

Slovakia

Factsheet

This document provides an overview of Slovakia's initiatives and current state in the bioeconomy sector, highlighting regional policies, educational programmes, key trends, existing and expected sub-sectors, and opportunities for personal advancement in bioeconomy related fields.

About the region

The Žilina region in Slovakia is renowned for its strong focus on transport, IT, and medical sciences, driven by the presence of high-quality universities, robust ties with business entities, and extensive international cooperation. The region excels in technical fields, particularly electrical engineering, telecommunications, ICT, and robotics, making it a hub for advanced technological development. Additionally, with 50% of the region covered by woodlands, forestry plays a crucial role in the local economy, and the region's energy potential is largely represented by wood biomass.

Slovakia's system of adult learning is currently evolving, though it remains somewhat fragmented, developing across several different streams.



Thematic Orientation

Existing Sub-Sectors

- Transport and Logistics
- Information Technology (IT)
- Medical Sciences
- Technical Sciences and Engineering
- Forestry
- Energy (Wood Biomass)
- Adult Education and Lifelong Learning

Key Trends Influencing Innovation

National project **SRI Sector-driven Innovations** identified several key changes in labour market, considering specific needs for each sector. Also, requirements for specific qualification on sector basis were set. The main innovation & technological trends include:

- Precision farming techniques, organic farming practices, and the rise of social agriculture.
- The food industry is witnessing a shift towards functional and personalised foods, complemented by business automation and digitisation.
- In forestry and wood processing, robotics and smart technologies are enhancing efficiency, while virtual reality is revolutionising training and design.
- The pulp, paper, and printing industry is embracing digitisation, smart packaging, and AI to optimise resource use and improve quality control.
- Construction is moving towards automation, digitisation, and sustainability.
- Waste management sector is transitioning towards sustainable solutions, circular economy principles, and advanced digital technologies.

Expected Sub-Sectors / Value Chains

In accordance with the Social and economic development plan 2021+, the Žilina Region plans to implement the principles of Bioeconomy and prepare to achieve the goals of the European Union.

- Implementation of Bioeconomy principles in the region.
- Involvement of the region in innovative projects in the field of Bioeconomy.
- Incorporation of Bioeconomy principles into regional public procurement.
- Support for building a network of product reuse centers in the region.

Opportunities for advancement (Growth, Career, Social etc.)

The opportunities for advancement lay in the main integrated development trends domains that include:

- Sustainable and competitive primary agricultural and forestry production resources.
- Production of safe, health-supporting foods with high nutritional value and added value.
- New technologies of mechanical, chemical and energy processing of agricultural and forest biomass into products with high added value.
- Complex technologies and systems for reducing the negative impacts of agriculture activities on the environment, protection and sustainable use of land and water in changing climatic conditions.

Governance, Education Levels & Skills

Governance structure in adult education on Bioeconomy, or on the wider topic of sustainability (Higher Education, Vocational Training etc.)

- Existing Policies – Strategies / No specific policies – strategies
- Governance Model – Regulation – Legislation
 - School Education
 - Further Education
 - Structure: Two ministries involved (Education, Labor) and Inst. lifelong learning
 - Adult learning policy: Decided at National level Plus Regional initiatives
 - Not concrete list of skills related to the use of new technologies, sustainability circular economy etc.

Organisation of Adult and Lifelong Learning

- Main providers
 - Schools & Universities
 - Private Institutes
 - NGOs
- Curricula develops
 - State Education Programme (general)
 - School Education programme (specific)
 - Sectorial strategies (on a case by case basis)
- Duration of the programmes: Varies according to the specific programme (e.g. 2y follow-up, or 2y qualifying, or 6m refresh, or 2-3y specialised and/or highly professional programmes)
- Learning forms [Dual, Part-time, Distance, Regular] [Requalification, Interest based]
- Requirements & Fees: Varies on a case-by-case basis

Main Training, Retraining or Lifelong Learning on Sustainability

- Slovak Agricultural University
- Technical university in Zvolen
- AgroInstitute Nitra (Dedicated programme Plus 5 Erasmus+ and one H2020 programmes)
- National Forestry Center
- Slovak Chamber of Commerce
- Slovak Technical University Slovak Chamber of Agriculture & Food
- Slova Fotovoltaik and RES Industry Association
- Regional Initiatives (4 Initiatives)

Available Research on Bioeconomy skills needed

- **Sectoral strategies for human resource development** resulting from the national project Sector-driven innovations Investigated Sectors.
- Elaborated OECD document on: **"Skills Strategy Slovak Republic – Assessment and Recommendations"**

Linking Art & Bioeconomy Education

Bioeconomy education in which Art concepts are applied

- Art as a stimulus of the needed skills
 - Institute of Circular Economy (INCIEN)
 - Circular Slovakia (member of the consortium CIRCO)
- Art addressing learning styles
 - Not available examples
- Inspirational case studies from Art to Bioeconomy Education
 - Institute of Design, Faculty of Architecture STU in Bratislava
 - Academy of Fine Arts and Design in Bratislava
 - Divadelné centrum
- Injecting the Bioeconomy in design, art, architecture, etc. professions
 - Creative centre of the Slovak University of Agriculture
 - Slovak Green Building Council
 - Trvalo udržateľná architektúra – ARTUR (Sustainable architecture)



Marginalised Groups

In the context of target group priorities, the **Lifelong Learning and Guidance Strategy 2021-2030** highlights one of its main intervention areas as supporting selected target groups, particularly providing specific support for the **low-skilled**. Among the primary challenges identified are the **lack of specific skills**, such as creativity, critical thinking, problem-solving, and teamwork, as well as **persistent long-term unemployment** among marginalised groups.

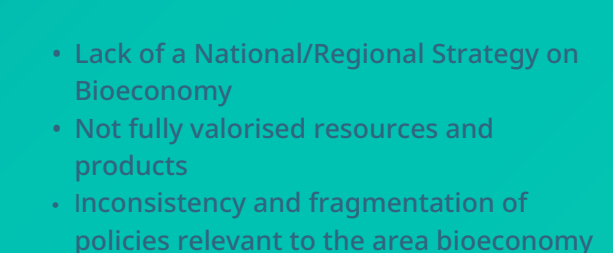
Relevant jobs and opportunities for the inclusion of these marginalised groups are found in sectors such as **services, construction, manufacturing, agriculture, food production, catering services, hunting and forestry, trade, craft activities, textile and clothing production, and services related to tourism.**

To effectively integrate marginalised individuals into the **bioeconomy**, their main needs are primarily centered on **cognitive skills**, including systems skills such as judgment and decision-making, systems analysis, and evaluation. They also require **basic skills** like reading, writing, and critical thinking, as well as **complex problem-solving skills**. Additionally, there is a necessity for higher-level skills, including verbal and quantitative abilities. In contrast, there is an identified **surplus of lower-level skills**, such as stamina and physical strength.

Existing educational and development activities designed to support marginalised groups for integration into bioeconomy activities include a variety of **active and past Labour Market Policies**. For **young jobseekers**, initiatives such as **NEET training, Take Your Chance, Training for Young People, and Work Experience to Employment** programmes have been implemented. Further initiatives include the **Graduate Traineeship** programme, which helps graduates start a job, as well as volunteering, internships, scholarships, and

extracurricular activities aimed at increasing knowledge and skills. These programmes often involve organising **local, national, and international projects** targeted at young people.

For **disadvantaged jobseekers**, specific activities like **activation programmes, individualised counselling, and support for long-term unemployed jobseekers** are in place. Moreover, **jobseekers with health disadvantages** are supported through personalised counselling. **Activation work, integration into social enterprises, and initiatives of employers** also play important roles in integrating marginalised groups into the labor market. These efforts are complemented by **social services provided by various organisations** and the presence of **community centers**, which serve as support hubs for marginalised individuals.



STRENGTHS

- Significant production potential of the region in forest land and water resources
- Structure and character of agricultural enterprises - concentrated agricultural production
- The multifunctional nature of the forestry that provides amount of biomass, biomaterials, bioproducts and fillings important ecological functions
- Inclusion of the majority of forests in the economic category forests
- Improvement on the exploration of the unqualified staff
- Increase of employment / available job positions
- Existing Educational Initiatives in the domain
- Existing lateral opportunities, Life-Long learning, Vocational training, Mass information, etc
- Partial overlapping between the Bioeconomy Education Institutions and Art related institutions

WEAKNESSES

- Lack of a National/Regional Strategy on Bioeconomy
- Not fully valorised resources and products
- Inconsistency and fragmentation of policies relevant to the area bioeconomy and the ambiguity of its position and role in development policies
- Lack of a National/Regional Plan aiming to achieve the defined goals
- Not existing Educational Strategies in the domain
- Fragmentation of activities and priorities. Lack of an organisational umbrella
- Life-long learning programmes, requalification programmes, programmes for skills development of vulnerable/disadvantaged groups funded from structural funds
- Not available a dedicated research on Bioeconomy Education

SWOT Analysis

OPPORTUNITIES

- Development of business activities in the countryside and creation of new value chains within the circular Bioeconomy
- Growing demand for biomass causing the need to increase production
- Increasing the contribution of the forestry and timber sector to the green sector of the economy
- Efficient use of resources, mitigating climate change, production of renewable energy, low-carbon economy
- Strengthening advice on topics in the field of Bioeconomy
- Potential expansion to new sectors
- Increase in the share of domestic production with higher added value
- Use of digitisation and innovative technologies
- Benefiting from the existing general educational background
- Perspective to extend the existing Education Initiatives in a regional scale
- Further exploration of opportunities on social and educational and career levels

THREATS

- Bioeconomy solutions will not be from an economic point of view more effective compared to fossil-based products
- Access to wood raw material – increased competition for wood as a raw material, especially due to the growing demand for renewable energy
- Departure of executive scientists due to lack of continuity of funding even though the marginalised groups are identified and initiatives are taken for each category, there is a lack of a concrete National plan aiming to their integration