to-face sessions, emphasizing innovative pedagogical practices.

Specific Skills and competencies addressed

Valorisation competencies. Transversal competencies

FOEBE is expected to equip bioeconomy students at Master's and Ph.D. levels with tailor-made sustainable entrepreneurship skills.

European Qualification Framework level/s

Level 7. Level 8.

Main benefit of the participant

Certificate of achievement that can be used to enhance the CV and the Diploma Supplement.

Importance and impact

By contributing a flexible and optimal approach to bioeconomy entrepreneurship training, FOEBE is expected to leverage the potential of graduate students to innovate and foster the transfer of their ideas to the market. At this date, 70 students and 15 teachers are trained.

Relevance (of the format)

In the long run, developing entrepreneurship in the bioeconomy is especially relevant since it is an emerging sector involving cutting-edge science and technology paradigms.

Data sources

Online resources: https://european-bioeconomy-university.eu/education/foebe-fostering-entrepreneurship-for-the-bioeconomy/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Learning Network Biobuilders (Lerend Netwerk Biobouwers)

Provinces of Noord-Brabant and Zeeland in the Netherlands; Region of East Flanders in Belgium

AVANS

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#19: Learning Network Biobuilders (Lerend Netwerk Biobouwers)

Abstract

Lerend Netwerk Biobouwers is committed to the development of an innovative, practice-oriented teaching method for the construction sector. It focuses on wood and biocomposites as examples of biocircular materials and focuses on ecological systems thinking and "21st-century skills" such as problem-solving, leadership and multidisciplinary collaboration. Five Flemish and Dutch partners, together with many stakeholders from the construction sector, worked on this future-proof, innovative teaching method until the end of 2022 as part of an Interreg Vlaanderen-Nederland project. To this end, gaps between supply and demand are being mapped out and cross-border pilots are set up in which new methods are tested. Both bachelor students and professionals will participate in the pilots. The intended result is a roadmap along which relevant study programmes can further develop their existing curricula.

Target Groups

Professionals in the construction sector (focus on middle management positions); bachelor students universities of applied sciences.

Case Study Category

Bioeconomy education, training and retraining in Higher Education (HE).

Training Provider

Avans University of Applied Sciences; HZ University of Applied Sciences; Ghent University of Applied Sciences; Ghent University; Bouwmensen.

Region

Provinces of Noord-Brabant and Zeeland in the Netherlands; Region of East Flanders in Belgium.

Language

Dutch.

Objectives of the education Format

Other – Combination of entrepreneurship education for students and complementing education for professionals.

Final objective of the education format

The intended result is a roadmap along which relevant study programs can further develop their existing curricula.

Scope and context of the education format

The Biobouwers project was a project executed as part of the Interreg Netherlands-Flanders program. The project focussed on direct collaboration between current employees of the

construction industry and employees of the future (e.g. students). In the project Universities, Universities of applied sciences, and representatives from construction industry were involved. The project focused on biobased construction and the transition to biobased construction.

The project consisted of three parts: First of all, it was investigated what knowledge was lacking in the construction sector about biobased materials and what is not yet reflected in the current curriculums the university of applied science partners involved. Based on this accumulated knowledge, the consortium has developed a set-up for teaching materials, including learning objectives and core competencies, which were tested in pilots. The pilots were then evaluated to see if the intended goals of the lesson material had been achieved, which was the final phase in the project.

Specific Skills and competences addressed

Technical competences: Within the biobouwers approach, both technical and business economic skills are combined, with the construction sector as central topic.

Transversal competences: problem-solving, teamwork, verbal & non-verbal communication, learning and working online & offline, connecting and collaborating effectively online & offline.

European Qualification Framework level/s

Level 6.

Main benefit of the participant

The project was a pilot and therefore it did not result in a certificate. The aim is to further develop the outcomes of the pilot which could potentially result in educational modules that will result in a certificate for participants. (but this is not the case just yet) One of the recommendations of the roadmap is to look into the possibility of working with microcredentials (especially in relation to Lifelong Learning).

Importance and impact

235 bachelor students (divided over 3 pilots); 54 SMEs and industry partners.

Relevance (of the format)

The pilot corresponds to a need from the construction industry as well as educational institutes to ensure that students and employees have more and quicker insight in the developments regarding biobased construction and can more easily implement those developments into their work. Not only technical know-how, but also the development of certain transversal skills is required. The pilot has explored the potential of combining those elements by testing modules in which students and professionals work together.

Data sources

Online resources: https://www.coebbe.nl/en/projecten/lerend-netwerk-biobouwers/
Resource persons: Bas Koebrugge (Avans)
Other sources:
https://www.grensregio.eu/projecten/lerend-netwerk-biobouwers
https://www.grensregio.eu/blog/2022/biobased-bouwen

https://publicaties.avans.nl/lerend-netwerk-biobouwers1/home-lerend-netwerk-biobouwers

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Bioeconomy certificate course

Germany

BSS

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#20: Bioeconomy certificate course – Bioeconomy and sustainability: A practical introduction to the basics

Abstract

The certificate course in six modules gives the participants a practical introduction to the basics of the bioeconomy and the challenges and opportunities associated with its implementation. Companies can book the entire course or individual modules for their employees.

Target Groups

Entrepreneurship education, complementing education for professionals, re-qualification of professionals.

People who deal with bioeconomic issues in companies or authorities, e.g. executives, sustainability managers, site/facility operators.

Case Study Category

Bioeconomy education, training and retraining in Higher Education (HE).

Training Provider

Springer Nature.

Region

Germany.

Language

German.

Objectives of the education Format

Re-qualification of professionals.

Final objective of the education format

Practical introduction to the basics of the bioeconomy and the challenges and opportunities associated with its implementation.

Scope and context of the education format

Companies can book this course for their employees.

In order for a company to be able to operate sustainably at all levels, it is important to sensitize their own employees to this.

Blended learning course in 6 modules: self-study and online seminars, targeted at People who deal with bioeconomic issues in companies or authorities.

Module 1 - basics and starting points

Module 2 - Biomass as a cornerstone of sustainable bioeconomy

Module 3 - value chains and innovation potential

Module 4 - Sustainability and ecological assessment

Module 5 - corporate strategy

Module 6 - practice module biomass conversion.

Specific Skills and competences addressed

Valorisation competencies. Transversal competencies.

European Qualification Framework level/s

Level 5. Level 6. Level 7. Level 8.

Main benefit of the participant

At the end of the course, the participants will receive a Springer participation certificate.

Data sources

Online resources: https://www.springer.com/de/springer-campus/zertifikatskurse/biooekonomie

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Blue Bioeconomy Collaborative Laboratory (B2E CoLAB)

North region of Portugal

LOBA

Funded by the European Union

info@biogov.net www.biogov.net

#21: Blue Bioeconomy Collaborative Laboratory (B2E CoLAB)

Abstract

B2E CoLAB works daily to establish the most valuable synergies between academia and industry, and to promote the economic and social value of those sectors by developing added-value bio-based products and services inspired by the ocean and internationalisation processes of national scientific and technological capacity and knowledge.

Target Groups

Academia, Non-Profit Organizations, Industry, Policy Institutions, HE institutions.

Case Study Category

Bioeconomy education, training and retraining in Higher Education.

Training Provider

B2E CoLAB.

Region

North region of Portugal.

Language

Portuguese and English.

Objectives of the education Format

Other - valuable synergies between Academia and Industry (research, education, innovation and business).

Final objective of the education format

Shape a new blue bioeconomy and establish valuable synergies.

Scope and context of the education format

B2E CoLAB is a private non-profit association operating full speed since 2020, focused on helping to shape a new blue bioeconomy, by bringing together research, education, innovation and business – for a better and more sustainable world. The creation of the CoLABs resulted from an initiative by the Ministry of Science, Technology and Higher Education with the aim of implementing research and innovation agendas, with the creation of economic and social value. Their objective is to Galvanise and support the three main sectors of the blue bioeconomy and with the greatest potential: Natural Marine Resources, Marine Biotechnology and Sustainable Aquaculture.

Specific Skills and competencies addressed

Technical competencies. Transversal competencies.

Scientific and technological capacity, knowledge of blue bioeconomy

European Qualification Framework level/s

A broad range of EQF levels is addressed.

Main benefit of the participant

Valuable synergies between Academia and Industry that represent valuable opportunities.

Importance and impact

B2E coLAB is important because it promotes innovation, reduces costs, increases efficiency, opens up new business opportunities and helps attract and retain talent. B2E coLAB has several undergoing projects and associates.

Relevance (of the format)

One of the main objectives of B2E coLAB is to promote the creation of highly skilled jobs that can actively contribute to enhancing the economic and social value of new and existing ocean-inspired bio-based products and services, supporting blue growth sectors with the highest potential. By doing so it will be possible to shape a new blue bioeconomy leveraged by 4.0 automation and data exchange technologies.

Data sources

Online resources: https://b2e.pt/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: CO3 Campus

Southwest- Netherlands, Zeeland, East and West Flanders Belgium

AVANS

Funded by the European Union

info@biogov.net www.biogov.net

#22: CO3 Campus

Abstract

CO3 Campus is a networking centre for the sustainable economy and innovation in the technology sector.

It boasts a sustainable building with an exemplary function in the region. Demo facilities include:

- Water purification system
- Suntrackers
- Circular coffee area
- Circular biobased offices/meeting rooms
- Energy neutrality/energy transition

They facilitate events, training, workshops and meetings.

Target Groups

All organisations, companies and networks in the North Sea Port region: Zeeland, West Brabant, Oost Vlaanderen, Westvlaanderen.

Case Study Category

Bioeconomy education, training and retraining in Vocational Education and Training (VET).

Training Provider

CO3 Campus (with help from Competence Development Center / Scalda)

Region

Southwest- Netherlands, Zeeland, East and West Flanders Belgium.

Language

Dutch and English.

Objectives of the education Format

Complementing education for professionals.

Final objective of the education format

Training and re-training the (biobased) process operator.

Scope and context of the education format

- CO3 Campus developed simulation software for the (bio) process industry. The vocational school in the area makes use of our software while educating the (bio) process operators of the future. Other companies use our software as a guidebook to look up some theory or use it as a refresher course.
- The campus facilitates trainings for the Maintenance and Process Industry in the area. We train approximately 6000 employees in the region per year for their

Compliance trainings. None-technical trainings and soft skills trainings are also facilitated.

Specific Skills and competences addressed

Technical competences. Transversal competences.

The study centre is where you can find digital study materials, exams, and process simulation.

The tools are aimed to further develop competences for (future) operators and technicians.

The study materials are useful for both students and more experienced employees in bio-based- and petrochemical companies, as well as the food industry.

All tools are currently available in English and Dutch.

- Separation technologies like; distillation, extraction, drying, washing, absorption
- Fermentation, biochemistry, celbiology, bioprocess
- Heat exchange
- Simulation software
- And others.

European Qualification Framework level/s

Level 4.

Main benefit of the participant

Certificates that are essential to be able to do the work as operator or other jobs in the chemical industry; communication skills, and other relevant skills.

Importance and impact

+- 50 people per year since 2013 with our software and the Scalda opleiding procestechniek.

The Competence Development Centre has trained up to 6000 people per year since 2013 for compliance trainings in the Maintenance and process industry.

Relevance (of the format)

The region has a strong focus on the chemical industry. The region ranges from Terneuzen to Gent and all major companies in the area are connected to the CO3 Campus for their educational activities.

Data sources

Online resources: CO3campus.nl / studiecentrum.bbetc.org
Resource persons: Alexander Lie Kwie, Jean-Paul Leenknegt

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Boosting Bioeconomy Knowledge in Schools

Online

BSS

Funded by
the European Union

info@biogov.net www.biogov.net

#23: Boosting Bioeconomy Knowledge in Schools (BLOOM)

Abstract

This MOOC aims to bridge the gap in education by giving teachers a fresh perspective on the bioeconomy field and its applications in teaching STEM subjects. The course will do so by presenting the BLOOM School Box, a series of lesson plans co-created by twenty pilot teachers in ten European countries, which illustrate how bioeconomy can be introduced in different STEM subjects.

Target Groups

Complementing education for teachers, professionals, re-qualification of professionals.

Case Study Category

Bioeconomy education, training and retraining in Vocational Education and Training (VET).

Training Provider

European School Net.

Region

Online.

Language

English.

Objectives of the education Format

Re-qualification of professionals.

Final objective of the education format

Bridge the gap in education by giving teachers a fresh perspective on the bioeconomy field and its applications in teaching STEM subjects.

Scope and context of the education format

Needs 2-3 hours per week. Presentation of the BLOOM School Box, a series of lesson plans co-created by 20 pilot teachers in 10 European countries, which illustrate how bioeconomy can be introduced in different STEM subjects.

Course participants will learn about bioeconomy in (STEM) education by making use of the various educational tools and lesson plans.

Learning objectives: Understand what bioeconomy is, its importance for society and for students, and its implications for education.

- Explore the BLOOM School Box and learn how they can use it in their teaching.
- Learn how to use bioeconomy in educational contexts.

- Know what the BLOOM project is, how it can help teachers innovate their classroom practices.

Modules:

- Module 1: Bioeconomy in our lives
- Module 2: The BLOOM School Box: bioeconomy in the classroom
- Module 3: Teaching with bioeconomy
- Module 4: Your bioeconomy learning scenario

Specific Skills and competences addressed

Valorisation competencies.

European Qualification Framework level/s

Level 3.

Main benefit of the participant

Participants will receive a digital course badge and a course certificate upon completion of the full course.

Importance and impact

The BLOOM MOOC gathered over 800 teachers from 46 countries participating, impacting on almost 10,000 students.

Relevance (of the format)

Bioeconomy covers a broad range of sectors, from agriculture and the agrifood industry, to fisheries, forestry, bio refineries, chemistry, and (bio) energy – but despite its many applications, it has yet to enter the public consciousness as an exciting solution to today's societal challenges. Teachers can contribute to raising awareness about bioeconomy in future generations.

Data sources

Online resources: https://www.europeanschoolnetacademy.eu/courses/course-v1:BLOOM+BoostBioec+2019/about

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Bioeconomy, innovation and achieving climate neutrality in the rural economy

Estonia

CE

Funded by
the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#24: Bioeconomy, innovation and achieving climate neutrality in the rural economy

Abstract

The training prepares the advisors to provide practical solutions to those involved in the rural economy on issues related to the different areas of bioeconomy and circular economy, innovation and achieving climate neutrality.

Target Groups

Consultants and advisors involved in the rural economy, wishing to develop the competencies required by the professional standard at levels 5, 6, and 7 and suitable for all specialisations.

Case Study Category

Bioeconomy education, training and retraining in Vocational Education and Training (VET).

Training Provider

Estonian University of Life Sciences.

Region

Estonia.

Language

Estonian.

Objectives of the education Format

Complementing education for professionals. Developing the competences required by the professional standard.

Final objective of the education format

The objective is to prepare the advisor to provide practical solutions to those involved in the rural economy on issues related to the different areas of bioeconomy and circular economy, innovation and achieving climate neutrality.

Scope and context of the education format

The training consists of three modules: bioeconomy and circular economy, innovation management, achieving climate neutrality in the rural economy. First two modules include visiting enterprises, and they include individual, and group works.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies

The skills and competencies acquired are primarily technical and valorisation in nature, focusing on knowledge and application of specific concepts and principles in the bioeconomy, circular economy, innovation management, and sustainable development. For example:

ability to identify and manage innovation capacity in enterprises; familiarity with different investment opportunities related to innovation in the bioeconomy; knowledge of climate objectives; carbon footprint assessment.

European Qualification Framework level/s

Level 5. Level 6. Level 7.

Main benefit of the participant

Certificate.

Importance and impact

The maximum number of participants is 20, the course is happening about twice a year.

Relevance (of the format)

The training corresponds to the local needs, as there aren't any trainings targeted especially to this target group (consultants, advisors). There are some limitations: participation in the training for natural persons and civil servants is not eligible. Also, as the training is in Estonian, that can also be a limiting factor.

Data sources

Online resources:
https://www.emu.ee/et/ylikoolist/uudised/sundmused/kalender/2023-02-08/biomajandus-innovatsioon-ja-kliimaneutraalsuse-saavutamine-maamajanduses/
https://ois.emu.ee/pls/ois/!tere.tulemast?leht=OK.AY.VP&id_ay_programm=14243&id_ay_toimumine=20145&systeemi_seaded=3,1,12,1,
Resource persons: Kristina Marran, coordinator

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Higher technical Institutes (ITS)

All Italian regions

UNIBO

Funded by
the European Union

info@biogov.net www.biogov.net

#25: Higher technical Institutes (ITS)

Abstract

The Higher Technical Institutes are new schools with a high technological specialisation that create two-year post-diploma courses as an alternative to the university to train higher technicians able to enter the strategic sectors of the economic-productive system and to bring highly specialised and innovative capacity. 40% of the total number of course hours are dedicated to internships in companies.

Seven foundations, six areas, and forty-two courses only in the Emilia Romagna Region, with many more all over Italy.

Target Groups

High school post-diploma students.

Case Study Category

Bioeconomy education, training and retraining in Vocational Education and Training (VET).

Training Provider

ITS foundations, ITS Academy.

Region

All Italian regions.

Language

Italian.

Objectives of the education Format

Complementing education for professionals.

Final objective of the education format

ITS courses are created in collaboration with companies, universities, research centres and local bodies to develop new skills in technological areas considered strategic for the country's economic development and competitiveness.

Scope and context of the education format

The I.T.S. constitute the non-university tertiary training segment that responds to the demand of companies for new and advanced technical and technological skills to promote innovation processes. The courses are usually divided into 4 semesters (1,800/2,000 hours) and can last up to 6 semesters.

The courses are structured by skills rather than by subjects. Competence is the ability to put what you know to good use to achieve something. Learning-by-doing, project work, problem solving, design thinking are just some of the teaching approaches most used by ITS.

At least 50% of lecturers are industry professionals made available by companies that collaborate with ITS: they bring the skills and technologies they use every day in their work to the classroom.

Specific Skills and competencies addressed

Technical competencies. Valorisation competencies. Transversal competencies

The ITS courses are divided into 6 areas defined at national level, considered strategic for the development of our country:

- Energy efficiency
- Sustainable mobility
- New technologies of life
- New technologies for Made in Italy
- Innovative technologies for cultural assets and activities – Tourism
- Information and communication technologies

European Qualification Framework level/s

Level 5.

Main benefit of the participant

At the end of the course, the Diploma of Higher Technician is obtained with the certification of the skills corresponding to the V level of the European Qualifications Framework - EQF.

To facilitate circulation at national and European level, the qualification is accompanied by the EUROPASS diploma supplement. The diplomas are issued by the reference institution of the I.T.S. based on a national model.

Importance and impact

Enrolled in active courses: 19,137

Partners: 3,260 of which companies 1,330, of which Business associations 146.

Relevance (of the format)

ITS courses are created in collaboration with companies, universities, research centres and local bodies to develop new skills in technological areas considered strategic for the country's economic development and competitiveness.

Data sources

Online resources: https://www.miur.gov.it/percorsi-its; https://www.indire.it/progetto/its-istituti-tecnici-superiori/numeri-its/

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Sustainable Design

Cologne, Germany

BSS

Funded by
the European Union

info@biogov.net www.biogov.net

#26: Sustainable Design

Abstract

As part of the Sustainable Design course, designers are trained to create in a meaningful and aesthetic way by placing design in an interdisciplinary context with the ecological, social, cultural and economic challenges of the globalised world.

Graduates are equipped with a unique selling point through the focus on sustainable design.

Target Groups

Entrepreneurship education, complementing education for professionals.

Case Study Category

Injecting the bioeconomy in design, art, architecture, etc. professions.

Training Provider

ecosign – Academy for design.

Region

Cologne, Germany.

Language

German.

Objectives of the education Format

Entrepreneurship education.

Final objective of the education format

Diploma or Bachelor of Fine Arts + Master of Fine Arts.

Scope and context of the education format

The ecosign/Academy for Design combines design and sustainability throughout the course - both in the Bachelor's course in Sustainable Design (BA) and in the Master's course in Sustainable Design (M.A.). At ecosign students will study the creative, technical and aesthetic skills that designers need. Expressions such as ecodesign, sustainability and sustainable design are formative elements of the course. The design is course individually tailored to personal wishes and career planning and offer specialisations in communication design, product design, illustration or photo design.

Goal: With the degree, graduates have the opportunity to work in the following areas: design offices, advertising agencies, Freelance work as a communication or product designer, publishers, Interface between sustainability and design in scientific institutes, Management positions in the field of design management.

Specific Skills and competences addressed

Technical competences. Transversal competences.

Subjects: communication design, product design, illustration, photo design, sustainability and design, General studies (philosophy, psychology, cultural studies, ethics...), Design and Art Theory, Business Administration/Marketing, Technical English for designers, Various electives (e.g., computer courses, film design, rhetoric, model making, drawing...)

European Qualification Framework level/s

Level 6. Level 7. Level 8.

Main benefit of the participant

Higher Education Degree (Bachelor's and Master's degree possible).

Importance and impact

Maximum of 120 new students per year, but approximately 400 applicants. The academy already exists for 25 years (so approximately 3000 graduates)

Relevance (of the format)

The design course at ecosign includes the ecological, economic, social and cultural challenges of our time in the training of tomorrow's designers.

As part of the "Sustainable Design" course, designers are trained to create in a meaningful and aesthetic way by placing design in an interdisciplinary context with the ecological, social, cultural and economic challenges of our globalized world.

Graduates receive a unique selling point through the focus on sustainable design.

Data sources

Online resources: https://www.ecosign.de/de/

BioGov.net
Governance & Upskilling for a Stronger Bioeconomy

Case Studies in Bioeconomy education, training and skills development

Case study sample: Sustainable Art Prize

Italy, but the prize is open to international participants

FVA

Funded by the European Union

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

info@biogov.net www.biogov.net

#27: Sustainable Art Prize

Abstract

In 2022, the Ca' Foscari University of Venice in collaboration with Artverona announced the fifth edition of the Sustainable Art Prize, dedicated to an artist or a collective of artists working on sustainability issues and, using artistic language, actively disseminating issues related to major global challenges, in line with the 17 objectives of the 2030 Agenda for Sustainable Development promoted by the UN.

In the 2022 edition, the Prize saw the collaboration and involvement of other Venetian universities: the IUAV University of Venice, the University of Padua and the University of Verona.

The Universities joined the jury and collaborated in the realisation of the project of the winning artist with the participation of female and male students.

Target Groups

Art students, Artists, Professors, Associates.

Case Study Category

Injecting the bioeconomy in design, art, architecture, etc. professions.

Training Provider

Ca' Foscari University of Venice in collaboration with ArtVerona. The winning artist will realise an artistic project in collaboration with Ca' Foscari, Iuav University of Venice, University of Padua and University of Verona.

Region

Italy, but open to international participants.

Language

Italian, English.

Objectives of the education Format

Other – Award good practices in sustainability communication.

Final objective of the education format

The Sustainable Art Prize wants to encourage students and professionals to actively disseminate issues related to major global challenges, by using creativity and artistic language and by presenting them in an innovative way, including emotional investment. The Sustainable Art Prize wants also to promote dialogue between art and research, giving artists the unique opportunity of working in a new environment collaborating with the university communities.

Scope and context of the education format

This Award focuses on the development of contents and visions related to one or more of the 17 Sustainable Development Goals of the Agenda 2030.

The prize entails the construction of an installation, an exhibition or a performance which relates to sustainability, to be hosted at Ca' Foscari University of Venice in autumn 2023. The construction of the project will involve students from the aforementioned four universities, while the artists will work in a new environment collaborating with the university communities - a unique opportunity for dialogue between art and research. The winner obtains a budget of € 5,000.00 for the completion of his project.

The prize falls within the projects of Art&Sustainability of Ca' Foscari and shows the commitment of Ca' Foscari towards sustainable development issues by presenting them in a new innovative way, including emotional investment that characterizes art.

Specific Skills and competencies addressed

Technical competencies in art: creativity, storytelling, knowledge of art materials, proportions, colour theory, composition etc.

Transversal competencies: Communication, innovative mind development, critical thinking and problem solving, both individual and teamwork (collaboration).

Valorisation competencies: information literacy, social and cross-cultural skills, personal training and career development.

European Qualification Framework level/s

Level 6. Level 7.

Main benefit of the participant

Be awarded and receive a budget of € 5,000.00 for the completion of the project/installation/performance and exhibit at Ca' Foscari University of Venice in autumn 2023.

Importance and impact

The Sustainable Art Prize has been launched in 2022 for its fifth edition. Number of participants for each edition is unknown.

Relevance (of the format)

The format is highly relevant, as it targets and put in contact both students and professionals, encouraging them to collaborate and injecting in their education or professions issues related to major global challenges. There is no particular focus on bioeconomy, but more generally on sustainability.

Data sources

Online resources: https://www.unive.it/pag/29219/
Resource persons: anna.bonfante@unive.it
Other sources, if any: https://www.unive.it/pag/18359/

9 References

Allthings.Bio (n/a). Art and gaming make bioeconomy fun. Allthings.Bio. Accessed on April 2, 2023. Available at: https://www.allthings.bio/art-and-gaming-make-bioeconomy-fun/

BIObec (n/a). BIObec. Accessed on April 3, 2023. Available at: https://biobec.eu/

BIObec (2022). D1.2 - Best practice cases for Bio-based education Centres. BIObec. Available at: https://biobec.eu/wp-content/uploads/2022/04/Report-on-best-practices-of-bio-based-education-Centres.pdf

BIOEAST, (December 5, 2022). *BioEast TWG on Bioeconomy Education.* BIOEAST. Accessed on April 2, 2023. Available at: https://bioeast.eu/education-2/

BIOEAST.Up (2021). Deliverable 1.4: BIOECONOMY INSTITUTIONAL PROFILES - COMPARATIVE ANALYSIS, BENCHMARKING AND POLICY RECOMMENDATIONS. BIOEAST. Available at: https://bioeast.eu/download/d_1_4-instit_analysis_v5_final-pdf/

British Ecological Society (n/a). Citizen Science Hub. Available at: https://www.britishecologicalsociety.org/learning-and-resources/engaging-the-public/citizen-science-hub/

Dingo, H. a) (April 10, 2023). *SCC Expo to showcase student and community partner projects April 27.* Pennsylvania State University. Available at: https://www.psu.edu/news/sustainability-institute/story/scc-expo-showcase-student-and-community-partner-projects-april-27/

Dingo, H. b) (April 12, 2023). *Local Climate Action Program connects students with local governments.* Pennsylvania State University. Available at: https://www.psu.edu/news/sustainability-institute/story/local-climate-action-program-connects-students-local-governments/

European Commission a), Directorate-General for Research and Innovation, Graaf, I., Papadimitriou, A., Peijl, S., et al., (2022). *Promoting education, training & skills in the bioeconomy: final report*, Publications Office of the European Union, https://data.europa.eu/doi/10.2777/367

European Commission b), Directorate-General for Research and Innovation, 2022. *European bioeconomy policy: stocktaking and future developments : report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*, Publications Office of the European Union, https://data.europa.eu/doi/10.2777/997651

European Commission, Directorate-General for Research and Innovation (2013). *A bioeconomy strategy for Europe: working with nature for a more sustainable way of living*, Publications Office, 2013, https://data.europa.eu/doi/10.2777/17708

Genspace (n/a). About Genspace. Available at: https://www.genspace.org/mission

Haarich, S., Kirchmayr-Novak, S., Bioeconomy strategy development in EU regions, Sanchez Lopez, J., Borzacchiello, M.T. and Avraamides, M. editors, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-49341-9, doi:10.2760/065902, JRC128740.

JLM IMPACT (2022). *Community Power: The challenge of providing access to electricity from renewable sources, in light of the growing usage of electric vehicles*. JLM IMPACT. Available at: https://jlmimpact.org.il/community_power_english/

Marr, B. (January 21, 2022). *The 2 Biggest Future Trends In Education.* Forbes. Accessed on Available April 2, 2023). Available at: https://www.forbes.com/sites/bernardmarr/2022/01/21/the-2-biggest-future-trends-in-education/?sh=2e77853c2d6f

Ministry of Environment of the Czech republic (November 2021). STRATEGICKÝ RÁMEC
CIRKULÁRNÍ EKONOMIKY ČESKÉ REPUBLIKY 2040: „MAXIMÁLNĚ CIRKULÁRNÍ ČESKO V ROCE 2040“. Available at: https://www.mzp.cz/C1257458002F0DC7/cz/cirkularni_cesko/$FILE/OODP-Cirkularni_Cesko_2040_web-20220201.pdf

Ministry of Environment of the Czech republic, 2017. Strategický rámec Česká republika 2030. Available at: https://www.mzp.cz/C1257458002F0DC7/cz/ceska_republika_2030/$FILE/OUR_Strategicky_ramec_20181015.pdf.002.002.pdf

Ministry of Transport in the Transport Policy Czech Republic, 2020. *The National Energy and Climate Plan of the Czech Republic. Available at: https://www.climate-laws.org/documents/national-energy-and-climate-plan_cdd7*

Nadace VIA (n/a). COMMUNITY ALPHABET. Nadace VIA. Available at: https://www.nadacevia.cz/our-programs/community-alphabet/?lang=en

National Academies of Sciences, Engineering, and Medicine, 2020. *Safeguarding the Bioeconomy*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25525

OECD (2022), *Trends Shaping Education 2022*, OECD Publishing, Paris, https://doi.org/10.1787/6ae8771a-en.

Paris, B.; Michas, D.; Balafoutis, A.T.; Nibbi, L.; Skvaril, J.; Li, H.; Pimentel, D.; da Silva, C.; Athanasopoulou, E.; Petropoulos, D.; Apostolopoulos, (2023) Review of the Current Practices of Bioeconomy Education and Training in the EU. *Sustainability*. *15*, 954. https://doi.org/10.3390/su15020954

Salvador, R.; Barros, M.;Donner, M.; Brito, P.; Francisco, A.; Halog, A. (2022). How to advance regional circular bioeconomy systems? Identifying barriers, challenges, drivers, and opportunities. Sustainable Production and Consumption. 32. 10.1016/j.spc.2022.04.025.

Sirovátka, T., & Spies, H. (Eds.). (2017). Effective Interventions for Unemployed Young People in Europe: Social Innovation or Paradigm Shift? (1st ed.). Routledge. https://doi.org/10.4324/9781315279138

European Commission, Directorate-General for Research and Innovation, Graaf, I., Papadimitriou, A., Peijl, S., et al., *Promoting education, training & skills in the bioeconomy : final report*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2777/367

BioGov.net

Governance & Upskilling for a **Stronger Bioeconomy**

Consortium

CIVITTA

Q-PLAN INTERNATIONAL

LOBA CUSTOMER EXPERIENCE DESIGN

PEDAL
GET YOUR BUSINESS SPINNING

ZVT | Agricultural Research, Ltd. Troubsko

CoE BBE Centre of Expertise Biobased Economy

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

FVA NEW MEDIA RESEARCH

WILA Bonn

Funded by the European Union

@biogovnet

info@biogov.net www.biogov.net