BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

D2.2

Description of Job Profiles related to bioeconomy

Consortium

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Table of Abbreviations and Acronyms

Abbreviation	Meaning
AI	Artificial intelligence
CoP	Communities of Practice
EC	European Commission
ESG	Environmental, Social and Governance expert
EQF	European Qualifications Framework
EU	European Union
HR	Human resources
LCA	Life Cycle Analysis
LGBTIQ	Acronyms used to signify Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, and Asexual people collectively
NGO(s)	Non-governmental organization(s)
R&D	Research and Development
SMEs	Small and medium-sized enterprises
VET	Vocational education and training

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Executive Summary

This document entitled **"D2.2: Description of job profiles in the bioeconomy"** has been elaborated as a deliverable of **BioGov.net Project**, under the Task 2.4 "Story telling on job profiles in the bioeconomy"**.** The analysis and the findings presented in this deliverable were obtained via desk research, followed by the active contribution of all BioGov.net partners. The aim of this task is to develop 30 different job profiles related to the bioeconomy sector, in order to support the decision making for training curricula and inform the governance system for training needs and skills needed for the transition.

In the Bioeconomy sector unique requirements for professions and occupation are created that include different mixtures of technical expertise and entrepreneurial skill sets. Job profiles are a valuable tool to help bridge the gap between the skills which are needed by the market and the ones that are being offered by the academia or VET. Bridging the gap between academia and industry is expected to ensure that individuals are well-prepared for the diverse roles within this field.

The job profiles outlined in this deliverable are representative of roles within the bioeconomy sector and are not direct representations of individual resumes or CVs. BioGov.net job profiles are a collection of career paths in Bioeconomy, including job description, context analysis, education requirements and professional certifications, as well as specific skills that may be required to work within that occupation. Skill gaps and needs are also identified for each job profile.

The main goal under T2.4 according to BioGov.net Grant Agreement was to collect 30 job profiles. By the end of the process of collecting all profiles and refining all information, 40 profiles were gathered, deriving from all BioGov.net consortium countries.

The collection of job profiles in bioeconomy is expected to support decision-making for setting up effective training and education guidelines. They may also constitute a guiding basis for those who are interested in pursuing one of these professions.

1 Introduction

Bioeconomy is an important economic sector in Europe. There are multiple definitions of bioeconomy. According to the European Commission (EC), 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. Or, in short, the term bioeconomy describes everything that is produced with renewable biomass.

Bioeconomy includes all economic and industrial sectors that rely on renewable biological resources from land and sea, such as crops, forests, fish, animals and micro-organisms to produce food, materials, energy and services.[1]

Trying to highlight what is needed to transition to green jobs, BioGov.net identifies by this report a collection of Job Profiles that are relevant to Bioeconomy. The identification of job profiles was accomplished after developing a methodology which is described in this report. The career paths collected depict either occupation in current fields related to bioeconomy, or future jobs that are foreseen evolve or to be further developed.

BioGov.net seeks innovative approaches in bioeconomy education governance models, with the effective use of art & creativity in bioeconomy education, which is a specific element explored in the project and makes it differ from other bioeconomy Horizon Europe projects. The aim of D2.2 “Description of job profiles in the bioeconomy”, is to develop 30 different job profiles related to bioeconomy sector. These job profiles together with the “yellow pages” will support decision-making for setting up training curricula and inform the governance system for training needs and skills needed for the transition to bioeconomy[2].

By “Yellow Pages”, a catalogue of the most relevant training programmes, organisational structures and educational practices (case studies) is meant, also includes higher education institutions, vocational and non-formal education centres in the field of bioeconomy. Both case studies and the results from this deliverable will be presented in an online open library that may be used by Bioeconomy actors (clusters, higher education institutes, vocational training organisations, business support organizations, innovation support organisations, investors, etc) and also by each one of the stakeholder groups involved in BioGov.net project (education organizations, policymakers, NGOs and active communities).

The purpose of using this collection of job profiles can be summarized as follows:

- Educational organizations can receive information on existing and new training opportunities, relevant to the job profiles that arise in the project. Through educational organizations, this document can help young people follow one of these professions in the future and develop educational programmes.
- Public authorities can use the list of job profiles to develop strategies for bioeconomy education and training and to inform the wider public on career trends in bioeconomy.
- NGOs and non-formal education providers can inspire marginalized people to join one of these professions by providing them with the necessary knowledge and skills they need.

[1] https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/european-bioeconomy-2050-four-foresight-scenarios-2021-04-12_en
[2] Amended Grant Agreement, BioGov.net Project, page 09

- Artists and active communities can identify new fields of work contributing to bioeconomy advance and educational excellence.

Offering a quick insight about what a job in bioeconomy is really like, the current report gives an overview of diverse career paths to choose from. It focuses on mapping the main bioeconomy profiles, based on the needs of each country participating in the project and is comprised of seven distinct chapters:

- **Chapter 1** introduces BioGov.net and this deliverable's aim.
- **Chapter 2** describes key drivers identified in Bioeconomy in the EU.
- **Chapter 3** offers basic definitions for job profiles, but also describes the objectives and main targets of developing bioeconomy job profiles.
- **Chapter 4** presents the methodology that was followed for the desk research, the identification of the profiles and the deliverable development, so to collect and analyse all information needed.
- **Chapter 5** contains the finalised job profiles identified which are enriched by the partners, a well as including a suggested categorization of these profiles according to their characteristics.
- **Chapter 6** offers a Critical Review Analysis.
- **Chapter 7** summarizes conclusions of the deliverable.

Last but not least, the Annex of this report includes the tool provided to the partners that can be used to collect existing or future job profiles related to bioeconomy (Job Profiles Matrix- Annex Ia) followed by instructions on how to fill it in (Annex Ib) and an excerpt of the Matrix filled-in (Annex Ic).

2 Bioeconomy dynamics and trends

Bioeconomy, or biobased economy, is a quite new model for industry and the economy. It involves using renewable biological resources sustainably to produce food, energy and industrial goods. It also exploits the untapped potential stored within millions of tons of biological waste and residual materials.

Despite the heterogeneous trends of bio-based activities in the EU, the gross value added per person employed in the bioeconomy showed a strong increasing trend in the period between 2010 to 2019. This variable grew from 26,842€ in 2010 to 38,689€ in 2019, which represents an accumulated increase around 40% during this period. This reflects an improvement in the labour productivity on the overall bioeconomy. The above finding relates to the increasing trends in both turnover and value added in the total bioeconomy, but also by a slightly decreasing trend in the number of people employed in the bioeconomy sectors (from 19.1 million persons employed in 2011 to 17.4 million in 2019). This fall can be explained by the reduction in the agricultural labour force in the analysed period, which was only partially offset by an increase in the number of employed persons in other bio-based sectors[3].

According to joint research by JRC and the nova-Institute[4], in 2019 the EU bioeconomy accounted for almost 17.5 million jobs, annually adding value amounting to €614 billion, in particular in rural and coastal areas e.g. in forestry and blue bioeconomy (the bioeconomy based on aquatic biomass). Most of the growth in employment is expected to take place in nonfood sectors (including liquid biofuels and bioenergy) in the upcoming years, as well as in support services (logistics, equipment and input production, etc.)[5].

To identify the potential of Bioeconomy in job creation, the investigation of **Bioeconomy Trends** is important so to recognize future job profiles. The organization Foresight Scenarios has identified key drivers in the field for the EU bioeconomy for 2050[6]. The following table provides a synopsis of the relevant key drivers for bioeconomy in the EU 2050:

Table 1 Drivers for the EU Bioeconomy 2050

Drivers in the EU 2050	
Ecosystem in the EU	• agroecology • bioeconomy-based carbon sequestration
Social system in the EU	• awareness and engagement for change • food security • food-related health concerns
Economic system in the EU	• bioeconomy-based employment • bioeconomy-based international trade

[3] Mubareka, S., Giuntoli, J., Sanchez Lopez, J., Lasarte Lopez, J., M`barek, R., Ronzon, T., Renner, A. and Avraamides, M., Trends in the EU bioeconomy, Publications Office of the European Union, Luxembourg, 2023, p48, doi:10.2760/835046, JRC132639

[4] https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html

[5] https://www.allthings.bio/wp-content/uploads/2021/04/JobsCareers_EN_2104.pdf

[6] 4 Foresight Scenarios for the EU bioeconomy in 2050, Knowledge Centre for Bioeconomy, 2021, European Commission, doi:10.2760/763277, https://publications.jrc.ec.europa.eu/repository/handle/JRC123532,

Energy system in the EU	• bio-based electricity/CHP* • bio-based heat • biofuels for transport
Material system in the EU	• bio-based chemicals, plastics etc. • bio-based construction materials • bio-based fertilisers

* = bio-based electricity/Combined Heat & Power is shifted towards providing grid and system services (balancing)

Source: Foresight Scenarios for the EU bioeconomy in 2050, Knowledge Centre for Bioeconomy, 2021, European Commission

Under Task 2.4 – *Storytelling of Job Profiles in bioeconomy*, BioGov.net consortium partners exercised in finding different Job Profiles inseparable to the drivers that the foresight scenarios have identified, also including Job Careers that have to do with consulting, facilitation, art and creativity as indispensable difference that BioGov.net project exhibits, in relation to other bioeconomy projects.

3 Definitions, objectives and main targets

Bioeconomy offers jobs and career opportunities for people of varying levels of education attainment. Moreover, it may offer employment opportunities for a diverse social background also including less advantaged persons, i.e. vulnerable groups (such as ethnic and religious minorities, migrants and refugees, LGBTIQ community, and/or disabled persons). The potential of job creation in the sector of bioeconomy is one of the strongest capacities available to increase local employment in urban or in rural areas. It provides social sustainability, particularly because the bioeconomy jobs are of such diverse types; with room for many kinds of talent and effort.

To ensure the full deployment of the bioeconomy and foster local development in regions and cities by creating new opportunities and jobs, it is mandatory to stimulate both: education and entrepreneurship. However, due to its cross-sectoral nature and its relative novelty, the bioeconomy requires a workforce equipped with a set of skills and competences that are either not available in some regions or are only offered in a range of inconsistent curricula, both at academic and vocational levels. In many regions in the EU there is a complete lack of education and training initiatives specific for the bioeconomy to cover the gaps of necessary competences and skills. Even when these initiatives do exist, however, their level of formalisation and governance remains rather deficient and they focus mainly on the needs of specific actors in the local bioeconomy context.

BioGov.net's target is to provide an overview of (higher) education institutions, vocational and non-formal education centres in the field of bioeconomy. It is also called to find promising practices and case studies (Yellow Pages), gather an overview of the targets of educational practices, identify career paths, and skill gaps and better understand commonalities or divergencies of jobs career paths in bioeconomy across Europe.

BioGov.net aims at highlighting what the job opportunities are in this specific but wide sector, both for adults entering the labour market and for people who have long worked in traditional economic sectors but wish to proactively adapt to environmentally friendly new economic practices. Adult career seekers and policymakers increasingly understand how bioeconomy helps to face the **climate crisis, the food crisis, and the energy crisis**.

The project's strategic objective 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.

With the mission to bridge the gap between sustainable innovation and economic growth by fostering a workforce equipped with the skills and expertise necessary to thrive in the field of bioeconomy, the project is committed to providing comprehensive, up-to-date, and accurate information about diverse job roles within the bioeconomy sector. The main goal is to empower individuals, educators, and industry leaders with the knowledge needed to make informed decisions, drive advancements, and develop guidelines for effective education and vocational training in bioeconomy.

To this end, the overarching aim of this report is to describe the approach for the development of BioGov.net job profiles related to bioeconomy.

The specific objectives of this report are to achieve:

- **Comprehensive Profiles**: To create detailed and comprehensive profiles of various bioeconomy job roles, encompassing skill requirements, responsibilities, potential career paths, and the impact of each role on the bioeconomy and society.
- **Current and Relevant Information**: To commit that the elements gathered reflect the latest trends, developments, and innovations within the bioeconomy sector, ensuring that readers have access to up-to-date information.
- **Education Partnerships**: To establish partnerships with educational institutions, providing them with the necessary tools and skills needed to incorporate bioeconomy-related content into their curricula and enabling adults/ students to explore this field with confidence.
- **Promotion of Diversity and Inclusion**: To commit to showcasing the diverse range of individuals contributing to bioeconomy and promoting inclusivity within the sector, encouraging equitable opportunities for all, also focusing on marginalized groups by finding ways to include them in each job position (for example as a Social Farmer).
- **Awareness and Consultation**: To actively consult and inform on the importance of the bioeconomy sector job positions in addressing global challenges, raising awareness among policymakers, industry leaders, and the general public.

By fulfilling these objectives, job profiles related to Bioeconomy aim to play a pivotal role in shaping the future of work, innovation, and sustainability in the bioeconomy sector, creating a positive impact on individuals and communities.

But first, what is a Job Profile?

A job profile is a short description of a specific job that summarises expectations, responsibilities, tasks, and requirements of a particular job. Most often, it is an internal document drafted by Human Resources department to help hire the most fitting candidates for a specific position.

Why a Job Profile is needed?

Organizations draft job profiles to streamline recruiting, employee onboarding, performance appraisals and other internal processes. A job profile is a written document that summarizes the key characteristics of a given role, including the educational requirements, duties and pay rates. Job profiles in the context of BioGov.net are expected to set the basis of understanding current and future job position needs, inform the governance system for training needs and support decision making for training and curricula development.

The profiles collected in this deliverable mostly present job types in bioeconomy rather than specific job positions. Keeping that in mind, they present career paths, identified by partners from their professional network or desk research, and indicatively include job description, responsibilities to be undertaken by each job position, essential skills, education requirements and professional certifications needed, as well as specific skills that may be required to work within that occupation, either existing or acknowledged as meaningful for the future as the profession evolves and bieconomy spreads.

The catalogue of job profiles is expected to serve as lists with job requirements/skills and identified skill gaps related to these positions in bioeconomy. Moreover, by publishing Job Profiles, the main target groups of the BioGov.net (Higher Education Institutions and VET centres, BioBased Industries, Bioeconomy businesses or Bioeconomy Associations, NGOs and creative industries) will be informed about existing gaps in skills of high or lower demand. The benefit gained by Education Institutions and VETs from exploiting the profiles, will be the identification of skills missing in the Bioeconomy sector across Europe. People from different sectors in the bioeconomy could work together with other Educational Institutions towards more informed bioeconomy training curricula and a more updated governance system for training needs and skills that are needed for the transition. Industries, Companies and Bioeconomy associations will better understand:

- What workforce skills are needed when hiring experts.
- What skills are already available in the market or what kind of skills are missing and need to be developed.
- How could marginalized people be part of these job profiles.
- How could art and creativity play a role in the Bioeconomy.

Regarding the latter, BioGov.net attempts to go one step further integrating art and creativity as a means of diffusing Bioeconomy, also differentiating from other projects concerning bioeconomy. The project acknowledges that there are different ways to integrate humanities/art/design/culture and social innovation in the field of bioeconomy some of which are the following:

- Art can develop skills needed in bioeconomy education.
- Art can address different learning styles and can include marginalized groups in creative bioeconomy pathways.
- Art can be used as an understandable language to communicate messages, inspire people and raise their interest and awareness. Last but not least,
- Art can inject biobased solutions into design and architecture.

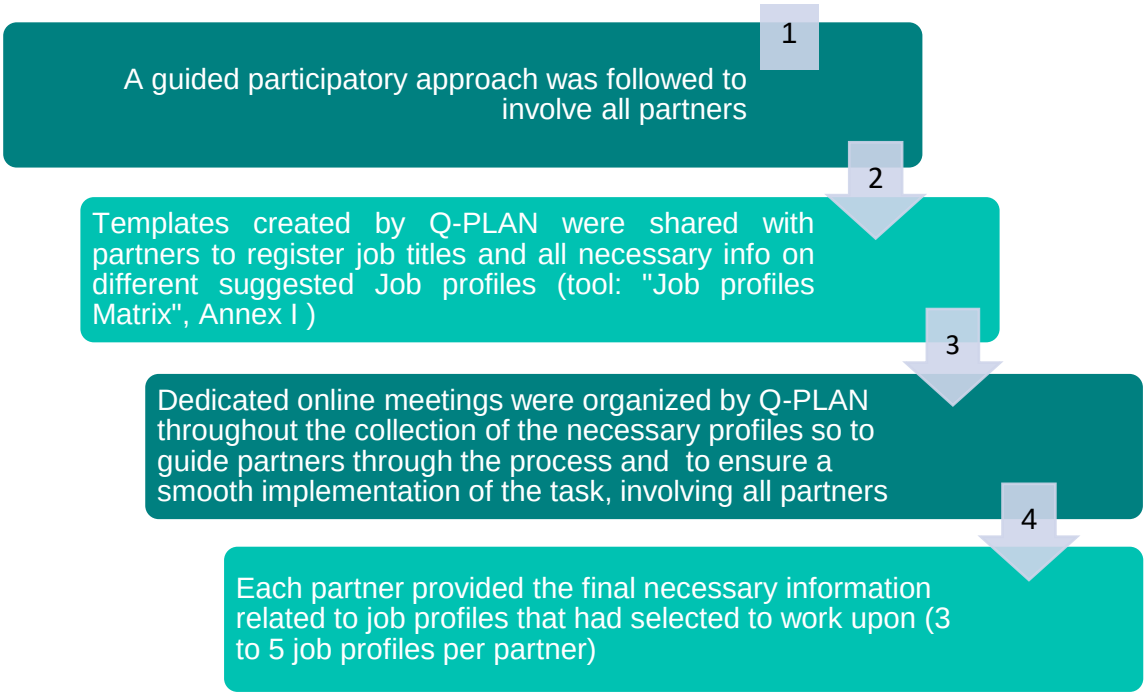
For this reason, during the exercise of identifying bioeconomy job profiles, the consortium included job positions relevant to art and creativity in the list, such as Biobased products Artist & Fashion Designer and also included marginalized people in activities and future opportunities in order to contribute to their inclusion in the Bioeconomy.

4 Methodology

4.1 Methodological Steps

To successfully develop and elaborate Task 2.4 - Storytelling on job profiles in bioeconomy, Q-PLAN designed tailored methodological steps to ensure that the expected target of 30 job profiles is met, that all partners contribute equally bringing their countries' bioeconomy background in the project and that all professions described are up to date.

Figure 1 Methodological Steps followed for Job Profiles collection.



All files were uploaded on BioGov.net Microsoft Teams shared folder to allow partners contribute to a common workspace, where messages and digital content on the specific topic were shared. Sharing the Job Profiles Matrix on Teams Folder let everyone within the consortium have access to all information entered by other BioGov.net partners in order to avoid duplication of entries and repetition of Job Profiles.
The initial goal of 30 job profiles was far exceeded after the initial claim of 3-5 job Profile by each partner, since 50 profiles were initially collected from partners inputs. The resulting list after the partners additions is shown in the presented table below:

Table 2 Job Profiles initially identified by partners in random order and ungrouped

A/A	Job Profiles Titles
1	Biobased products Art and Fashion Designer
2	Biomass Producer
3	Bioinformatician
4	Biofuel Plant Manager
5	Biorefinery Technician
6	Sustainable Engineer

7	Waste Management Specialist
8	Agricultural Scientist
9	Farmer in mixed farming
10	Landscape ecologist (geoecologist)
11	Specialist for precision agriculture
12	Forestry advisor/consultant
13	Social farmer
14	Adviser on social agriculture
15	Specialist in research and development in printing production
16	Agricultural irrigation specialist
17	Research and development specialist in wood processing
18	Regional and rural development specialist
19	Science communicator (in Bioeconomy)
20	Sustainable architect and designer
21	Material scientist
22	Biotechnologist
23	Ecosystem facilitator
24	Woodland Manager
25	Energy Engineer
26	Biotransformation Plant Operator (e.g. fermentation)
27	Risk Assessor
28	Social Innovation Manager
29	System thinking promoter
30	Multi-stakeholder dialogue facilitator
31	Social change and impact manager
32	Bio-based Business & Production Consultant
33	Bio-based Transition Manager
34	Prefab Building Production Employee
35	Bio-Based Crop Farmer
36	Bio-based Process Engineer
37	Bio-based Process Operator C
38	Project Manager Bioeconomy
39	Project Manager Municipal Bioeconomy
40	Consultant for the topic of Green Tech - Resource Efficiency, Green Tech, Bioeconomy
41	Head of Education and Research on Sustainability and Circular Economy
42	Research assistant or postdoc for sustainability assessment in horticulture
43	Scientist for his doctorate for the research area of fibre production from peatland biomass
44	Scientific Advisor Environment, Energy & Bioeconomy
45	ESG (Environmental, Social and Governance) expert
46	Sustainability engineer
47	Environmental engineer
48	Microbiologist
49	Pharmacologist
50	Biostatistician

All aforementioned job titles were elaborated in the Job Profiles Matrix, including descriptive texts on each profession's responsibilities, skills, skill gaps, educational background and certifications needed. After the join contribution of all BioGov.net partners, Q-PLAN in collaboration with LOBA (dissemination manager) created a first

version of Job Profiles in “Yellow Pages” format, thus presenting each one of the profiles in a one-pager visually upgraded and eye-catchy presentation. The Yellow Pages' first layout for Job Profiles was created in a simple yet colorful template to attract the reader’s attention (when published) and to gather all information in infographics using both images and texts in visual formats. The graphic design of Job Profiles creates a more conceivable collection of information around each job type and also provides the opportunity to use the initial version of yellow pages during CoP workshops in the run of WP3 activities. The Yellow Pages layout was also useful for internal reasons. Partners had the chance to easily go through the profiles and share comments and suggestions with the deliverable responsible partner (Q-PLAN) on merging similar or interconnected jobs and adding more information when missing.
Following partners’ comments and taking into account all suggested changes, the deliverable responsible partner restructured the entries in the Matrix and provided targeted and meaningful information on job description, tasks and skills.
Some of the initially identified profiles got merged for the final deliverable when similar responsibilities or skills were described. The Profiles which have been merged were the following ones:

- ‘Biomass Producer’ and the ‘Mixed Farmer’ were combined in one entry.
- ‘Specialist in adaptive forestry’ was merged with ‘Forest\Woodland Manager’ and was renamed as ‘Adaptive Forestry manager (AFM)’.
- ‘Regional and Rural Development specialist’ was merged with ‘Project Manager on Municipal Bioeconomy’. The title of the first one was kept as more inclusive.
- ‘Social Innovation Manager’ was merged with ‘Social change and impact manager’ and was retitled as ‘Social Innovation and Social Impact Manager’.
- ‘Ecosystem Advisor/facilitator’ was merged with ‘System thinking promoter and Multi-stakeholder facilitator’ into ‘Bioeconomy Multi-stakeholder dialogue facilitator’.
- ‘Consultant for the topic of Green Tech - Resource Efficiency, Bioeconomy’ was merged with ‘Scientific Advisor Environment and Energy & Bioeconomy.’
- ‘Irrigation specialist’ was changed to ‘Farming advisor’ to include more competencies and responsibilities apart from irrigation.
- ‘Scientist or doctoral researcher on fibre production from peatland biomass’ was enlisted with the more generic job title of ‘Researcher on biomass exploitation’.
- ‘Research assistant for sustainability assessment in horticulture’ was changed to ‘Expert in sustainability assessment’.
- ‘Life Cycle Assessor’ was added as a new job profile, not initially enlisted.

4.2 Methodological tools

In order to fulfil the abovementioned methodological steps and to end up with a collection of diverse job profiles on bioeconomy, partners used desk research and the “Job Profiles Matrix” tool to register the information collected. To face differences in national qualifications framework, the Job Profiles exercise used the **European Qualifications Framework**[7] as a translation tool to make national qualifications easier to understand and more comparable.

[7] https://europa.eu/europass/en/europass-tools/european-qualifications-framework

Desk Research

By desk research methodology, information from available secondary sources was collected and analysed, such as documents, reports, academic publications, and other materials available online. As the purpose of desk research is to gain a broader perspective on the issue under study, as well as to supplement or confirm knowledge on the topic, a reference to other projects related to bioeconomy was held to collect more information (BIOTRANSFORM Project, AllThings.Bio project). The final results were based on various European research and projects regarding Job profiles and skills needed such as UrBIOfuture[8]. A Canadian research[9] was also helpful to create a more comprehensive Matrix, but was not prioritized as the characteristics of job titles mentioned in it were outside the European context and their impact was not tested in European countries. Q-PLAN adapted information to create a Matrix according to the needs of the BioGov.net countries (Estonia, Italy, Netherlands, Greece, Slovakia, Czech Republic, Portugal and Germany).

Partners relied on sources and projects that focused on art[10] all around Europe, as well as on the inclusion of marginalized people[11] to job profiles as this is the main goal of BioGov.net project that makes it differ from similar bioeconomy projects. Moreover, Q-PLAN created an online digital library on shared Microsoft Teams folder, in which all BioGov.net partners could save documentation, past papers, past project reports and other sources. The library worked as a digital repository to hold material and information that could feed the Job Profiles Matrix and help partners navigate in diverse documentation used.

"Job Profiles Matrix" tool

This section outlines a Matrix created to serve as a qualitative instrument (Annex Ia), accompanied by a set of guidelines (Annex Ib) for partners to fill in. Each of the 10 BioGov.net partners were called to add at least 3 to 5 different job profiles in the Job Profile Matrix, so to collect a minimum of 30 job profiles. For the better organization and categorization of the profiles, Q-PLAN deemed necessary the utilization of a Job profiles Matrix in order to define the main issues about the profiles of BioGov.net project. This approach supported all project partners in identifying and managing all the inputs added in the document, in order to have a full overview of the profiles each partner chose to focus on, thus avoiding double input and thus sharing necessary sources to enable comprehensive information.

The Job Profiles Matrix was set-up in an Excel file and is comprised of 3 distinct but interconnected sheets. It is structured as follows:

Job Profiles claim in which each partner chose/added the titles of job profiles that claimed to work on, including organization name and comments if needed.

[8] https://ddd.uab.cat/pub/infpro/2019/216850/Focus_Group_ReportVF.pdf
[9] https://www.biotalent.ca/skillsprofilesandskillsataglance/
[10] MyHandScraft http://www.myhandscraft.eu/
[11] https://naomi.gr/projekte/textile-academy/

Job Profiles (title, description, etc.)

This corresponds to the main part of Job Profiles Matrix in which all partners had to provide the final necessary information related to job profiles of their choice; not only the title of the job profile but the full description. Each partner had to also include details such as:

- Job Description- describing the main function associated with a specific occupation.
- Responsibilities & Tasks- describing the responsibility competencies, tasks, and subtasks associated with a specific occupation.
- Education level and specific certificates, like necessary Bachelor's or Master's Degrees.
- EQF level[12], classifying in a unified way across different European countries the level of qualifications and level of proficiency. More details on EQF levels will follow in the next subchapter.
- Essential Skills such as Problem Solving, Working with others etc.
- Professional Certifications, meaning certificates from chambers, work permit etc.
- Regional Aspect, connecting relevant job profiles with local characteristics or local CoP work.
- Gaps & Needs in Skills, identifying specific needs on training or skills that are required. For instance, need for knowledge in automated processes, need on how to process data and generate relevant information for the improvement of a process or a product, specialization in the reuse of existing resources, waste management and advance in abandonment of fossil fuel resources and use of biomass, gaps in support services as management, sales, economics, analysis etc.

The Job Profiles Matrix was a comprehensive tool, easily managed by the partnership in terms of useability, but soon became a very "heavy" file to process due to much information filled in. Q-PLAN tried different drives or bilateral communication with partners to assure that their contribution is fitted in the Matrix and to secure their easy involvement in the exercise.

EQF Analysis

Regarding the job profiles presented in this deliverable, the European Qualifications Framework (EQF) helped both allocate the profiles in each category and keep a balance of the qualifications needed. The European Qualifications Framework is an 8-level, learning outcomes-based framework for all types of qualifications that serves as a translation tool between different national qualifications frameworks. This framework helps improve transparency, comparability and portability of people's qualifications and makes it possible to compare qualifications from different countries and institutions[13].
The EQF covers all types and all levels of qualifications, and the use of learning outcomes makes it clear what a person knows, understands and is able to do. The level increases according to the level of proficiency, level 1 is the lowest and 8 the highest level. Most importantly the EQF is closely linked to national qualification frameworks, thus providing a comprehensive map of all types and levels of qualifications in Europe, which are increasingly accessible through qualification databases.

[12] https://europa.eu/europass/en/europass-tools/european-qualifications-framework
[13] https://www.ehea.info/Upload/TPG_A_QF_RO_MK_1_EQF_Brochure.pdf

The EQF was set up in 2008 and later revised in 2017. Its revision has kept the core objectives of creating transparency and mutual trust in the landscape of qualifications in Europe. Member States committed themselves to further develop the EQF and make it more effective in facilitating the understanding of national, international, and third-country qualifications by employers, workers and learners[14].
Regarding the job profiles presented in this deliverable, EQF Level was inserted in the Matrix to help allocate the profiles to each category in a unified and transnational way. Moreover, it helped keep a balance and representativeness of different qualifications in job profiles. In other words, the Matrix included profiles with lower qualifications requirements and with no references, but also profiles of high EQF level showcasing most advanced and specialized skills, great knowledge background and proportionate experience.
In the following table more information is given on the different EQF levels, also including required knowledge and skills.

Table 3 EQF Analysis

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	basic general knowledge	basic skills required to carry out simple tasks	work or study under direct supervision in a structured context
Level 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

[14] https://europa.eu/europass/en/europass-tools/european-qualifications-framework,

Level 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
Level 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
Level 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
Level 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 the professional development of individuals and groups
Level 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 are 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	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 European Union, C189/15, 15.06.2017[15]

[15] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017H0615(01), https://europa.eu/europass/en/description-eight-eqf-levels

5 Selected Job Profiles in depth

In this chapter, all final profiles are presented in detail as they have resulted from the contribution of all partners. The profiles are grouped together based on relevant characteristics, contribution to a common bioeconomy value chain component, or based on broader societal shifts towards sustainability, ethics, inclusivity and responsible resource management. Moreover, the categorization corresponds to the extend of the partners input.

Value-chain is defined as a set of interlinked activities that deliver products/services by adding value to bulk material (feedstock). In a bio-based value chain, the feedstocks tend to be biomass drawn from an existing primary production route (e.g., agriculture, forestry and livestock), or a novel one (e.g., microalgae) or secondary origin (e.g., sludge, industrial wastewater and household organic waste).[16]. Pathways that are capable of transforming waste/secondary feedstock into an array of high value products are called integrated biorefineries. Biorefineries prepare the feedstock for upcoming transformation and refining technologies, before packaging, distribution, and marketing steps. In all intermediate steps within the biobased value chain, from researching innovation, and farming, to developing a biobased product, biorefining, designing, packaging and marketing, given job positions are needed, differing in expertise, EQF, background knowledge and skills.

In BioGov.net, the categorization of Job Profiles is somehow born from the value chain, and is an adaptation of the value chain components, however, enriched and extended by wider ongoing societal shift.

In the table below, the final categorised job profiles are listed. The final output of this exercise (under ask 2.4) is the collection of 40 Job Profiles for bioeconomy, overachieving the initial target of 30 (target defined in the Grant Agreement).

Table 4 Categories and bioeconomy final job profiles list

Categories	Job Profiles Titles
Recearch & Development	Specialist in research and development in printing production
	R&D Specialist in wood processing
	Regional and Rural Development specialist
	Researcher on sustainability assessment
	Researcher on biomass exploitation
	Head of Education and Research on Sustainability and Circular Economy
	Expert or researcher in Bioenergy/Bioeconomy
Primary production	Biomass Producer & Mixed Farmer
	Social Farmer
	Specialist for precision agriculture
	Agricultural Scientist
	Landscape Ecologist (geoecologist)
	Adaptive Forestry manager (AFM)
	Environmental Engineer

[16] Lokesh, Kadambari & Ladu, Luana & Summerton, Louise. (2018). Bridging the Gaps for a 'Circular' Bioeconomy: Selection Criteria, Bio-Based Value Chain and Stakeholder Mapping. Sustainability. 10. 1695. 10.3390/su10061695.

Engineering & Processing	Sustainability engineer
	Bio-based Process Engineer
	Biotransformation Plant Operator
	Waste Management Specialist
	Biorefinery Manager
	Biorefinery Technician
	Bio-based Process Operator
Consulting/Advisory	Adviser on social Agriculture
	Farming Advisor
	Bio-based Business & Production Consultant
	Consultant for the topic of Green Tech - Resource Efficiency, Bioeconomy
	Prefab Building Production worker
	Risk Assessor
	Life cycle assessor
Life Sciences	Biostatistician
	Pharmacologist
	Microbiologist
	Bioinformatician
	Laboratory technician
	Biotechnologist
Humanities and Art	Bioeconomy Science Communicator
	Bioeconomy Multi-stakeholder Dialogue Facilitator
	Social Innovation and Social Impact Manager
	ESG expert
	Biobased products Artist & Fashion Designer
	Sustainable architect and designer

Research & Development

The job profiles in the category of Research and Development are related to activities companies undertake to innovate and introduce novel products and new services or to improve their existing offerings.

Specialist in research and development in printing production

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Stronger Bioeconomy

Job description

Research and development of technological processes in the field of printing techniques and printing production. Also, responsible for ensuring that the products meet company standards and resolving issues that arise during production.

Responsibilities and Tasks

Carries out research and development of technological processes in the field of printing techniques and printing production. Has an overview of current and new technologies used in the printing industry and is familiar with their potential use for streamlining production processes, minimizing the ecological footprint and their possible use in future technologies.

Education

Engineer´s degree

No special certificate required by law besides the university in the field degree

Essential Skills

- Decision Making
- Analytical & Critical Thinking
- Strategic Thinking
- Technology Design
- Task Planning and Organising
- Analysis and application of new trends in polygraphy
- Environmental aspects of printing production
- Creativity

Gaps & Needs in Skills

- Digital and Industrial Technologies
- Elaboration of concepts, methodologies and forecasts of development in printing production
- Scientific research and development methods
- Data analysis supported by AI
- Project Management

EQF

Research and development Specialist in wood processing

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Job description

Research and development of technological processes and products in the field of mechanical wood processing. A research and development specialist focuses on collating data from different sources, analyzing information about wood processing, creating new ideas and development concepts and supporting the RD department in management and generate reports on each research task's status.

Responsibilities and Tasks

Carries out research and development of technological processes in the field of mechanical wood processing, production of composite wood materials and wood modification. Designs new and innovates existing production lines, monitors and applies the latest scientific knowledge with a focus on the procedures of complex and efficient use of wood raw material. Develops and validates new innovative wood-based products with specific properties and maximum added value. Leads, coordinates and solves complex research and development tasks.

Education

Higher technological education focused on wood processing

Essential Skills

- Problem Solving
- Attention to Detail
- Decision Making
- Technology Design
- Computer Use
- Creativity
- Analytical & Critical Thinking

No special certificate required by law besides the university in the field degree

Gaps & Needs in Skills

- Digital and Industrial Technologies
- Application knowledge in smart technologies
- Principles of augmented reality, visualization and process modelling
- Technologies of robotization and collaborative robots in woodworking
- Creation of new programs for CNC machines
- Data Literacy

EQF

Regional and Rural Development specialist

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Stronger Bioeconomy

Job description

Participates in the development of regional policy and ensures the process of preparation and implementation of the action plan at the district level. Tries to improve the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas. Regional and rural development specialist has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry.

Responsibilities and Tasks

Involved in ensuring the preparation of strategy and action plans. Coordinates subjects involved in the preparation and realization of the action plan, cooperates with state administration authorities, municipalities, higher territorial units as well as other subjects of territorial cooperation and other socio-economic partners. Regional development specialist could work as Project Manager on Municipal strategy for Bioeconomy, also working on the development of long-term implementation projects. His/her tasks also include the cooperation with municipalities, municipal companies, business, industry and clusters and follow-up of appointments and events.

Education

Bachelor´s degree, Completed studies in the field of natural sciences, (economic) geography, rural & urban development engineering

Essential Skills

- Problem Solving
- Analytical & Critical Thinking
- Decision Making
- Strategic thinking
- Task Planning and Organising
- Monitoring and Evaluation
- Working with Others

No special certificate required by law besides the university in the field degree

Gaps & Needs in Skills

- Principles of restructuring of regions undergoing transformation of economic orientation
- Development of strategic plans
- Socioeconomic Development
- Local Bioeconomy Aspects
- Networking and Cooperation
- Project Management

EQF

Researcher on Sustainability Assessment

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Job description

A Researcher on sustainability assessment supports ongoing research projects, collects and analyzes data, and assists in the evaluation of sustainability practices within an industry (eg horticultural industry, peatland industry, bioplastics industry, bioalcohol industry, biodiesel etc). Also helps in the development of sustainable strategies and practices that promote environmental stewardship and social responsibility. Researchers on sustainability assessment conduct studies to develop sustainability models, indicators and best practices.

Responsibilities and Tasks

Data Collection and analysis; sustainability assessment; investigation of regional value creation in the use of regionally available residues and renewable raw materials; preparation and drafting of proposals for new research projects; recommendations to internal and external clients on effective sustainable development strategies; Publication of scientific articles in international peer-reviewed journals.

Education

Scientific university degree (diploma or Master) in the field of agriculture, biology, physics, bioeconomy, natural Resources & Conservation

Essential Skills

- Goal oriented working
- Oral and written communication
- Project acquisition
- be up-to-date on key drivers of sustainability
- Knowledge of environmental legislation and regulations
- Computer-aided design
- Attention to detail

No European professional certification identified

Gaps & Needs in Skills

- Life Cycle Analysis
- Sustainability Assessment methods & tools
- Empirical research in agriculture, renewable raw materials, horticulture Local Bioeconomy Aspects
- Databases and data collection / Related software experience
- Ability to identify correct data classifications
- Excellent written and verbal communication skills

EQF ●●●●●●●

Researcher on biomass exploitation

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Job description

A researcher on biomass exploitation plays a critical role in conducting innovative research, analyzing data, and providing insights into the development of new products. His/her research may be focused on different renewable materials of organic nature, including terrestrial vegetation (crops for food and feed use, woody vegetation, energy crops, industrial plants), aquatic (algae, herbaceous) and microorganisms (fungi, yeasts, bacteria), as well as organic waste and residues from agriculture, fish farming, forestry, municipal waste and other waste.

Responsibilities and Tasks

Research design and implementation; experimental work following research protocol; documentation, evaluation of the test results; Revision recommendation to experimental methods based on observations of the data; preparation of reports and scientific publications; Project management; adaptation of machines; determination of material properties and process modelling.

Education

Master's degree in Biology, Biochemistry, Cellular Biology, Chemical Engineering, Environmental Engineering or related fields

Essential Skills

Certification in research management is an asset

- Planning and Testing
- Openness for research methods
- Personal commitment
- Transdisciplinary cooperating
- Knowledge transfer
- Flexibility
- Obedience to follow clear instructions
- Critical analysis

Gaps & Needs in Skills

- Script based software
- Data analysis
- Determine material properties (e.g. fiber, suspension, strength analysis)
- Leading skills in collaborative research projects

EQF

Head of Education and Research on Sustainability and Circular Economy

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Governance & Upskilling for a
Stronger Bioeconomy

Job description

This professional focuses on developing and implementing educational programs and conducting research initiatives focused on sustainability and circular economy principles. He/she may lead a team of educators and researchers, collaborating with internal and external stakeholders to promote sustainable practices and drive positive change. Also focusing on testing, monitoring (quality assurance), certification of products, training and further education, research and development as well as certification of management systems.

Responsibilities and Tasks

Develop educational programs and educational strategy; lead research initiatives; collaborate with internal and external stakeholders, including universities, research institutions, industry partners, and government agencies; manage a team of educators, researchers, and support staff; conduct training and workshops to engage with diverse audiences to raise awareness and drive behavioral change; tay updated on industry trends; evaluate the effectiveness of educational programs and research initiatives and drive organizational sustainability.

Education

Completion of a University degree in economics, natural sciences or engineering is indispensable, completed doctorate is desirable

Essential Skills

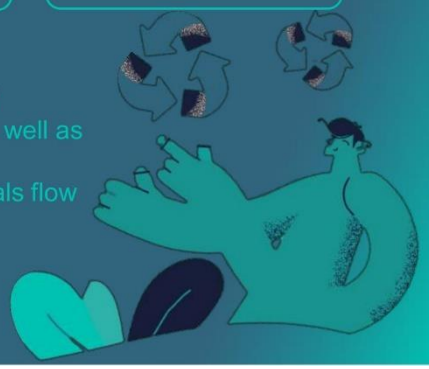
- Strong economic mindset
- Leadership experience
- Interpersonal skills to interact with students, and educators
- Openness for new topics
- Communication
- Obedience to follow clear instructions
- Cooperation mindset
- Ability to abstract

Certification in Educational Leadership is an asset

Gaps & Needs in Skills

- In-depth expertise and experience in the fields of sustainability and circular economy of plastics as well as related topics
- Deep understanding of how products and materials flow through different systems
- Digital literacy

EQF ●●●●●●●



Expert or researcher in Bioenergy/Bioeconomy

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Stronger Bioeconomy

Job description

This professional conducts research activities, assists in data collection and analysis, and contributes to the development of innovative solutions in the bioenergy and bioeconomy sectors. While helping advance sustainable practices, optimize resource utilization, and promote the transition to a more environmentally friendly and circular economy.

Responsibilities and Tasks

Research support; data collection and analysis; Assist in conducting laboratory experiments, including sample preparation, instrument operation, and data recording and support fieldwork activities, such as sample collection, measurements, and data collection, as required; report writing and documentation; Evaluate and assess the feasibility, efficiency, and sustainability of bioenergy technologies and bioeconomy strategies; assist in project management tasks; Identify and screen new projects.

Education

Master's degree in industrial engineering, technology management, energy or environmental protection engineering, mechanical engineering or comparable courses of study

Web programmes certification , 5 years relevant industry, research or consultancy experience

Essential Skills

Enthusiasm	Problem identification	
Independent	Problem solving	Critical Thinking
Structured	Task Planning and Organising	Monitoring Performance

Gaps & Needs in Skills

- Basic software (MS Office)
- Programming (languages, e.g., Python)
- Optimisation models
- Laboratory equipment use
- Project Management
- Strategic Thinking

EQF ●●●●●●

Primary production

Primary production refers to people and economic activities that are relevant to the extraction and production of raw materials, such as farming, logging, fishing, forestry and mining. Primary production in the bioeconomy involves activities related to the cultivation, harvesting, and collection of biological resources that serve as raw materials for bio-based products. Jobs related to primary production are usually agricultural or extractive and are based on natural resources (agricultural products, minerals, timber and fish) deployment. The following primary production roles are essential for establishing a sustainable and renewable supply chain of biological resources for bioeconomy applications. Professionals in these positions contribute to the foundation of the bio-based industry by ensuring the responsible management of natural resources and the cultivation of biomass for various applications.

Biomass Producer & Mixed Farmer

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Stronger Bioeconomy

Job description

It's an intensely physical job related to livestock production and crop production using powerful farm machinery. Producers need to stay alert to avoid serious injury. The work schedule for this occupation features long hours, especially during growing seasons that require you to work sunrise to sunset.

Responsibilities and Tasks

Biomass Producer is responsible for all aspects of crop growing, such as seeding, feeding and reaping. This includes the planning of crops according to market conditions, weather patterns, government subsidies and soil condition. Also purchase supplies and equipment necessary for success. One of the responsibilities is to repair farm machinery to make sure cultivation and harvest proceed smoothly, in addition to fixing things like fences, pipes or hoses. The business duties of agricultural producers revolve around sales and maintaining accurate records of production, financial and employee records. Moreover, it includes management and control of the growing conditions, registration of seeds, fertilizer and pesticide use, soil health maintenance, erosion prevention and soil conservation practices. Within the field of animal production, farmer´s responsibilities include management and control of a daily regime of animals, their nutrition and reproduction.

Education

Complete secondary vocational education, Vocational trainings / experiential learning

Essential Skills

- Quality Control
- Task Planning and Organising
- Working with Others
- Critical Thinking
- Good physical health
- Monitoring Performance
- Stress Tolerance

A certification scheme to provide assurance that biomass is sourced both legally and sustainably, machine driver's license type B and T

Gaps & Needs in Skills

- Driving Specialist Vehicles
- Local Bioeconomy Aspects
- Technical Farming Skills
- Networking and Cooperation

EQF ●●●●

Social Farmer

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Stronger Bioeconomy

Job description

Social Farmer is acknowledged as stand-alone job profile, given that it refers to added social value attributed to ordinary agricultural production practices. Social Farming offers people who are socially, physically, mentally or intellectually disadvantaged the opportunity to spend time on a farm in a healthy, supportive and inclusive environment. Social farming could thus be provisionally defined as a cluster of activities that use agricultural resources – both animal and plant – to generate social services in rural or semi-rural areas, such as rehabilitation, therapy, sheltered jobs, lifelong learning and other activities contributing to social integration.

Responsibilities and Tasks

Provides agricultural production, but also offers and creates services, new jobs, educational activities and carries out different types of therapies for a wide range of people with specific needs. This represents an additional source of income for the social farmer as well as building his own labor capacity among disadvantaged and vulnerable groups. Executes the ordinary farming practices but is also responsible to create a safe and supportive environment taking into account the individuals' abilities, desires and interests. Focus remains on encouraging participants to socialize, gain confidence and build relationships.

Education

Agricultural production and social studies/sociology

No special certificate required by law on farming. Vocational training on social work

Essential Skills

- Decision Making
- Task Planning and Organising
- Application of crop and agronomy knowledge
- Problem solving
- Stress Tolerance
- Working with Others
- Knowledge of the methodology of social work
- Communication skills

Gaps & Needs in Skills

- Sustainable Business Models
- Socioeconomic Development
- Ethical and Justice Aspects
- Networking and Cooperation

EQF ●●●●

Specialist for precision agriculture

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Stronger Bioeconomy

Job description

Manages plant cultivation based on data from technologies used for precision farming. More specifically, it includes the use of drones, sensors, soil sampling, GPS and GIS technologies to manage grower activities, which are used to optimize production and conserve resources.

Responsibilities and Tasks

Provides support and technical assistance to growers who are using precision technologies on their farms. Creates and implements plans for farmers to enhance the health of their fields based on the data from global positioning systems (GPS), drones, sensors, soil sampling and other precision machinery.

Education

Master's degree in agricultural engineering, agronomy, agricultural business or information technology (IT)

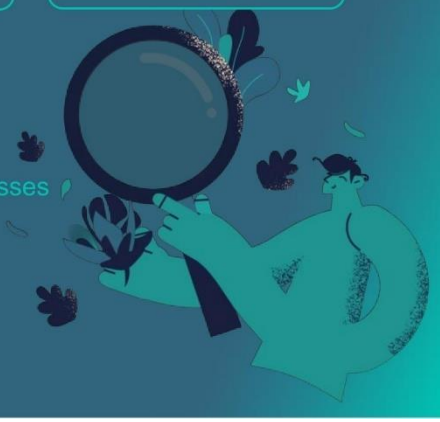
No special certificate required by law besides the university degree

Essential Skills

- Problem Solving
- Attention to Detail
- Decision Making
- Critical & Analytical Thinking
- Procedures for the application of research results
- Processing Information
- Application of crop and agronomy knowledge
- Monitoring Performance

Gaps & Needs in Skills

- Command and monitoring of IoT elements
- Use of AI tools in agriculture
- Application and use of drones for selected processes in agriculture
- Technical Farming Skills
- Data Literacy



EQF ●●●●●●●

Agricultural Scientist

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Stronger Bioeconomy

Job description

Applies scientific principles and knowledge to improve the agricultural industry. He/She works on developing new and more efficient farming practices, improving crop yields, and managing pests and diseases. Additionally, may work in research and experiments to improve the productivity and sustainability of field crops and farm animals, and may specialize in areas such as crop science, soil science, plant genetics, animal science, food science, and sustainable agriculture. Agricultural scientist plays a critical role in the development of the agricultural industry and works to ensure that the world's growing population has access to safe and sustainable food sources.

Responsibilities and Tasks

The responsibilities of an agricultural scientist are conducting research, developing new crops and products, improving crop yields, managing pests and diseases, ensuring food safety, collaborating with industry and government, teaching and training. Agricultural scientists try to maintain a balance between the economic requirements of farmers and environmental conservation and management concerns.

Education

Degree in agricultural science, agribusiness or a related field. It may also be beneficial to obtain a master's or doctoral degree in agricultural science or a related field to some job opportunities

Professional memberships; Certifications on organic farming, precision agriculture, or crop management

Essential Skills

- Finding Information
- Attention to Detail
- Processing Information
- Critical & Analytical Thinking
- Monitoring Performance

Gaps & Needs in Skills

- Sustainable Business Models
- Local Bioeconomy Aspects
- Networking and Cooperation

EQF

Landscape Ecologist (Geoecologist)

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Stronger Bioeconomy

Job description

Landscape Ecologist is an expert on both biophysical and socioeconomic sciences to explore basic and applied research on ecology, conservation, management, design/planning, and sustainability of landscapes as coupled human-environment systems. The Landscape ecologist analyses the relationship between ecological processes and spatial patterns and land use on different levels and scales. He/She is an expert studying the interaction between ecosystems and how these interactions affect ecological processes in the environment.

Responsibilities and Tasks

Some responsibilities and tasks are knowledge of the structure, properties, processes in the landscape and their dynamics and based on socio-economic characteristics and phenomena, landscape ecologist carries out the determination of the potential of land use, the determination of the ecological carrying capacity of the landscape, the determination of the threat and load of the landscape. Interprets the landscape for the most optimal use for human activities and use of resources. Finally, the Landscape Ecologist deals with the impact of humans on the diversity of the landscape in terms of spreading and developing new pathogens that can affect the ecosystem

Education

Master´s/Engineer´s degree (in specialized natural sciences such as botany or forestry)

Essential Skills

- Problem Solving
- Attention to Detail
- Environmental protection
- Critical & Analytical Thinking
- Orientation in applied ecology
- Monitoring Performance
- Landscape-ecological planning

No special certificate required by law besides the university degree, driving licence type B1 recommended

Gaps & Needs in Skills

- Transversal Skills
- Project Management

EQF ●●●●●●●

Adaptive Forestry manager (AFM)

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Governance & Upskilling for a
Stronger Bioeconomy

Job description

Adaptive forest manager (AFM) is a specialist in minimizing the risks and impacts of climate change by reducing forest vulnerability. To address this challenge, quantitative information from several perspectives is needed. Silvicultural and Eco physiological field data, modelling studies, and remote sensing tools are crucial for AFM. Engages at different stages of a forest care program implementation and also in sustainable management of timber production and the preservation and protection of trees and the forest environment.

Responsibilities and Tasks

Management consists of planning and implementing activities meant to ensure the conservation and utilization of a forest, according to objectives to be achieved (among which, wood production) under a given physical, and socio-economic context. Ensures not only the optimal use of forest resources, but also to fully use the capacity of the forestry for the protection of forest ecosystems from natural disasters at regional and international level in the forest area of the temperate zone of Europe

Education

Master´s/Engineer´s degree or/and science degree in forestry or botany, with preference typically given to those with a forestry degree

Essential Skills

- Decision Making
- Critical Thinking
- Task Planning and Organising
- Quality Control
- Working with Others
- Monitoring Performance

No special certificate required by law besides the university degree

Gaps & Needs in Skills

- Sensor Technologies
- Driving Specialist Vehicles
- Local Bioeconomy Aspects
- Project Management

EQF ●●●●●●

Engineering & Processing

Engineering is the practice of using natural science, mathematics, and the engineering design process[17] to solve technical problems, increase efficiency and productivity, and improve systems. Modern engineering comprises many subfields which include designing and improving infrastructure, machinery, vehicles, electronics, materials and energy systems. **Processing** refers to a series of actions that are taken to change raw materials during the production of goods.

Engineering and Processing job positions require an analysis of functions of a product, or system being studied. They also focus on problem solving and life-cycle costs reduction while improving performance and quality. Job Profiles in Engineering and Processing in bioeconomy require a strong background in engineering, biology, and chemistry, along with a focus on sustainability and environmental considerations. Professionals in these positions contribute to the development of innovative and sustainable solutions for utilizing biological resources in industrial processes and they practice themselves on function analysis, recommendations and solutions, or the improvements of quality and performance.

[17] definition of "engineering" from the https://dictionary.cambridge.org/dictionary/english/ Archived, February 16, 2021, at the Wayback Machine Cambridge Academic Content Dictionary © Cambridge University

Environmental Engineer

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A professional who specializes on protecting the environment by reducing waste and pollution and optimizes the use of natural resources, help to develop renewable energy resources and maximize the use of existing materials. He/she is involved in the production of energy from renewable or sustainable sources of energy, such biofuels. Also involved in designing, developing, and building renewable energy technologies, caring out lab experiments and adapting them to large-scale industrial processes, keeping up to date legislation and environmental standards so to improve recycling, waste disposal, public health, and water and air pollution control.

Responsibilities and Tasks

Designing and overseeing the development of systems, processes and equipment for the control, management or improvement of water, air or soil quality Involving with the production of energy through natural resources, such as the extraction of oil and gas, as well as from renewable or sustainable sources of energy, including biofuels, hydro, wind and solar power. Providing engineering and technical assistance in environmental cleanup projects, including design of cleanup systems and regulatory enforcement. Monitoring the implementation of plans for the improvement of environmental activities.

Education

Bachelor's degree in engineering or environmental science

Sustainability Certifications: LEED AP,BREEAM Assessor, CEM, CSDP, RECs etc.

Essential Skills

- Attention to Detail
- Analytical & Critical Thinking
- Quality Control
- Processing Information
- Computer Use
- Working with Others
- Computer Use
- Monitoring Performance

Gaps & Needs in Skills

- Digital and Industrial Technologies
- Sustainable Business Models
- Networking and Cooperation
- Project Management

EQF

Sustainability Engineer

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A Sustainability engineer designs products and processes that drive material and energy efficiencies to minimize their environmental impact while cutting costs and improving the bottom line. By this engineering practice, ,manufacturers can minimize waste while maximizing the value they deliver. Today, consumers and investors alike are expressing tremendous interest in sustainability and in response, manufacturers are adopting sustainability initiatives into their product development strategies.

Responsibilities and Tasks

The responsibilities and tasks vary depending on each area of specialization and the project that he/she is working on. However some common tasks can involve: conducting sustainability assessments, developing sustainable design solutions, designing and testing machinery, developing ways of improving existing, processes, converting, transmitting and supplying useful energy to meet needs for electricity, researching and developing ways to generate new energy, reduce emissions from fossil fuels and minimize environmental damage, implementing sustainable solutions, conducting research, providing engineering and technical assistance in environmental cleanup projects and litigation.

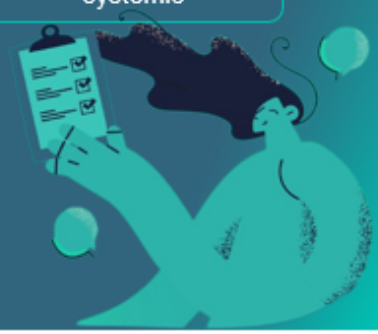
Education

Bachelor and/or master's degree in engineering/mechatronics/electronics or industrial engineering

University degree in mechanical engineering or a similar specialty

Essential Skills

- Problem Solving
- Technology awareness
- Task Planning and Organising
- Independent work
- Understanding of industrial operations and machinery
- Working with Others
- Computer Use
- Structured and systemic



Gaps & Needs in Skills

- Relevant databases and tools
- Specific industrial technologies
- Optimization models
- Data literacy

EQF

Bio-based Process Engineer

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

The role of Process Engineer in the field of bio-based and green chemistry involves working with various biologically derived materials and sustainable chemical processes to develop and optimize production operations. Next to that, integrating bio-based approaches in established processes is a key element. This position requires a strong understanding of both engineering principles and environmentally friendly practices.

Responsibilities and Tasks

Process Optimization: Analyze and evaluate existing processes, identify areas for improvement, and implement optimizations to enhance efficiency, yield, and sustainability. Test, check and maintain equipment. Contribute to the design process of new equipment. Supervise the production process. Improve product quality. Develop protocols. Support R&D department in process and product development.

Education

Bachelor's Degree University of Applied Sciences or Engineering

Essential Skills

- Problem Solving
- Critical/ Analytical Thinking
- Engineering experience certifications
- Decision Making
- Technology Design
- Task Planning and Organising
- Quality Control
- Working with Others
- Stress Tolerance

Gaps & Needs in Skills

- Transversal Skills
- Digital and Industrial Technologies
- Local Bioeconomy Aspects

EQF

Biotransformation Plant Operator

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Holds a senior position for overseeing all operations at a production or manufacturing facility. Is responsible for managing the Biotransformation group and its activities, overseeing the production process itself, as well as providing Molecular Biology Subject Matter Expertise in strain engineering and/or protein engineering. May oversee people and machinery, scheduling, and quality control, among other duties and work in a variety of industries, including agriculture, manufacturing, energy production, biological systems and transportation. Also works in factories, warehouses, or other sites where manufacturing processes take place, in facilities that utilize machinery or processes.

Responsibilities and Tasks

Oversees and maintains equipment at power plants, chemical plants, oil refineries, and other establishments that handle industrial, nuclear, or chemical materials and specialize in a specific piece of equipment or a particular part of the production or be required to monitor a number of processes. Some of responsibilities are: Ensuring that safety and environmental rules and programs are strictly adhered to, conceptualizing and recommending plant improvement strategies, carrying out site inspections and audits, observing gauges, dials, switches, and alarms, and other indicators to ensure that all machines are working properly.

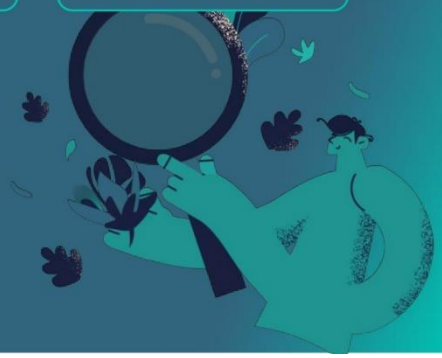
Education

Bachelor's degree

Essential Skills

- Decision Making
- Problem Solving
- Analytical/Critical Thinking
- Task Planning and Organizing
- Processing Information
- Working with Others
- Work Independently

Proficiency in math and technical subjects is preferred, experience in a manufacturing or industrial setting



Gaps & Needs in Skills

- Digital and Industrial Technologies
- Local Bioeconomy Aspects
- Data Literacy

EQF ●●●●●●●

Waste Management Specialist

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Waste Management Specialists typically is responsible for developing and implementing waste management plans that meet regulatory requirements and are cost-effective and coordinate comprehensive waste management systems that are designed to maximize waste prevention, reuse, and recycling opportunities.

Responsibilities and Tasks

A waste management specialist is responsible for analysing waste streams, promoting waste reduction and recycling, managing waste collection and transportation, evaluating waste treatment and disposal options, ensuring regulatory compliance, developing and delivering training programs, monitoring and analysing waste management data, playing a critical role in ensuring that waste is managed safely, efficiently, and in compliance with regulations.

Education

Bachelor's degree or Master's degree in environmental engineering, environmental sciences or a related field.

Essential Skills

- Problem Solving
- Quality Control
- Task Planning and Organising
- Monitoring Performance

Waste management licenses (waste collection, transportation, treatment, disposal, or recycling permits)

Gaps & Needs in Skills

- Local Bioeconomy Aspects
- Project Management

EQF ●●●●●●●

Biorefinery Manager

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Biofinery Manager is responsible for all aspects of plant operations including: health and safety, quality assurance, regulatory compliance, production, training, standard operating procedures, human resources, budget, maintenance, and facility management. Provides guidance, input and oversight to operations and maintenance activities by collaborating on solutions to biofuels production plant issues and ensures that production is efficient and effective. Also collaborates on the development of capital and operating budgets and are held accountable for delivering on-time, on-budget results and ensures that all levels of safety within the plant and the environmental conditions meet compliance standards at all times.

Responsibilities and Tasks

Some of responsibilities are: providing leadership, developing budget, identifing required maintenance of business and improvement, analyzing financial and operational data, developing policies and procedures, following standard operating procedures, ensuring compliance with codes, regulations and standards, maintain plant's record system, managing projects, coordinating contracted services, managing purchase orders, managing risk, seting organizational priorities, managing and protecting intellectual property.

Education

Bachelor's degree in Engineering, Business Administration, or Science with specialization in Chemistry, Biotechnology, or Physics

Essential Skills

- Technology Design
- Problem Solving
- Computer Use
- Task Planning and Organizing

Certifications that show a higher level of competency in quality or management systems

Gaps & Needs in Skills

- Local Bioeconomy Aspects
- Project Management
- Networking and Cooperation

EQF ●●●●●●

Biorefinery Technician

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Biorefinery technician typically is responsible for a range of duties related to the operation and maintenance of equipment used in the production of biofuels, bioplastics, and other bioproducts. Some common responsibilities of a biorefinery technician are operating and maintaining a variety of equipment used in the production of bioproducts, conducting quality control tests, troubleshooting and repairing equipment, monitoring production processes, maintaining accurate records of production data, quality control tests, and equipment maintenance. Biorefinery technician is supervised by Biorefinery Manager or a Plant operator.

Responsibilities and Tasks

Some common responsibilities and tasks of a biorefinery technician are equipment operation and maintenance (fermentation reactors, distillation units, centrifuges, pumps, and other specialized equipment); conducting quality control tests on raw materials, intermediate products, and finished products; closely monitoring production processes to ensure that they are running smoothly and that products are being produced according to specifications and identifying potential issues and taking corrective actions; record-keeping of production data, quality control tests, and equipment maintenance; cleaning and maintaining the equipment and production areas to ensure that they are in good working condition; and development and implementation of process improvements to increase production efficiency and reduce waste.

Education

High school diploma or equivalent, and some may require a technical diploma, certificate, or a degree in a relevant field.

Essential Skills

- Quality Control
- Problem Solving
- Monitoring Performance
- Task Planning and Organizing

Biorefinery permits, certifications and qualifications in biorefinery engineering (EUREM PMP, SBP etc.)

Gaps & Needs in Skills

- Transversal Skills
- Local Bioeconomy Aspects
- Digital and Industrial Technologies
- Networking and Cooperation

EQF ●●●●●●

Bio-based Process Operator

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

The role of Process Operator in the field of bio-based and green chemistry involves working with and optimizing green and sustainable processes and machinery in an industrial setting. Next to that, integrating bio-based approaches in established processes is a key element. This position requires a strong understanding of both operational processes and environmentally friendly practices.

Responsibilities and Tasks

Some responsibilities are: Monitor production processes, directly at the installation and from the control room; Set up, adjust and convert machines; Perform quality measurements; Operate and monitor security protocols; Optimize process and output; Act appropriately in the event of malfunctions; Perform minor repairs; Administrative processing, checking and correcting data from the installations; Identify and report errors, environmental issues or other details; Report to those involved, including the manager; Clean installations and keep the workplace clean.

Education

Vocational Training

Experience certifications

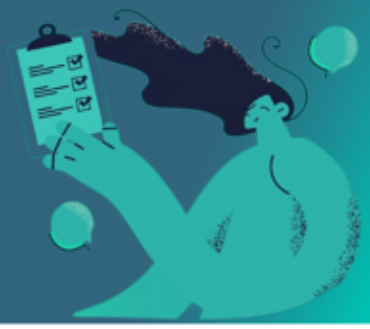
Essential Skills

- Decision Making
- Problem Solving
- Analytical Thinking
- Working with Others
- Stress Tolerance

Gaps & Needs in Skills

- Transversal Skills
- Local Bioeconomy Aspects
- Digital and Industrial Technologies

EQF



Consulting/Advisory

The job profiles in this category provide guidance and solutions to organizations, businesses, and individuals. In the field of bioeconomy, consulting and advisory roles play a crucial role in helping organizations navigate the complex landscape of sustainable and bio-based business practices. The following job profiles in Consulting category often require a combination of expertise in bioeconomics, environmental science, business, and policy. Professionals in these positions play a vital role in shaping the future of sustainable and bio-based industries.

Advisor on social Agriculture

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Provides information on social economy and support for enterprises focused on social agriculture and leadership in design, development, planning, implementation, and capacity-building for agriculture and food security. An Adviser on social Agriculture is also responsible to gather, review, report and make recommendations based on findings to help increase yields, improve efficiency and reduce losses and to deal with issues such as animal nutrition, pest control, disease control, harvesting practices, and much more.

Responsibilities and Tasks

Raises awareness of the social economy and agriculture, provides interested and potential social economy actors with information on social entrepreneurship in agriculture, information on the Social Economy and Social Enterprises Act, guidance and the necessary assistance and support for the start-up of newly emerging social enterp rises. Also advises farmers, rural industries and government on aspects of farming, develop techniques for increasing +AV10+AT10.

Education

Bachelor degree or higher qualification in social studies

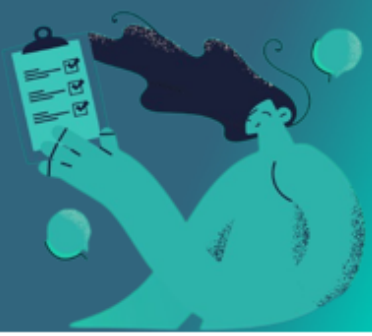
No special certificate required by law. Expertise in agriculture, social entrepreneurship

Essential Skills

- Problem Solving & Critical Thinking
- Decision Making
- Application of organic farming principles
- Legislation in the field of social entrepreneurship
- Crop and agronomy knowledge
- Task Planning and Organising
- Working with Others
- Finding Information
- Orientation in funding schemes

Gaps & Needs in Skills

- Transformation and diversification of business activities in agriculture
- Transversal Skills
- Socioeconomic Development
- Sustainable Business Models
- Working with the disadvantaged and vulnerable
- Ethical and Justice Aspects
- Networking and Cooperation



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Farming Advisor

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A farming advisor is an expert who provides advice to farmers on a wide range of topics, including agronomy, animal husbandry, environmental sustainability, and business management. Their primary goal is to enhance agricultural productivity, sustainability, and profitability while taking into account regulatory, environmental and economic considerations.

Responsibilities and Tasks

Advice on obligations at farm level resulting from the statutory management requirements and the standards for good agricultural and environmental land conditions. Advise on best practices for crop cultivation, including planting, fertilization, irrigation, and pest control. For livestock farming, offer guidance on animal husbandry, nutrition, and health management. Promote agricultural practices beneficial for the climate and the environment and maintenance of the agricultural area. Recommend appropriate soil improvement techniques, efficient water management strategies. Advise on measures provided for in rural development programmes for farm modernisation, competitiveness building, sectorial integration, innovation and market orientation, as well as the promotion of entrepreneurship.

Education

Master´s/Engineer´s degree in sustainable agriculture related fields.

Certification of Agricultural Advisers

Essential Skills

- Agronomic Knowledge
- Business Acumen
- Data Analysis
- Legal and regulatory knowledge
- Project management skills
- Communication skills
- Working with Others
- Self-motivation, adaptability and Interpersonal skills
- Accuracy and a methodical approach to work

Gaps & Needs in Skills

- Cross-disciplinary understanding
- Sustainable and climate friendly practices in farming
- Market analysis
- Sustainable Business Models
- Technological proficiency
- Socioeconomic Development
- Local Bioeconomy Aspects
- Data Literacy

EQF

Bio-based Business & Production Consultant

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A Bio-based Business & Production Consultant is responsible for advising product-oriented businesses and organisations on the development and implementation of bio-based products and processes and also to facilitate the development and implementation of sustainable solutions that promote the use of biomass as a source of renewable energy and raw materials. These professionals have in-depth knowledge of the bio-based industry and can apply this knowledge effectively to improve the strategy and production processes of companies.

Responsibilities and Tasks

Some responsibilities and tasks of these professionals are to analyze the bio-based industry and market trends and advise companies on the implementation of bio-based processes, research technologies and suppliers, and prepare business cases and project plans to support the implementation of bio-based products and processes. Coordinate the efforts of different organizations and stakeholders involved in the bio-based economy, and ensure that their activities are aligned with the organizations' strategies. Monitor the progress of the transition towards a bio-based economy, and report periodically to senior management and other stakeholders.

Education

Minimum higher vocational education (HBO) with over 5 years of experience in the industry

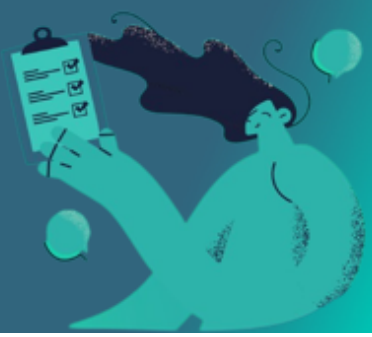
A degree in chemistry, biotechnology, engineering or a related field

Essential Skills

- Technology Design
- Problem Solving
- Critical & Analytical Thinking
- Working with Others
- Finding Information

Gaps & Needs in Skills

- Digital and Technologies
- Sustainable Business Models
- Networking and Cooperation



EQF

Consultant for the topic of Green Tech - Resource Efficiency, Bioeconomy

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A specialist in resource efficiency, green technology, and the bioeconomy. These professionals work closely with clients from various sectors to develop sustainable strategies, identify opportunities for resource optimization, and promote environmentally friendly practices. Their main objective is to help organisations to transition to a more sustainable and efficient strategy and future. This consultant contributes to the proactive maintenance and expansion of relevant Green Tech or bioeconomy networks in Europe as well as for the active support of scientists and companies in the preparation and development of new EU funding applications.

Responsibilities and Tasks

Some responsibilities and tasks of these professionals are providing expert guidance to other professional and clients on resource efficiency, green technology adoption, and bioeconomy strategies; conducting assessments to evaluate where there's a need to improve resource efficiency; developing sustainable strategies; analysing data and use of it to provide the clients with improvement and develop actionable recommendations; provide training and education to clients and their employees on resource efficiency, green tech, and bioeconomy concepts; promote awareness and understanding of sustainable practices and their benefits and monitor progress of sustainability initiatives.

Education

Diploma/master's degree program in a scientific, technical or environmental degree program or in administrative sciences, administrative economics, political science, business administration

Essential Skills

- Professional experience
- Project management
- Communication skills development certification
- Funding procedures
- Working with Others
- Confidence & independent working
- Conceptual & Analytical Thinking
- Above average motivation
- Written & oral expression skills

Gaps & Needs in Skills

- Environmental technology
- Resource efficiency
- Communicate complex technical contexts
- Funding mechanisms
- Horizon Europe regulations
- IT skills
- Digital communication formats

EQF

Prefab Building Production worker

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A Production worker in a Bio-based Prefab Building factory is responsible for the production of bio-based building materials and components. These professionals work in a team, following production schedules and quality standards to ensure the timely delivery of high-quality products. They are competent to also assemble the building parts.

Responsibilities and Tasks

Some responsibilities of this professional are to operate and maintain production equipment, including saws, presses, and other machinery used in the production of bio-based building materials, read and interpret production schedules, work orders, and technical specifications ensuring that production processes are followed correctly, follow safety protocols and maintain a clean and organized work area, measure, cut, and shape bio-based building materials and assemble and fabricate biobased components using various techniques such as nailing, stapling, gluing, and drilling. Other tasks are performing quality control checks on finished products to ensure they meet technical specifications and quality standards and participating in process improvement initiatives, identifying opportunities to streamline production processes and improve quality.

Education

Vocational Training

Essential Skills

- Attention to Detail
- Quality Control
- Working with Others
- Computer Use
- Equipment operation and maintenance skills
- Ability to read technical drawings
- Stress Tolerance

High school diploma or equivalent

Gaps & Needs in Skills

- Logistics and Transport
- Digital and Industrial Technologies

EQF

Risk Assessor

BioGov.net
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Stronger Bioeconomy

Job description

A business expert responsible for determining the potential consequences of performing a business action. An assessor duties include reading and analyzing financial data, creating visual models to represent possible outcomes and preparing reports about business decisions.

Responsibilities and Tasks

Risk Assessor uses advanced analytical skills to calculate the risk of a financial decision. Reporting this information to team members along with suggestions for reducing the risk. Specific responsibilities: Makes recommendations to reduce risk, including diversification, portfolio investment and currency exchanges, uses analytical software to calculate the risk of a decision, consult with business decision-makers and understand data needs, evaluates business and finance records and determine the level of risk and creates reports and anticipate the losses of certain business decisions.

Education

Bachelor's degree in business, accounting, finance or statistics

Essential Skills

- Decision Making
- Analytical Thinking
- Communication skills
- Processing Information

Experience certification

Gaps & Needs in Skills

- Project Management
- Local Bioeconomy Aspects
- Data Literacy

EQF ●●●●●●●

Life sciences

Life sciences play a pivotal role in bioeconomy by providing the scientific foundation for understanding, manipulating, and harnessing biological systems for sustainable and innovative applications. The following Job Profiles present key areas within life sciences

that contribute to the bioeconomy. Life scientists in the bioeconomy work across disciplines to drive innovation, sustainability, and efficiency in the use of biological resources. Their research and applications contribute to the development of bio-based products, processes, and solutions that address global challenges related to resource depletion and environmental sustainability.

Pharmacologist

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A Pharmacologist is a scientist who investigates how drugs and chemicals interact with biological systems. Main aim is to understand biodiversity, especially for medicines and their actions to enable their effectiveness and safety. A Pharmacologist carries out researches to aid drug discovery and development, determines how biological systems function with the aim of identifying how components of the subsystem can be targeted by drugs and/or chemicals for therapeutic gain. The main role includes improving the diagnosis, prevention and treatment of physiological diseases. A pharmacologist may carry out in vitro or in vivo research to predict what effect certain drugs might have on humans.

Responsibilities and Tasks

Identify potential research areas that also apply in bioeconomy, develop research hypothesis, develop the research plan for an initiative, execute, organize and support the research plan, analyze data and interpret results, report findings, develop and implement trial plan and protocol, monitor the trial, collect and review data, assess research / trial outcomes, present results, provide expert or advisory services.

Education

Advanced degree such as a Pharm.D. or a PhD in a relevant scientific field.

Training and theoretical courses and laboratory research in medicine, pharmacy, molecular biology or biochemistry

Essential Skills

- Attention to Detail
- Critical Thinking
- Quality Control
- Finding Information
- Stress Tolerance

Gaps & Needs in Skills

- Data Literacy
- Project Management

EQF ●●●●●●●

Microbiologist

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Microbiologist is a biological scientist who implements research on microorganisms in order to understand how they affect our lives and how we can exploit them. This position needs to conduct research, document the findings, write reports and research papers, supervise laboratory staff and study microorganisms (microbes) to solve a range of problems affecting the environment, food and agriculture, human health, and climate.

Responsibilities and Tasks

Supervise and conduct research on various microbiological activities on a regular basis; Maintain knowledge on various research methods and perform all manual operations on various supplies; Develop and maintain validation in all protocols for various environmental controls; Perform laboratory analysis on all materials after appropriate sterilization; Proficient in methods and practices of microbiological analysis; Great ability to prepare research papers and technical reports; Study various cultures of microorganisms in isolation according to standard inhibition and ensure control over moisture and temperature

Education

Advanced degree in a relevant subject such as microbiology, biomedical sciences, or biology

Essential Skills

Strong IT and math skills, training as a biomedical scientist

- Analytical Thinking
- Critical Thinking
- Self-motivation
- Accuracy and a methodical approach to work
- Attention to Detail

Gaps & Needs in Skills

- Data Literacy
- Error management

EQF

Bioinformatician

BioGov.net
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Stronger Bioeconomy

Job description

Bioinformatician develops methods, standards, guidelines and documentation for the data management team of companies. Works with and supports the functions of data capture and analysis, laboratory automation, database mining, software development and scientific management systems. Bioinformatician uses computational approaches to extract information from chemical, biological and ecological measurements, enabling them to analyse and interpret the experimental data. Often involved in drug design and gene expression work by performing analysis on the data obtained. Working as part of a team collaborates with scientists, IT personnel, government agencies and executives.

Responsibilities and Tasks

Provides expertise to molecular biology, infers protein sequence structure and function, identifies metabolic networks, creates and modifies bioinformatics software, designs algorithms, maintains and administers database, performs statistical analysis and data mining, organizes data, utilizes data repositories, interacts with clients, interprets search findings from data repositories, disseminates information, chooses appropriate media for data representation, writes technical report, demonstrates computational statistical and molecular biological proficiency.

Education

Undergraduate or graduate-level degrees in computer science and/or applicable scientific field such as biology, chemistry, biochemistry

Essential Skills

- Problem Solving
- Finding Information
- Working with Others
- Computer Use

Algorithm courses for solving various biological problems, professional computer learning certifications

Gaps & Needs in Skills

- Digital and Industrial Technologies
- Sensor Technologies
- Project Management

EQF 6

Laboratory technician

BioGov.net
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Stronger Bioeconomy

Job description

A Laboratory Technician plays a crucial role in supporting laboratory operations and conducting scientific experiments including sample preparation, performing tests and analyses, maintaining laboratory equipment, and ensuring adherence to safety protocols. This position requires strong technical skills, attention to detail, and a commitment to maintaining accurate records and producing high-quality results.

Responsibilities and Tasks

Execution and documentation of laboratory analyses and sample preparation; test and analysis; data collection and recording; support in the preparation of the measurement results and the laboratory organisation, including the ordering of laboratory materials; equipment operation and maintenance; laboratory safety; quality control and assurance and record keeping and documentation.

Education

Completed training as a laboratory technician, chemical laboratory assistant, biological technical assistant or in a comparable field

Essential Skills

- Professional experience
- Independent working
- Biotechnology /Molecular Biology Laboratory Technician Certificate
- Communication
- Structured working
- Working with Others
- Interpersonal skills
- Use of complex laboratory equipment
- Ability to keep detailed records
- Analytical Thinking
- Attention to Detail
- Knowledge of Biosecurity measures

Gaps & Needs in Skills

- Wet chemical and instrumental analysis of raw materials
- Basic software (MS Office)
- Driver's license
- Preparation of biomass samples
- Implementation of complex laboratory protocols

EQF

Humanities & Art

While bioeconomy is often associated with science, technology, engineering, and mathematics (STEM) disciplines, there are also important roles for professionals from the humanities, art and creativity. These individuals contribute to areas such as communication, social inclusion, social dialogue, facilitation, and public engagement,

playing a significant role in shaping the narrative and ethical considerations of bioeconomy initiatives. Incorporating art and creativity into bioeconomy job profiles is considered by BioGov.net partners as important for fostering effective communication, and a well-rounded approach to sustainable development. These job profiles demonstrate the diverse ways in which humanities and creativity can enhance bioeconomy initiatives by fostering a deeper understanding, appreciation, and connection with various stakeholders, including the general public. Their perspectives help to ensure a more holistic and inclusive approach to the development and implementation of bioeconomy projects. Integrating aforementioned skills helps create a more holistic and socially conscious approach to bio-based projects.

Relevant job profiles identified by BioGov.net partners are the following.

Bioeconomy Science Communicator

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Bioeconomy Science Communication is universally recognized as a critical element to boost the transition towards a more sustainable future. The Bioeconomy Science Communicator, specialized in the bioeconomy, raises awareness and promotes knowledge and education about bioeconomy and bio-based products. Depending on the target audiences, the communication can be more general or specific (e.g. business models, finance, stakeholder engagement, etc.). The science communicator can also play a role in engaging and mobilising stakeholders in events and workshops aiming at addressing barriers and enabling opportunities for the bioeconomy and bio-based economy uptake.

Responsibilities and Tasks

This figure bridges communication capacities with extensive knowledge of the topic addressed. The responsibility may vary depending on the type of communication and target audiences. The science communicator is in general a creative person that designs and implements formats to effectively reach the intended target audiences.

Education

Bachelor's degree in Communication. Additional training or certifications with respect to bioeconomy and bio-based economy.

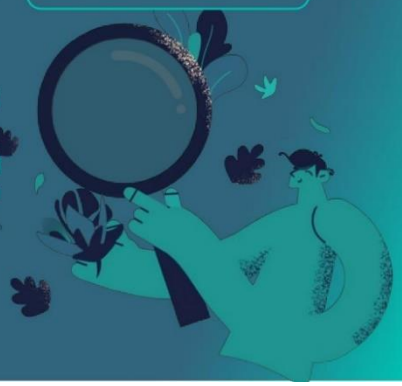
Essential Skills

- Finding Information
- Problem Solving
- Analytical Thinking
- Task Planning and Organizing
- Systemic knowledge of the bioeconomy
- Working with Others
- Critical Thinking

No Professional Certification beyond the University Degree

Gaps & Needs in Skills

- Transversal Skills
- Sustainable Business Models
- Socioeconomic Development
- Local Bioeconomy Aspects
- Project Management
- Networking and Cooperation
- Public speaking
- Communication



EQF ●●●●●●●

Bioeconomy Multi-stakeholder Dialogue Facilitator

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Bioeconomy Multi-stakeholder Dialogue Facilitator is a job profile that will become increasingly important in the future, to make sure flow of information and ideas within different sectors, fields and stakeholders is achieved in a smooth and transparent way. The Facilitator recognises the importance of achieving equity and accountability in communication between stakeholders and gets involved in multilateral interactions to enhance levels of trust, discussion and collective problem solving amongst different stakeholder groups or individuals.

Responsibilities and Tasks

Bioeconomy Mutli-stakeholder Dialogue Facilitator need to have the skill of holistic thinking (system thinking), which involves considering the whole over the parts and the capacity to identify and work with all possible stakeholders who might have insight or who might be affected, positively or negatively, by the proposed changes (in the education and training programmes and ecosystems). Also is an external figure providing consultancy in the following topics: awareness on circular bio-based processes, specific knowledge to improve the value chain's sustainability, specific solutions and processes to implement the changes, assessment and measurement, methodology capacities and skills needed.

Education

Bachelor's Degree preferably in business administration, social sciences, or a scientific field.

Essential Skills

- Problem Solving
- Critical Thinking
- Analytical Thinking
- Systemic knowledge of the bioeconomy
- Working with Others
- Communication skills

Trainings or certifications with respect to bioeconomy and bio-based economy

Gaps & Needs in Skills

- Transversal Skills
- Sustainable Business Models
- Socioeconomic Development
- Local Bioeconomy Aspects
- Public speaking
- Networking and Cooperation
- Knowledge of value chains and processes

EQF ●●●●●●●●

Social Innovation and Social Impact Manager

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

Social Innovation and Social Impact Manager refers to the design and implementation of new solutions that imply conceptual, process, product, or organisational change, which ultimately aim to improve the welfare and wellbeing of individuals and communities. The Social Innovation and Social Impact Manager creates meaningful social change and impact that is regarded as crucial to tackle societal problems while creating value for the organisations and businesses. He/she could undertake the role of the social impact designer to proactively manage and maximize the positive social and environmental impact of a business, nonprofit, or organization.

Responsibilities and Tasks

Involves in designing projects or programmes, while setting goals and targets for impact, implementing strategies to achieve those goals, and regularly measuring and reporting progress, organises regular meetings with target beneficiaries and strong qualitative and quantitative research skills to collect data from stakeholders to measure impact in a continuous and iterative way. In the case that the set targets are not met in terms of impact on the communities and society, the social innovation and impact manager will need to identify the gaps and necessary changes that can be made in the design of the programmes to reevaluate and revise necessary actions.

Education

Bachelor's Degree needed for this career, preferably in a business administration, social sciences, or a scientific field.

Essential Skills

- Analytical Thinking
- Task Planning and Organising
- Working with Others

No specific certification is necessary.

Gaps & Needs in Skills

- Transversal Skills
- Sustainable Business Models
- Project Management
- Socioeconomic Development

EQF

ESG expert

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

The content of work is to bring to life and manage sustainability projects based on company s ESG strategy. It involves mapping and analysing the internal processes of the industry's/plant's operation, give an assessment and plan actions for making operations more sustainable, participate in various field projects and work closely with the head of the quality and with other engineers in the field of sustainability to meet EPD (Environmental Production Declaration) of the production. Position is supporting reports of the manager of the quality area in the field of sustainability preparation and participate in the preparation of the factory budget, giving input about the needs of sustainability activities. In addition, position provides technical support for the work and sales, also to product engineers.

Responsibilities and Tasks

A sustainability expert who can take a leading role in the company in the strategic planning of ESG activities, in achieving measurable goals and indicators for sustainable development and climate neutrality, in the preparation of sustainability reports and in the development of new business models, and in the provision of sustainable products and services on the long-term towards interests of customers.

Education

Bachelor and/or master's degree in environmental sciences and/or economics and/or industrial engineering, technology management, energy or environmental protection engineering, or comparable courses of study

A degree in (environmental) technology, engineering or economics or a related field.

Essential Skills

- Structured and systemic
- Processing Information
- Computer Use
- Strategic thinking
- Strong economic & industrial mindset
- Environmentally aware

Gaps & Needs in Skills

- Digital and Industrial Technologies
- Project Management

EQF

Biobased products Artist & Fashion Designer

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Job description

Biobased Artist and Fashion designer sketches designs of biobased products (commercial or industrial goods -other than food or feed- composed in whole or in a significant part of biological products, forestry materials, or renewable domestic agricultural materials, including plant, animal, or marine materials) clothing, footwear, and accessories. Also creates original clothing, accessories, and footwear, selects fabrics or patterns and gives instructions on how to make the products they design.

Responsibilities and Tasks

Study fashion trends and anticipate designs that will appeal to consumers decide on a theme for a collection, use computer-aided design (CAD) programs to create designs, visit manufacturers or trade shows to get samples of fabric, select fabrics, embellishments, colors or a style for each garment or accessory, work with other designers or team members to create prototype designs, present design ideas to creative directors or showcase their ideas in fashion or trade shows, market designs to clothing retailers or to consumers, oversee the final production of their designs.

Education

A bachelor's degree to enter the occupation.

Essential Skills

- Attention to Detail
- Technology Design
- Quality Control
- Task Planning and Organizing
- Computer Use
- Working with Others

Industrial design certification for (bio)products, design programs certification, computer learning certifications

Gaps & Needs in Skills

- Transversal Skills
- Networking and Cooperation
- Digital and Industrial Technologies

EQF ●●●●●●

Sustainable architect and designer

BioGov.net
Governance & Upskilling for a
Stronger Bioeconomy

Job description

A Sustainable architects and designer is challenged to produce smart designs to ensure healthy living environments while aiming to minimise negative environmental impacts, energy consumption, and the use of human resources. This can be achieved through the implementation of green technologies, the recycling of materials and the use of renewable energy sources. Bio-architecture and bio-design are part of an emerging movement, whose aim is to incorporate the use of living materials, such as fungi, algae, yeast, bacteria, and cultured tissue for construction and design applications. These professionals essentially cross traditional art-design-science boundaries in order to create new architecture/design solutions and technologies.

Responsibilities and Tasks

Sustainable architect and designer needs to recognise the existing natural resources and environmental conditions and incorporate these factors in their practice to ensure a delicate balance between a building/design piece's form, aesthetics, function and its interactions with the surrounding environment. This is reflected in the choice of materials, construction methods, resource use and design in general.

Education

Bachelor's degree in Architecture or Design Additional trainings or certifications in sustainable architecture and design practices.

Essential Skills

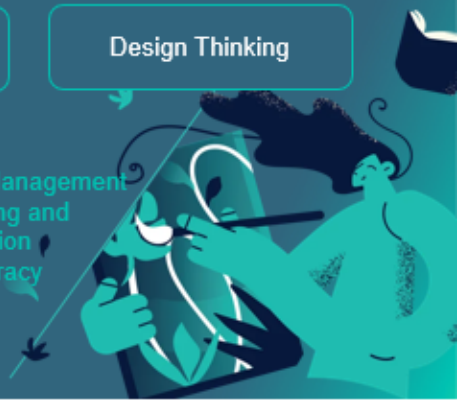
No Professional Certification beyond the University Degree

- Attention to Detail
- Technology Design
- Monitoring Performance
- Task Planning and Organizing
- Quality Control & Information Processing
- Computer Use
- Working with Others
- Design Thinking

Gaps & Needs in Skills

- Transversal Skills
- Digital and Industrial Technologies
- Sustainable Business Models
- Socioeconomic Development
- Project Management
- Networking and Cooperation
- Data Literacy

EQF



6 Critical Review of the collected job profiles

A critical review of the exercise on collecting different job profiles for occupation in bioeconomy, highlights both the target and challenges of this deliverable. Bioeconomy, which encompasses the sustainable utilization of biological resources for various applications, such as agriculture, forestry, and biotechnology, has the potential to drive innovation and address pressing global issues, including climate change and resource depletion.

According to the job profiles that were analysed in this deliverable one important result is the impressive growth in the bioeconomy sector. Investments and research have yielded significant advancements in bioenergy, bioproducts, and biotechnology, opening new markets and opportunities. This indicates a shift towards a more sustainable and environmentally friendly economy[18] which creates new job opportunities.

However, critical examination also reveals certain drawbacks and gaps between the value chains and each job profile. An equitable distribution of benefits remains a challenge, as large corporations that absorb more employees often in positions with prerequisite knowledge, skills and training, dominate the bioeconomy landscape, leaving marginalized both smaller stakeholders and lower requirements' job positions.

As for geographical & thematic orientation, most job profiles are relevant both at European and at regional level.

By understanding the differences, the gaps and the common skills between the profiles of each category, a comparison is made to draw reasonable conclusions about the groups of profiles separately.

Research and Development

The Research and Development (R&D) component plays an essential role in driving innovation and progress across various industries. Despite the diversity of jobs within this category, they share several common skills that contribute to their collective success. Most of the profiles in this category (Table 4) demand a commitment to problem-solving and are tasked with identifying challenges and creative solutions. So, they have critical thinking as a common skill. Collaboration skill is another shared element. Effective communication and teamwork are vital for sharing knowledge, pooling resources, and refining ideas. Continuous learning and adaptation are crucial, given the ever-evolving nature of technology and knowledge. Employees in R&D must stay up to date with the latest trends and research, fostering a culture of growth and development. Moreover, decision making is a common thread throughout the R&D value chain. Balancing the pursuit of innovation with resource allocation and potential setbacks requires careful consideration. Additionally, rigorous data analysis and measurement are core to all jobs in this category to assess the impact of innovations and improvements. All the profiles in R&D demand a master's or bachelor's degree and the EQF level ranges between 6 to 7,

[18] Fritsche, U., Brunori, G., Chiaramonti, D., Galanakis, C., Hellweg, S., Matthews, R. and Panoutsou, C., Future transitions for the Bioeconomy towards Sustainable Development and a Climate-Neutral Economy - Knowledge Synthesis Final Report, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-21518-9, doi:10.2760/667966, JRC121212. https://publications.jrc.ec.europa.eu/repository/handle/JRC121212

meaning that they demand highly specialised knowledge and advanced problem-solving skills.

Regarding the gaps and needs recorded among the features in this category almost all job titles have lack of communication skills that can hinder project success. Improved communication and information sharing can enhance teamwork and productivity. In many R&D sectors, such as Specialist in research and development in printing production or Research and development Specialist in wood processing, there's a gap in knowledge about scientific research and development methods. Bridging this gap by promoting cross-disciplinary training can lead to more innovative and holistic solutions.

Primary production

Building new bioeconomy value chains by setting up new agro-industrial cooperation is a challenge for many regions in Europe that want to unlock their bioeconomy potential. The involvement of farmers is a cornerstone for a sustainable bioeconomy, where technological innovations are able to attract new industrial investment and provide new agricultural income within ecological boundaries. In fact, both food and biobased product innovations require structural change in the value chains. This means that farmers and industry have to find new collaboration forms, new contracts or networks to put innovations into practice. These changes require careful testing, and can be facilitated by public intermediaries and by multiple policy instruments from a wide spectrum of policy spheres[19].

The primary production category includes agriculture, productive fisheries, and plantation forestry, along with the infrastructure, workforce and communities that support them. It covers the full value chain: key inputs, growth and harvest, production, and processing – everything that gets products to market and encompasses a wide range of jobs involved in the initial stages of creating raw materials and resources. Despite the diversity of roles within this category, there are commonalities that tie these jobs together. All jobs in primary production are intimately connected to the environment, especially with field. They require a deep understanding of natural systems and ecosystems, emphasizing the importance of sustainable practices to ensure the long-term availability of resources. Another shared element is a strong emphasis on physical labor, stress tolerance and machinery operation. Many jobs in primary production, such as *Biomass Producer & Mixed Farmer* (Table 4), involve hands-on work in often challenging conditions, demanding physical endurance and expertise in handling specialized equipment. Meticulous task planning and work organizing is a common skill in job profiles of primary production which needs careful planning and organization to confront seasonal variability, changing conditions and labor management. Risk management skills and problem solving are also highly appreciated skills in this category. Primary production jobs are exposed to various risks, including weather-related challenges, market fluctuations, and safety concerns. Professionals in these sectors need to employ risk management strategies to mitigate potential setbacks and ensure operational continuity. Working with others is also prominent in primary production. These jobs often involve working closely with local communities, other farmers, researchers, suppliers and processors. Moreover, they are jobs that need collective work in a certain period of time. In addition, quality control and safety standards are crucial.

[19] https://www.agro-chemistry.com/agenda/inclusion-of-primary-production-in-biobased-value-chains/

Whether it's ensuring food safety in agriculture and human health or minimizing environmental impacts, maintaining high standards is a shared concern.

The primary production value chain thrives on the dedication and expertise of professionals who, despite the diversity of their roles, collectively contribute to the foundational stages of resource creation and sustainability[20].

In this category there are job profiles with low EQF level with no specific qualification needs, such as Biomass Producer & Mixed Farmer or Social Farmer. Some other profiles in the same category demand a master's or bachelor's degree in agricultural science, agribusiness, or a related field with EQF level 6 to 7, such as *Landscape Ecologist or Adaptive Forestry manager* both demanding a master's degree.

In addition to the common skills, that were observed in the profiles of this category, there are also several common gaps and needs in skills which are presented below.

- Technical farming skills: While there has been a growing trend towards automation and technology adoption in primary production, some job profiles have been slower to embrace these advancements. There is a gap in the integration of digital tools data analytics, and automation into traditional roles, which can enhance efficiency and sustainability.
- Local Bioeconomy Aspects: even though primary production professionals work with given natural resources, they often are not aware of local bioeconomy aspects. The success of bioeconomy is highly dependent on understanding and integrating into the local context. Factors such as climate, soil conditions, biodiversity, and cultural practices vary widely from one region to another, influencing the feasibility and sustainability of bio-based initiatives.
- Networking and cooperation: Primary production in bioeconomy often involves numerous small-scale farmers, foresters, and producers. Small-scale producers, especially in rural areas, may face resource constraints, making it difficult to invest time and effort in networking activities. Limited access to technology and communication infrastructure can exacerbate these challenges. Moreover, in some cases, primary producers operate in isolation, limiting the exchange of information and best practices. This lack of networking and cooperation can impede the adoption of innovative and sustainable techniques.
- Sustainable business models: While sustainability being a common theme, there is a gap in the level of expertise and commitment to sustainable practices across job profiles. In some cases, professionals of primary production may adhere to traditional farming or production methods, which may not align with modern sustainable business models. Developing a shared understanding and commitment to sustainability is essential to address environmental challenges. Access to adequate education and training programmes that specifically address sustainable business practices are needed to result in sustainable business models.

[20] https://idl-bnc-idrc.dspacedirect.org/server/api/core/bitstreams/dfcdbc99-9203-4c26-9865-450ff6ea1fd7/content

Engineering & Processing

The engineering and processing in the Bioeconomy encompasses a wide range of job profiles involved in designing, manufacturing, and processing products and systems across various industries. These job profiles share common characteristics about essential skills such as technology awareness, technology design, computer use and technical expertise which are shared requirement across the category. Some of these job profiles are *Environmental Engineer*, *Sustainability engineer*, *Biorefinery Manager* and *Bio-based Process Engineer* (Table 4).

All professions in this category require a commitment to decision making and problem-solving. Whether it's optimizing a manufacturing process, or troubleshooting technical issues, professionals in this field regularly face challenges that demand creative solutions. The ability to work effectively with others is identified as essential skill in engineering and processing within bioeconomy. Critical thinking is also key to analyzing challenges and finding effective solutions. These skills contribute to innovation, and successful collaboration in the complex and dynamic field of bio-based processing. Analytical thinking and information processing are essential skills for these professionals too, and help them encounter various challenges in biomass conversion, equipment optimization, and product development.

Finally, most of the job profiles involve project management responsibilities, overseeing timelines, processing information, and resources so to ensure successful product development and production.

This category gathers job profiles of EQF level from 5 to 7, meaning bachelor’s degree in engineering and engineering experience certifications.

While technical expertise is crucial, there is often a gap in interdisciplinary knowledge, especially in digital and industrial technologies. Engineers and processing professionals should prioritize learning about automation, data analytics, and digital tools to stay competitive. Bridging this gap by fostering cross-disciplinary training can lead to more comprehensive and innovative solutions. There’s also a growing gap in knowledge related to local bioeconomy aspects. In an increasingly eco-conscious world, engineers and processors need to address this gap by integrating sustainable practices relevant to local contexts into their work.

A crucial skill gap identified by the consortium in these professions is project management. As mentioned before project management is a much-needed skill. If some professionals lack in this, they pose significant challenges to the successful execution of projects within the field of bioeconomy. Project management is crucial for ensuring that engineering projects are completed on time, within budget, with local resources and to the satisfaction of stakeholders. Educational programmes or workshops to enhance project management skills are considered of indispensable need, paired by mentoring sessions and certifications. Moreover, training on project management tools and software to assist these professionals in planning, tracking, and managing projects effectively is helpful.

Consulting/advisory

Consulting and advisory job profiles provide expert guidance and solutions to organizations, businesses, and individuals. While these roles differ in focus and expertise, they share several commonalities, along with gaps and needs.

All job profiles in consulting and advisory (Table 4) require deep subject matter expertise, whether it's in management, finance, technology, or any other field. Being a knowledgeable authority is fundamental. Also, professionals in this field, such as Advisor on social Agriculture, Farming Advisor or Bio-based Business & Production Consultant, are united by their commitment to problem-solving. Clients seek solutions to complex issues, and consultants and advisors must have the skills to analyze, strategize, and implement solutions effectively. Proficiency in data analysis, market research, and critical thinking is necessary to assess situations, make informed recommendations, and measure outcomes. Effective communication, written and oral expression skills are a cornerstone, as consultants, assessors and advisors must convey complex information and recommendations to clients in a clear and understandable way.

Most of the job profiles in this category have high requirements for specific certifications and degrees, with EQF levels from 6 to 8.

Professionals in this category need to adapt to evolving technologies, obtaining data literacy, data analytics and digital tools, to provide cutting-edge solutions. There is an identified gap in digital literacy and technology integration in these professions nowadays that needs to be addressed with education and training. To stay competitive, professions in this category need to access professional development opportunities and upskilling and reskilling seminars. There is also a need for bridging the gap in interdisciplinary knowledge, that can enhance the ability to address complex, multifaceted problems that often require insights from various fields.

Another skill gap identified by partners in this category is the lack of knowledge in Life Cycle Analysis (LCA). In the context of bioeconomy LCA skills are essential for quantifying environmental impact of bio-based products and processes, for elaborating sustainability assessment, for resource efficiency recommendations and for risk assessment.

Life Sciences

The life sciences category comprises of job profiles focused on understanding and applying principles related to living organisms. Common features of these job profiles are that they have a biological focus, and they engage professionals in scientific research, laboratory experiments and data analysis. Common skills are analytical and critical thinking, attention to detail, accuracy, a methodical approach in work and ability to find information.

Teamwork and collaborative skills are considered important whether working on a research project, clinical trials, or other collaborative effort.

While enlisted roles may focus on different aspects of life sciences, the combination of technical expertise, analytical thinking, and a strong foundation in bio-sciences is common among professionals in these fields.

To begin with, the common essential skills needed in all life sciences job profiles is a strong foundation in scientific knowledge, such as biology, chemistry, statistics or genetics. A deep understanding of these principles is fundamental. Ensuring product quality, accuracy and a methodical approach to work are other common skills. Professionals are responsible for complying with regulations, maintaining high standards, and conducting rigorous testing. In life science job profiles for bioeconomy, individuals with strong structural working abilities, attention to detail, and systemic knowledge play a critical role in various fields, including research, development, and

quality assurance. Scientists in laboratories (laboratory technician) need to design experiments, follow protocols, know biosecurity measures and analyze results in a systematic and structured manner. This ensures the reliability and reproducibility of experiments. Moreover, precision is crucial in life science research, where even small variations can have significant consequences. Attention to detail is essential when handling samples, recording data, and interpreting results. Systemic Knowledge is needed to understand the entire bioproduction system, understand the production process and also comprehend the factors that can affect product quality.

The bioeconomy job Profiles in Life Sciences value chain component have EQF level from 6 to 8, since in almost all of them a Bachelor of Science degree is required and specialized knowledge to manage complex technical activities or to plan strategic approaches is needed.

In addition to the common skills, there are also several common gaps and needs in skills in job titles of this category. Data literacy is often missing or needs upskilling to follow increasing reliance on data-driven decision-making, advanced analytics, and the integration of technologies in research, development, and production. Data literacy involves the ability to handle various types of data, ranging from molecular and cellular, while also understanding algorithms, statistical methods, and data visualization is essential.

Project management skills are often a gap in these jobs that need to be upgraded with training or seminars, since project management skills are highly valuable in bioeconomy life science jobs, as these sectors often involve complex projects with multidisciplinary teams, tight timelines, and regulatory considerations. Efficient allocation of resources, including laboratory space, equipment, and personnel, is crucial. Moreover, moving from laboratory-scale processes in bioproduction to large-scale manufacturing requires careful planning. Project managers need to be competent to oversee the scale-up process, manage risks and ensure a smooth transition.

Last but not least, a shared skill gap in life science job profiles is technological and digital literacy. The rapid advancement of technology and the increasing integration of digital tools in various aspects of life science jobs have created a need for professionals to continuously develop their craft by upskilling training sessions or certified educational programmes.

Humanities & Art

The humanities and art bioeconomy category includes a wide range of job profiles, such as *Bioeconomy Science Communicator, ESG expert*, *Biobased products Artist & Fashion Designer* (table 4), that contribute to the creation, preservation, and dissemination of knowledge, as well as creative expression. While these roles vary considerably in focus and expertise, they share commonalities, as well as gaps and skill needs.

To begin with, creativity is a fundamental element across all job profiles of this category. Creative thinking helps in devising innovative communication strategies that capture attention and make scientific information more relatable. It also helps in incorporating sustainable design principles, considering both environmental impact and artistic expression. Creativity is at the core of design for bioeconomy, meaning designing unique and aesthetically valued biobased products, ensuring they stand out in the market.

Job profiles of this category demand good communication skills, to facilitate communication and collaboration among various stakeholders and to communicate: i) the sustainable and artistic aspects of biobased products through visual and design elements, ii) the social impact of bioeconomy initiatives, iii) the scientific concepts to diverse audiences. In this context, collaborative skills are much needed to help working with others. The professionals of this category need to be environmentally aware and to have a systemic knowledge on Bioeconomy to engage with diverse stakeholders and facilitate their cooperation, fostering partnerships and alliances for sustainable bioeconomic development. Another skill is to possess expertise in environmental sustainability, social responsibility, and governance principles, ensuring bioeconomy projects align with sustainable practices. Sustainability principles into artistic and design processes, is an asset to create products with reduced environmental impact.

Analytical thinking is a valuable skill for professionals in diverse bioeconomy roles such as Bioeconomy Science Communicator, Bioeconomy Multi-stakeholder Dialogue Facilitator, and Biobased Products Artist & Fashion Designer, to understand perspectives and social challenges and to evaluate the environmental impact of design choices.

Moreover, education plays a vital role in transmitting knowledge and fostering creativity resulting in many individuals within this category to have a role in education, whether as facilitators, teachers, professors, or educational programme coordinators.

Concerning the EQF level of the jobs, it stands between 6 to 8 demanding a bachelor's or master's degree.

As for the common skill needs, humanities and art job profiles often lack in knowledge of socioeconomic development ways. These profiles often need to advance their digital knowledge, especially in an era where online platforms are crucial for dissemination and engagement. Proficiency in digital tools is often a gap. Many artists struggle to monetize their work and sustain their careers financially. Knowledge on how these professionals can develop sustainable business models is a need. In the context of humanities and art in bioeconomy job profiles, there may be a perceived gap in certain transversal skills, e.g., adaptability, storytelling, eloquent public speaking. Providing training opportunities can enhance skill-sets to bridge this gap and enhance the overall effectiveness of bioeconomic initiatives.

Future key skills

The bioeconomy means using renewable biological resources from land and sea, like crops, forests, fish, animals, and micro-organisms to produce food, materials and energy. Stronger development of the bioeconomy will help the EU accelerate progress towards a circular and low-carbon economy. It will help modernise and strengthen the EU industrial base, creating new value chains and greener, more cost-effective industrial processes, while protecting biodiversity and the environment[21].

Since bioeconomy is a rapidly growing sector that leverages biological resources and processes to create sustainable products, technologies, and solutions, it is opening exciting job opportunities for the future. Several key skills are emerging as critical for professionals in various job profiles recorded in this deliverable within the bioeconomy.

[21]https://research-and-innovation.ec.europa.eu/research-area/environment/bioeconomy_en

Among the forty job profiles identified by the consortium, some jobs prevail to develop rapidly in the upcoming years such as the bioinformatician, the bio-based process operator, bio-based artist or designer, the sustainability engineer and energy engineer.

According to the final report of the EC (2022) "Promoting education, training and skills across the bioeconomy", the specific skills for which there will be a demand in the future bioeconomy (to 2030 and 2050) are **transversal skills**, **digital and technology skills**, and a **good command of the bioeconomy principles** (sustainability, circularity and systems thinking). Given that VET tends to provide training for people entering the labour market in specific fields, **specialised technical skills** will also continue to be in demand, including, waste management and environmental auditing. Finally, as the bioeconomy is evolving rapidly in line with the green transition taking place at local, regional, national and European levels, boosting **entrepreneurial skills** will be needed to enable future workforce to drive this transformation and adapt their own skillsets to benefit from emerging economic opportunities.[22]

To boost the skills that will be of high demand in the future, higher education institutes and VET need to develop educational programmes that adapt to bioeconomy trends: existing and emerging courses should include **multi-disciplinarity** and **systems thinking** elements, to better equip students with transferable skills that can be applied across the bioeconomy. AI and digital technologies are also likely to have a transformative impact on skills requirements in core bioeconomy sectors, such as agriculture, food and beverages (particularly up to 2050). **AI, digitalisation, robotics and Big Data applications** are expected to increase production efficiency[23] and relevant skills should be upgraded to fit the market needs. Emerging skills in this area include **active learning**, **learning strategies**, **analytical thinking** and innovation, **technology use monitoring and control** (World Economic Forum, 2020)[24].

Aforementioned skills cannot be claimed as common in a unified way across bioeconomy, since diversities apply within bioeconomy subsectors or geographical reference. Local characteristics play an influential role towards which direction bioeconomy jobs will be advanced. While there are common skill needs across all sub-sectors of the bioeconomy, there are also skill needs which are specific to certain fields. The skills required in agriculture are very different from those in biochemistry or bio-energy.

To achieve informed job positions and upgraded skill sets in the future, decisions on curricula design and educational content should be aligned with national and regional policies. Focus on local bioeconomy strengths will be the basis for effective courses that contribute to skilled workforce and to the bioeconomy bloom in the long run.

[22] 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**

[23] 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**

[24] World Economic Forum, (2020), The Future of Jobs Report 2020. Geneva. Retrieved from https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

7 Conclusions

The European Union (EU) has been actively promoting the development of a sustainable bioeconomy as part of its broader agenda for a more resource-efficient and circular economy. The evolution of the bioeconomy in the EU is characterized by a commitment to reducing dependence on fossil fuels, promoting innovation in bio-based industries, and addressing environmental challenges. Job profiles' identification is crucial in developing education curricula for the bioeconomy future in the EU to meet skill demands. Identifying specific job profiles in the evolving bioeconomy helps educational institutions align their curricula with the industry's skill demands. This ensures that graduates are equipped with the knowledge and expertise needed to fill key roles in bioeconomy sectors.

This report has outlined a list of job profiles relevant to bioeconomy, as they were identified by all partners in the European countries of BioGov.net consortium. The report has incuded skill sets that are needed to each job profile identified or skills that need to be further developed and upgraded. By using this report as a guide list, bioeconomy stakeholders and education providers (professors, trainers, mentors, vocational training centers, research business departments etc.) will be able to organize curricula, seminars or future career support programmes.

Job profiles within bioeconomy span a wide spectrum, from research and development to production and marketing. Scientists, engineers, and technicians are instrumental in innovating biotechnological processes, while farmers and agribusiness professionals contribute to the cultivation of bioresources. Furthermore, the value chains in bioeconomy emphasize the interconnectivity of various sectors, such as agriculture, forestry, and biotechnology, to ensure the efficient conversion of biomass into valuable products like biofuels, bioplastics, and pharmaceuticals.

Highlighting conclusions for each job profiles category analyzed in this deliverable, R&D job profiles category to begin with, turns out to thrive on the ingenuity, dedication, and collaboration of professionals, who collectively drive progress and innovation across a wide range of industries. Profiles in the R&D share common essential skills in problem-solving, analytical thinking, collaboration, continuous learning, computer use and critical thinking. However, there are gaps in communication skills, resource allocation, interdisciplinary knowledge, diversity and inclusion, and regulatory/ethical awareness that, if addressed, can enhance the effectiveness and impact of R&D efforts across industries.

Regarding the job profiles within the primary production value chain component share common values and challenges related to environmental stewardship, physical labour, and community engagement, there are gaps in terms of technology integration, skills shortages, diversification, and sustainability expertise that need to be addressed for the continued growth and sustainability of these sectors.

The engineering and processing category shares commonalities in technical skills, problem-solving, quality assurance, safety compliance, and project management. However, addressing gaps in interdisciplinary knowledge, environmental sustainability, digital skills, communication skills, and supply chain integration can enhance the effectiveness and sustainability of this sector, making it more adaptable to changing industry trends and global challenges.

Consulting and advisory share skills in expertise, problem-solving, client focus, analytical skills, and communication while addressing gaps in technology adaptability, interdisciplinary knowledge, diversity, ethical expertise, and ongoing learning can

enhance the effectiveness of these roles and help them better meet the evolving needs of clients and society.

Job profiles in the life sciences share common skills in scientific expertise, research and development, quality assurance, and regulatory knowledge. Addressing gaps in interdisciplinary collaboration, technology integration, diversity, and ethics can enhance the effectiveness of the life sciences sector and contribute to improved scientific advancements. To meet the needs of critical and emerging industries like biotechnology and biomanufacturing, people must channel the skills and talents of all students and workers - especially those who have been underrepresented in these growing sectors, such as women, individuals with disabilities, marginalised gourps or persons who live in rural communities.

Finally, job profiles in the humanities and arts value chain share commonalities in creativity, cultural preservation, interpretation, communication, and education. Addressing gaps in digital literacy, diversity and inclusion, financial sustainability, interdisciplinary collaboration, and accessibility can enhance the impact and sustainability of the arts and humanities, fostering creativity and innovation.

The collection of bio-economy job profiles provided in this deliverable offers a series of benefits:

- Helps individuals make an informed career choice
- Supports policy makers understand future trends in bioeconomy jobs and elaborate policies towards relevant careers
- Connects jobs with skill sets, determining which career is most appropriate according to the skills identified as needed for this position
- Contributes with the skills that are in demand for sustainable transition, leads to more innovation and improves employment/companies' competitiveness
- Helps education and vocational training organisations identify what kind of programmes they should offer to cover the skill needs for these profiles
- Identifies whether someone's background can help with future career choices

Since bioeconomy encompasses a wide range of sectors, including biotechnology, bioenergy, bio-based materials, and sustainable agriculture, the identified job profiles allow educational institutions to tailor their programmes to provide industry-relevant training, ensuring that graduates upgrade their practical skills.

Many bioeconomy job profiles involve entrepreneurship and business development, such as bio-based startups and companies. Including elements of business education in bioeconomy curricula helps students understand the economic aspects of the field and encourages an entrepreneurial mindset.

The potential of job creation in the sector of bioeconomy is one of the strongest capacities available to increase local employment in urban or in rural areas. Moreover, bioeconomy offers employment opportunities for a diverse social background also including vulnerable groups. This way, it provides social sustainability, particularly because the bioeconomy jobs are of such diverse types; with room for many kinds of talent and effort.

Given that bioeconomy is a rapidly evolving field with ongoing advancements, continuous learning and adaptability by learners and education providers is a must to stay updated on emerging technologies, industry trends, and scientific developments.

Many bioeconomy job profiles require interdisciplinary skills that bridge the gap between biology, technology, and economics. Developing curricula that incorporate elements

from various disciplines prepares adults for roles that involve collaboration across different fields.

In conclusion, the bioeconomy's success depends on a diverse workforce with specialized skillsets and the effective integration of value chains that harmonize the efficient use of bioresources, fostering economic development while promoting sustainability.

ANNEX I

Annex Ia- Job Profiles Matrix tool

Job Profiles

ORGANIZATION		
Guidelines	**Title of the Job**	
Please add the position title		
	Job Description	
Job Description describes the main function associated with a specific occupation		
	Responsibilities & Tasks	
Responsibilities & Tasks describes the responsibility tasks and subtasks associated with a specific occupation		
	Education	
Education level and specific certificates, like necessary Bachelors or Master		
	EQF	
Please Select from the dropdown menu		
	Essential Skills	
	Problem Solving	Attention to Detail
	Decision Making	Analytical Thinking
	Critical Thinking	Technology Design
Essential Skills please highlight	Task Planning and Organising	Quality Control
	Finding Information	Processing Information
	Working with Others	Monitoring Performance
	Computer Use	Stress Tolerance
other, please insert, if any		

Professional Certifications as certificates from chambers, work permit etc.	**Professional Certification**	
Regional Aspect in connection to local CoPs	**Regional Aspect**	
if a profession has a specific **need for training or skill**, it can be mentioned in this section. For instance, need for knowledge in automated processes, need on how to process data and generate relevant information for the improvement of a process or a product, specialization in the reuse of existing resources, waste management and advance in abandonment of fossil fuel resources and use of biomass, gaps in support services as management, sales, economics, analysis etc. Please, highlight	**Gaps & Needs in Skills**	
	Transversal Skills	Digital and Industrial Technologies
	Sensor Technologies	Sustainable Business Models
	Driving Specialist Vehicles	Socioeconomic Development
	Logistics and Transport	Local Bioeconomy Aspects
	Packaging and Labelling	Ethical and Justice Aspects
	Technical Farming Skills	Project Management
	Networking and Cooperation	Data Literacy
other, please insert, if any		

Annex Ib- Instructions on how to fill-in the Job Profiles Matrix

BioGov.net
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Stronger Bioeconomy

Guidelines for the completion of the Job Profile Matrix

This file provides all the information needed to successfully complete the necessary information related to job profiles. This will be accomplished via an excel spreadsheet, which contains three tabs, the cover page, the matrix, and the references.

1. Cover Page Tab

The cover includes the basic information of the project, as the **logo**, the name, number of the grand agreement, the task's name and a chart showing the progress towards reaching the 30 job profiles, and it automatically changes as new profiles are added. In this tab you **should not change anything**. It is there as a source of immediate information about the task and the project.

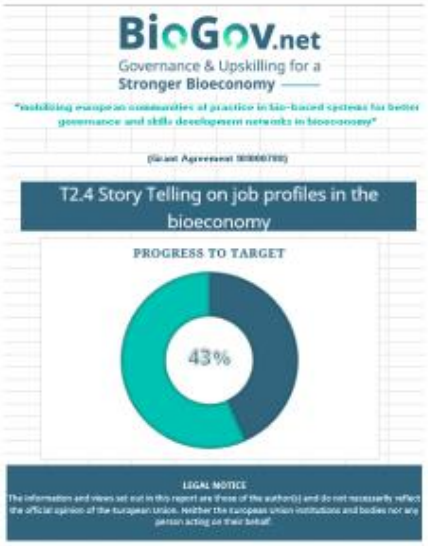

Figure 1. Cover Page

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2. Job Profiles Tab

This tab includes the main matrix to be completed. It is designed to work vertically. The first columns include the basic guidelines for each row, which are also presented below. The Table 1 presents the items to be completed.

Table 1. Job Profiles in details

Title of the Job	The title contains a short name of the job
Job Description	The description provides information about the function as well as what the specific profession is related to. It is a description of the most basic elements that comprise a routine of the specific work.
Responsibilities & Tasks	This part describes in detail the responsibility tasks and subtasks associated with this specific occupation.
Education	This section refers to specific degrees and post-graduate programs (bachelors and masters) or specializations for the profession if they are necessary.
European Qualification Framework	In this section there are the 8 levels in dropdown menu, based on the European Qualification Framework[1]. The level increases according to the level of proficiency, level 1 is the lowest and 8 the highest level
Essential Skills	In this section you should highlight/bold, between problem solving, decision making, critical thinking, tasks planning and organizing, finding information, working with others, computer use, and it should be selected the ones that match.
Professional Certification	This section includes some specific certificates that are necessary for the specific profession, such as certificates from chambers, work permit, etc.
Gaps & Needs in Skills	The main purpose of this task is to document the gaps that exist in the skills as well as the needs for a specific training topic, with the ultimate goal to inform the government system about the training needs and skills needed. So, if a profession has a specific need for training or skill, it can be mentioned in this section. For instance, need for knowledge in automated processes, need on how to process data and generate relevant information for the improvement of a process or a product, specialization in the reuse of existing resources, waste management and advance in abandonment of fossil fuel resources and use of biomass, gaps in support services as management, sales, economics, analysis etc.

Figure 2 presents the tab from the spreadsheet to be completed. It is better to be kept clear and to the point. Each of the 10 BioGov.net partners shall add at least 3 to 5 different job profiles in the same file on Teams folder, so to avoid double entries. The efforts of the 10 partners shall thus yield a minimum of 30 Job profiles.

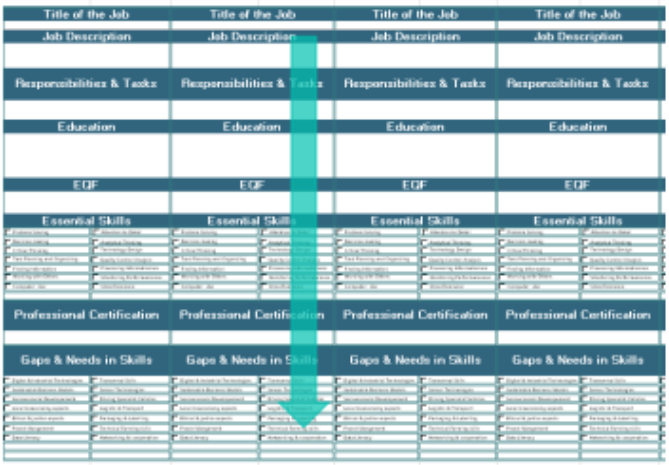

Figure 2. Matrix for job profiles

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3. Reference Tab

This tab is for bibliography and possible sources used to complete the above-mentioned job profiles.

4. EQF Analysis

In this tbs is included the analysis of the eight levels to be selected based on the european prototype.

5. Hints for partners

For the **selection process** a straightforward five-step procedure is presented in the figure that follows, outlining all steps from the identification of career paths related to the bioeconomy sector. Each partner is responsible for identifications of 3-5 related job profiles.

The Figure below summarizes selection criteria and briefly describes the rationale behind their inclusion.

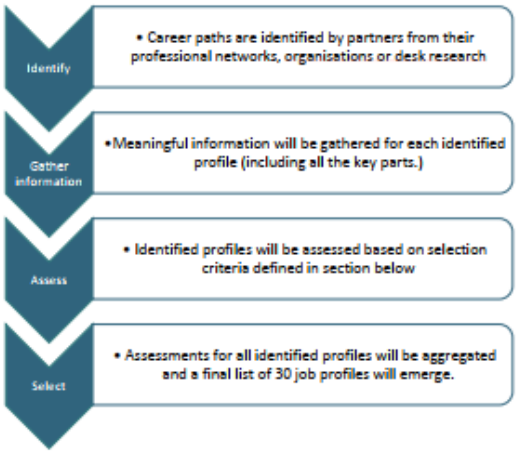


Figure 3. Selection process for job profiles

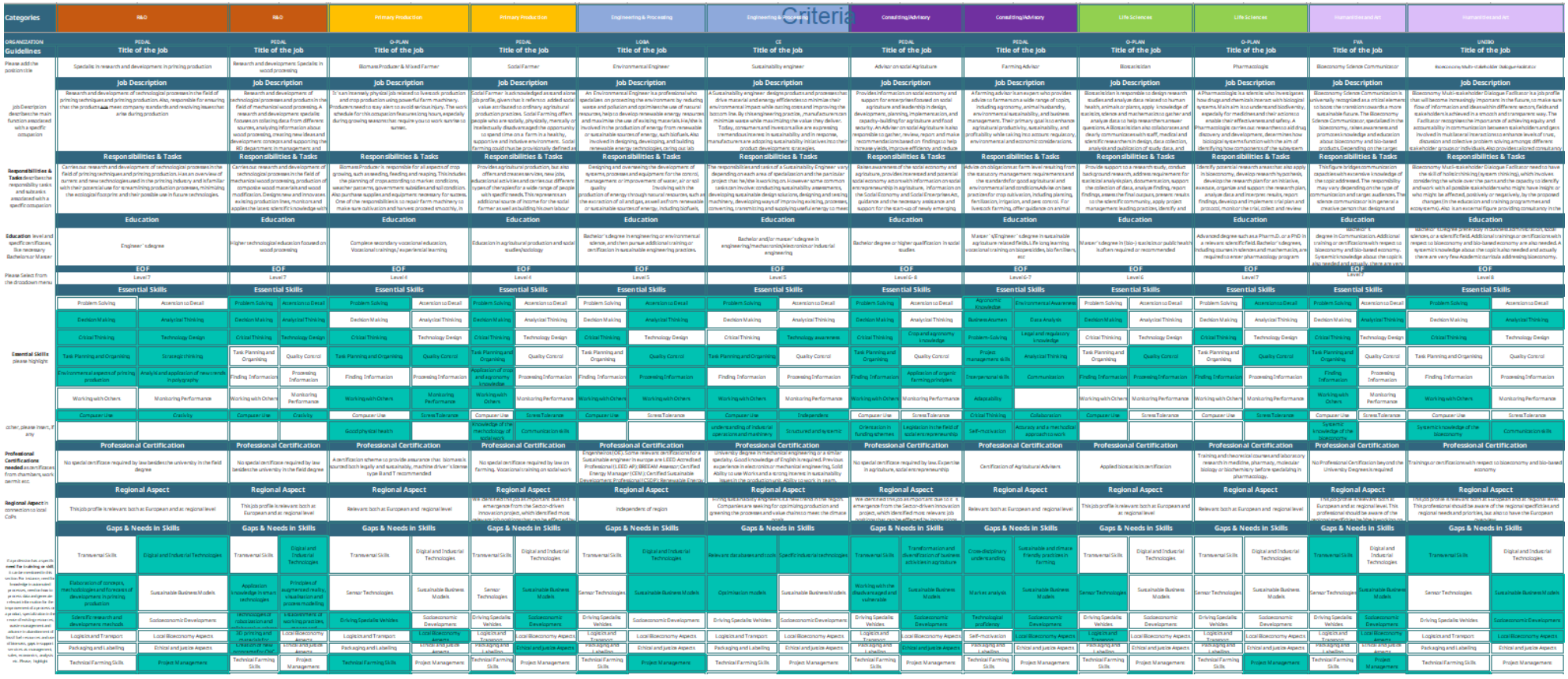
Table 2. Selection Criteria

No.	Selection criterion	The rationale for criterion inclusion
1	Interest	Career paths with high interest in the bioeconomy sector will ensure that help the project produce meaningful results with significant value.
2	Relevance	The job profile's relevance to the scope and objectives of the project is necessary to contribute of relevant project outputs
3	Appropriateness	The consortium will make sure that career paths selected to participate in the final list are appropriate to their scope
4	Representativeness	A balanced representation of perspectives within and across stakeholder groups is key to collect the representative insights required to inform design, development, and fine-tuning, thus addressing diverse needs.

Job descriptions should be prepared in a manner that all components are accurately stated to create a clear understanding of the role. Here are some hints to assist you in the process:

- Write in a concise, direct style.
- Always use the simpler word rather than the complicated one, keeping sentence structure as simple as possible. It will cut verbiage, shorten your description, and enhance understanding.
- Use descriptive action verbs in the present tense (for example: writes, operates, or performs).
- Avoid abbreviations and acronyms. Other people reading the position description may not be familiar with them. If abbreviations and acronyms are necessary, define them the first time you use them.

Annex Ic- Excerpt of the Job Profiles Matrix filled-in



REFERENCES

Agro & Chemistry. (2020). Inclusion of Primary Production in Biobased value chains. Retrieved from https://www.agro-chemistry.com/agenda/inclusion-of-primary-production-in-biobased-value-chains/

Allthings.bioPRO project. (2021). JobsCareers_EN_2104 [PDF]. Retrieved from https://www.allthings.bio/wp-content/uploads/2021/04/JobsCareers_EN_2104.pdf

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Barrera-Corominas, A., Gairín, J., & Tienda, D. (2019). UrBIOfuture - Boosting future careers, education and research activities in the European bio-based industry. Focus Group Report [PDF]. Retrieved from https://ddd.uab.cat/pub/infpro/2019/216850/Focus_Group_ReportVF.pdf

Bartning, M., (2020). Arbeitsmarktanalyse Bioökonomie. Retrieved from Arbeitsmarktanalyse Bioökonomie_2.10.20_Marie Bartning.pdf

BioTalent Canada. (n.d.). Skills Profiles and Skills at a Glance. Retrieved from https://www.biotalent.ca/skillsprofilesandskillsataglance/

Cambridge University Press. (2021). Engineering. In Cambridge Academic Content Dictionary. Retrieved from https://dictionary.cambridge.org/dictionary/english/Archived,%20February%2016,%202021,%20at%20the%20Wayback%20Machine

European Commission, Joint Research Centre. (n.d.). BIOECONOMICS. Retrieved from https://datam.jrc.ec.europa.eu/datam/mashup/BIOECONOMICS/index.html

European Commission. (n.d.). Bioeconomy. Research and Innovation - European Commission. Retrieved from https://research-and-innovation.ec.europa.eu/research-area/environment/bioeconomy_en

European Commission. (2021). Four (4) Foresight Scenarios for the EU Bioeconomy in 2050 [Knowledge Centre for Bioeconomy]. Retrieved from https://publications.jrc.ec.europa.eu/repository/handle/JRC123532

European Commission, 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, Joint Research Centre. (2021). European Bioeconomy 2050: Four Foresight Scenarios. Retrieved from https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/european-bioeconomy-2050-four-foresight-scenarios-2021-04-12_en

European Commission, Joint Research Centre. (n.d.). Description of the Eight EQF Levels. Europass. Retrieved from https://europa.eu/europass/en/description-eight-eqf-levels

European Union. (2018). The European Qualifications Framework: supporting learning, work, and cross-border mobility [PDF]. Luxembourg: Publications Office of the European Union. Retrieved from https://www.ehea.info/Upload/TPG_A_QF_RO_MK_1_EQF_Brochure.pdf

European Union. (2017). Council Recommendation of 22 May 2017 on the European Qualifications Framework for lifelong learning and repealing the recommendation of the European Parliament and of the Council of 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning (2017/C 189/03) [PDF]. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017H0615(01)

European Union. (n.d.). Description of the Eight EQF Levels. Europass. Retrieved from https://europa.eu/europass/en/europass-tools/european-qualifications-framework

Farm Radio International. (2013). An introduction to agricultural value chains. Retrieved from https://idl-bnc-idrc.dspacedirect.org/server/api/core/bitstreams/dfcdbc99-9203-4c26-9865-450ff6ea1fd7/content

Fritsche, U., Brunori, G., Chiaramonti, D., Galanakis, C., Hellweg, S., Matthews, R., & Panoutsou, C. (2020). Future transitions for the Bioeconomy towards Sustainable Development and a Climate-Neutral Economy - Knowledge Synthesis Final Report. Publications Office of the European Union, Luxembourg. https://doi.org/10.2760/667966

Gairín, J., Barrera-Corominas, A., Castro, D., Olmos, P., Marbà, A., & Tienda-Martagón, D. (2019). UrBIOfuture: Comprehensive map of completed and ongoing programmes addressing curricula in the bio-based sector. UAB. Retrieved from https://ddd.uab.cat/pub/infpro/2020/214907/D3.2_Comprehensive_map_of_completed_and_ongoing_programmes_v1.pdf

Lokesh, K., Kadambari, L., & Summerton, L. (2018). Bridging the Gaps for a 'Circular' Bioeconomy: Selection Criteria, Bio-Based Value Chain and Stakeholder Mapping. Sustainability, 10(6), 1695. https://doi.org/10.3390/su10061695

Mubareka, S., Giuntoli, J., Sanchez Lopez, J., Lasarte Lopez, J., M`barek, R., Ronzon, T., Renner, A. and Avraamides, M., (2023). Trends in the EU bioeconomy. Publications Office of the European Union, Luxembourg. https://doi.org/10.2760/835046

My Hands Craft. (n.d.). Retrieved from http://www.myhandscraft.eu/

Naomi Textile Academy. (n.d.). Textile Academy. Retrieved from https://naomi.gr/projekte/textile-academy/

Overview of Strategies. (n.d.). Sektorovo Riadene Inovacie. Retrieved from https://www.sustavapovolani.sk/strategie/prehlad-strategii/

Piotrowski, S., Carus, M., & Carrez, D., (2019). European Bioeconomy in Figures 2008-2016 [PDF]. BioVale. nova-Institute for Ecology and Innovation. Retrieved from https://biovale.org.temp.link/wp-content/uploads/2020/07/European-Bioeconomy-in-Figures-2008-2016_0.pdf

The Council of the European Union. (2017). Council Recommendation of 22 May 2017 on the European Qualifications Framework for lifelong learning and repealing the recommendation of the European Parliament and of the Council of 23 April 2008 on the

establishment of the European Qualifications Framework for lifelong learning (2017/C 189/03) [PDF]. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017H0615(01)

World Economic Forum, (2020), The Future of Jobs Report 2020. Geneva. Retrieved from https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

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