



RIBES

REGIONAL INCLUSIVE BIOBASED
ENTREPRENEURSHIP SOLUTIONS

DELIVERABLE 2.2

Regional ecosystems mapping and surveying report

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Regional Inclusive Biobased Entrepreneurship Solutions

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ABBREVIATIONS

MTF	Multi-Actor Transformative Forum
NUTS	Nomenclature of Territorial Units for Statistics

EXECUTIVE SUMMARY

This deliverable presents the results of Task 2.2 of the RIBES project, which focused on mapping regional ecosystems and surveying stakeholder perspectives in ten European regions. The overarching goal was to build a contextualized understanding of how place-based configurations of actors, institutions, resources, and practices shape the development of a socially, economically, and environmentally sustainable bioeconomy. The analysis was guided by two key motivations. First, it challenged the dominant focus on technological innovation by foregrounding the role of social innovation as a critical but often neglected enabler of transformation. Second, it addressed the conceptual ambiguity surrounding the bioeconomy, asking whether it can function as a *boundary object* that allows diverse actors to coordinate without requiring full consensus.

To explore these questions, the project combined desk research with stakeholder workshops and a cross-regional survey. Ten detailed regional ecosystem profiles were developed, capturing local actor networks, value chains, perceived barriers, and promising practices. The results highlight a greatly diverse and uneven landscape: while some regions show strong institutional density and existing initiatives, others remain fragmented or in early stages of development. Importantly, nearly all regions already exhibit successful bioeconomy-related value chains, particularly in agri-food, biomass utilization, and waste valorization which demonstrates that transformation is underway, albeit unevenly.

The findings strongly support the relevance of social innovation. Barriers related to stakeholder engagement, trust, collaboration, and skills development are consistently reported across regions and stakeholder types. Even where technological or sectoral strengths exist, transformation is frequently limited by deficits in social infrastructure. This confirms that sustainable bioeconomy development depends on the capacities of actors to engage, align, and co-create meaningfully.

The concept of the bioeconomy itself was found to be both enabling and contested. While it often serves as a useful umbrella for diverse priorities from industrial growth to environmental sustainability and rural resilience, there is also the risk of becoming vague or strategically incoherent in the absence of a shared understanding. In this regard, the bioeconomy holds potential as a boundary object but requires support by adequate structures (e.g., government) that can manage its flexibility productively.

Together, these insights provide a robust foundation for the upcoming co-creation, scenario-building, and governance activities in RIBES Work Packages 3–5. They highlight the need for strategies that are context-sensitive, socially inclusive, and capable of navigating ambiguity, not by removing it, but by building institutional and collaborative capacities to work within it.

1. Introduction

The transformation toward a sustainable bioeconomy is increasingly promoted by international organizations, national governments, and regional stakeholders, etc., as a key strategy for tackling global environmental crises, revitalizing economic systems, and, more recently, enhancing social resilience. Yet despite the growing momentum of the bioeconomy concept, it remains highly contested and multifaceted, shaped by divergent stakeholder interests and capabilities, regional or national specificities, and historically embedded interpretations (Allain et al., 2022; Bugge et al., 2016; Gordon, 1954; Vivien et al., 2019). In the RIBES project, this transformation is approached through the lens of regional ecosystems understood as territorially embedded configurations of actors, resources, institutions, and practices that shape the possibilities for sustainable bioeconomy development.

The motivation for the analysis carried out in this deliverable stems from two core observations. First, despite vivid and open political and academic discourses on what the bioeconomy is and why we need it, the debate often continues to focus on technological innovation and sector-specific solutions. While such approaches are undoubtedly important, they risk reinforcing a narrow vision of the transformation, one that overlooks the structural, institutional, and social conditions necessary for meaningful change (see Friedrich et al., 2022 on “technological fixes”). In fact, the assumption that unsustainable resource use can simply be replaced with “green” alternatives is, in many cases, highly unrealistic. Especially if we consider the imperative of a *socially, economically, and environmentally* sustainable bioeconomy, it becomes clear that even the primary energy demand of many countries far exceeds what could realistically be met through domestic biomass production. Consequently, while technological advances are undoubtedly essential, they are often insufficient when pursued in isolation. Against this backdrop, what has remained underexplored so far is the role of social innovation, e.g., new forms of cooperation, participatory governance, and collective learning, etc. (see also Falcone et al., 2019; Ludvig et al., 2019; Souza Piao et al., 2023; Weiss et al., 2021)

A second, equally important motivation for this study arises from the observation that the bioeconomy is conceptualized and operationalized through a wide range of disciplinary, institutional, and regional lenses. Stakeholders engaged in the bioeconomy transformation, ranging from researchers and entrepreneurs to policymakers and civil society actors, approach the issues at hand with divergent priorities, framings, and goals (see also D2.1). These differences reflect not only sectoral positions and knowledge backgrounds, but also territorial variations in economic structure, resource endowments, governance capacities, and the socio-political context. While this multi-actor perspective is indeed pivotal, there is a growing concern that the bioeconomy may evolve into an overly diffuse and ambiguous concept, too broad in scope and, thus, accommodating contradictory aims, diluting accountability, or fostering symbolic alignment without substantive coordination. Under these conditions, actions taken under the umbrella of a bioeconomy could inadvertently work at cross-purposes, generating trade-offs between innovation and inclusion, growth and sustainability, or efficiency and justice. This prompts a central overarching question: Can the bioeconomy nevertheless function as a productive integrative framework? Or to put things differently, can the bioeconomy serve as what science and technology studies refer to as a *boundary object*, denoting the idea of a concept broad enough to host local needs and interpretations, while at the same time robust enough to maintain coherence across social worlds (see also Janssen et al., 2023; Star & Griesemer, 1989). If so, the

bioeconomy may serve as a mediating concept that enables coordinated experimentation, shared learning, and negotiated transformation across diverse institutional and territorial settings in Europe.

The following report presents the results of Task 2.2: *Regional Ecosystem Mapping, Good Practices, and Surveys* of the *RIBES project*, conducted between project months 1 and 18. The overall aim of the task was to provide a structured yet context-sensitive understanding of regional ecosystems against the nexus of a sustainable bioeconomy and social innovation. To this end, the task combined desk-based research (based on the CORDIS database) with stakeholder consultations to identify promising local practices and assess region-specific transformation needs. An explorative stakeholder survey across all ten regions was conducted to validate the results and gather additional perspectives and insights on perceived barriers for the transformation.

Beyond providing a stand-alone assessment, the insights generated in Task 2.2 also play an integrative role within the RIBES project. The regional ecosystem mappings and survey results constitute a key input for subsequent tasks, notably for scenario-building in WP3, the co-creation of governance and business models in WP4, and the design of transformative forums in WP5. By offering a structured yet context-sensitive baseline of actors, practices, and perceived transformation needs, this deliverable ensures that later project activities are grounded in the realities of regional contexts and informed by diverse stakeholder perspectives. More specifically, Task 2.2 pursued the following objectives:

- **Identify and describe** key features of regional bioeconomy ecosystems, including relevant actors, governance arrangements, and thematic orientations.
- **Assess** perceived transformation needs and barriers to inclusive bioeconomy development, drawing on data from stakeholder workshops and the survey.
- **Capture and reflect** local interpretations of concepts such as bioeconomy, circularity, and social innovation, while highlighting tensions, misalignments, and areas of convergence.
- **Identify** good practices and enabling conditions that can support regional transformation, especially in rural contexts.
- **Support** a shared understanding across project partners by integrating the results into a baseline ecosystem map to inform scenario-building, co-creation, and governance activities in subsequent work packages (WP3–WP5).

The report is organized as follows: Section 2 explains the theoretical background. Section 3 outlines the methodological approach, describing how the different sources of data were collected and integrated. Section 4 summarizes the key findings of the analysis through regional-specific profile sheets. Section 5 concludes with reflections and directions for future work.

2. Framing the Transformation

2.1 Conceptualizing a Sustainable Bioeconomy in Regional Ecosystems

The work carried out under Task 2.2 is situated within RIBES broader conceptual framework (see deliverable D2.1) that views the sustainable bioeconomy as a socially embedded and territorially grounded transformation process (see also Binz et al., 2025; Schlaile et al., 2024; Tödtling et al., 2022). This perspective transcends traditional sectoral or technology-driven framings (see, for instance, the literature on technological innovation systems, Bergek et al., 2015; Hekkert et al., 2007; Markard et al., 2015) by emphasizing the relational, institutional, and place-based dimensions of change (Schlaile et al., 2024; see also Trippel et al., 2024). From this perspective, regions are not merely passive sites of policy implementation but dynamic arenas where transformation is passively and actively interpreted, negotiated, and contested (see Figure 1 for an illustration of the RIBES regions).

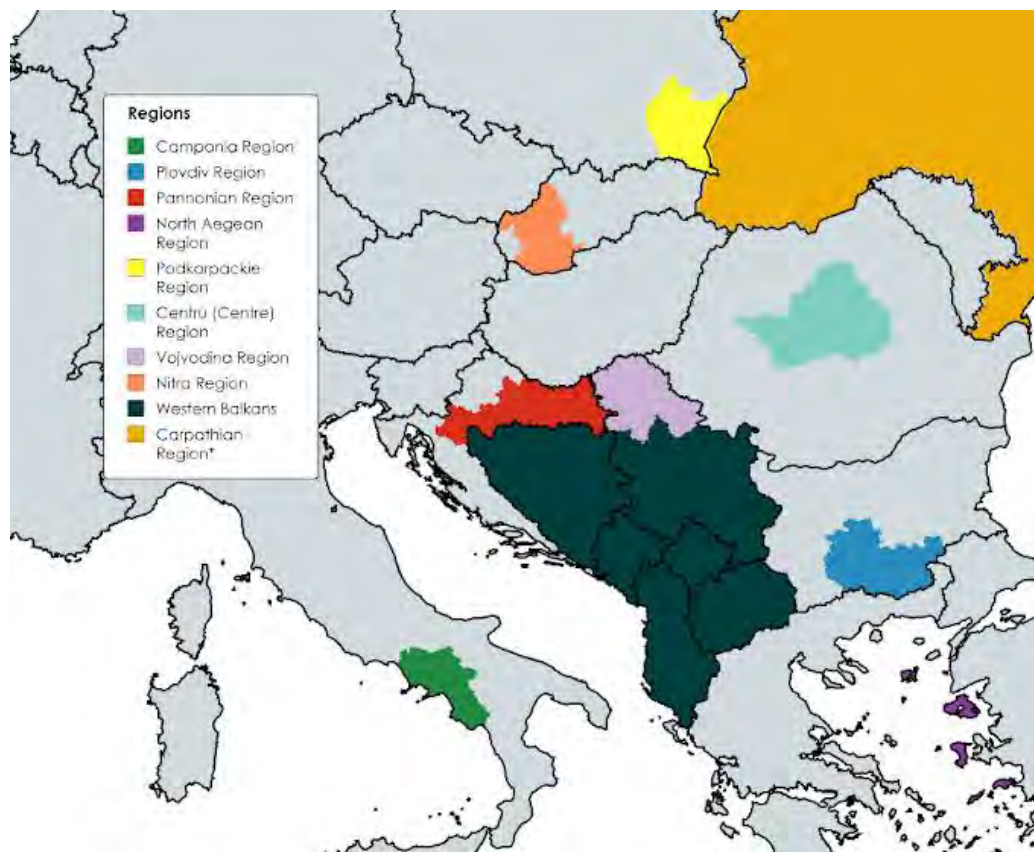


Figure 1: RIBES Regions

This territorial perspective draws from and builds upon insights from the literature on regional innovation systems, which recognizes that innovation processes are shaped by the interplay of economic structures, institutional arrangements, and cultural contexts (Hassink, 2001; Moulaert & Sekia, 2003). However, rather than assuming the presence of coherent or functionally integrated systems, our framework highlights the *fragmentation*, *ambiguity*, and *contestation* that often

characterize regional efforts to advance sustainability-oriented transformation. In many cases and particularly in peripheral or structurally disadvantaged territories, governance gaps, limited absorptive capacity, and competing priorities mean that transformative change does not unfold along predictable trajectories. Instead, it emerges through situated negotiations, shaped by uneven capacities and shifting alignments of local actors (see also Martinez-Fernandez & Potts; Wijen & Duysters, 2005). In this light, a *socially, economically, and environmentally* sustainable bioeconomy is not conceived as a discrete sector or predefined transformation pathway, but as a contested and evolving concept (Geels, 2002; Losacker et al., 2023; Pfau et al., 2014). It encompasses a variety of goals, including economic development, resource efficiency, environmental protection, circularity, and social inclusion, that are rarely interpreted or prioritized uniformly across or within regions. Furthermore, attempts to intentionally or unintentionally create directionality within transformation processes are inherently scalar in nature (Benz, 2018; McCauley & Murphy, 2013). As such, we have to acknowledge that regional transformation processes are deeply influenced by dynamics operating at multiple levels of governance and coordination. In the context of the European bioeconomy, regional actors must often navigate a complex interplay between local capacities, national regulations, European Union funding instruments or policy frameworks and global initiatives. This resonates with broader scholarship on multi-level governance and scalar politics, which emphasizes how policy authority and innovation capacity are distributed and often contested across different territorial scales (Bulkeley, 2005; Hooghe & Marks, 2001). Rather than treating these levels as neatly nested or clearly delineated, recent work highlights their fluidity and interdependence: regional strategies must constantly align with, resist, or reinterpret external pressures and incentives (Truffer et al., 2015).

The implementation of tailored bioeconomy strategies, therefore, is deeply conditioned by region-specific dynamics, including path dependencies, institutional legacies, infrastructural constraints, and dominant narratives of progress. As also deliverable D2.1 underscores, this territorial embeddedness means that transformation models cannot simply be transferred from one setting to another; instead, they must be adapted to the specific social, ecological, economic, and institutional realities of place.

2.2 Barriers to Transformation

Naturally, the ongoing transformation toward a sustainable economy faces numerous barriers. These challenges or obstacles have been the subject of increasing scholarly attention, often reflecting the broader tensions and contradictions embedded in the bioeconomy concept itself (D'Amato & Korhonen, 2021; Gottinger et al., 2020). For the purposes of this analysis, we group the most frequently encountered barriers into three groups: **Technological**, **Structural and Institutional**, and **Social Innovation** related barriers (D'Amato & Korhonen, 2021; Dietz et al., 2018; Golembiewski et al., 2015; see also Gottinger et al., 2020).

Starting with **Technological Innovation**, it is clear that technological advancements play a central role in most policy visions of the bioeconomy (see also Stegmann et al., 2020). In fact, advancements in areas such as biotechnology, bio-based materials, and renewable energy systems are still often portrayed as key barriers to a transition away from fossil-based economies. This includes, for instance, the absence of efficient technologies for the conversion of biomass into energy, chemicals, or high-value materials, as well as (technological) gaps in logistics, processing infrastructure, and circular integration. In many regions, the lack of mature, scalable, or context-appropriate technologies remains a persistent barrier, and even when the respective technologies are available, limited absorptive capacity, insufficient diffusion mechanisms, or sectoral lock-ins can inhibit their effective implementation.

As for **Structural and Institutional Barriers**, we must acknowledge that many aspects of the transformation toward a sustainable bioeconomy are embedded in complex policy and institutional environments (Bugge et al., 2016; Pfau et al., 2014). Barriers in this domain affect how effectively actors can navigate, coordinate, and mobilize resources across levels and sectors. Here we distinguish three core types of structural and institutional barriers: **Infrastructure**, **Regulation**, and **Fiscal Support**. **Infrastructure**, in this context, refers not only to physical assets such as transport, energy, and digital networks, but also to soft infrastructure, including access to knowledge systems, intermediary support structures, testing facilities, and coordination platforms. In several regions, a lack of enabling infrastructure, whether physical or organizational, hampers the ability of actors to experiment, scale solutions, or form cross-sectoral linkages. These gaps are especially pronounced in peripheral or rural regions, where fragmentation and limited institutional density can constrain transformative potential. Relatedly, the **Regulatory Environment** can serve either as a foundation for innovation or as a bottleneck to it. Examples cover outdated legal frameworks, inconsistent enforcement, hampering Bureaucracy, and complex or opaque approval procedures, etc. For emerging bio-based industries, navigating these regulatory landscapes can be time-consuming and unpredictable, especially when standards are not aligned across jurisdictions. Finally, there are **Monetary Challenges** in accessing adequate and targeted financial support. Even if there are dedicated funding schemes, they are often hampered by bureaucratic obstacles, poor communication, or a mismatch between available instruments and the financial needs of recipients. Furthermore, funding is sometimes overly focused on technological developments, with limited attention to enabling capacities such as networking, governance, or long-term cooperation, etc.

Finally, **Social Innovation related Barriers** focus on social processes that enable cooperation, build trust, and align interests across diverse actors and many more (Golembiewski et al., 2015; Viaggi,

2017). These social innovation related barriers are often less visible than structural or technical ones but are no less critical. They include deficits in engagement, collaboration, and the development of human capacities that support long-term, inclusive change. Here, **Stakeholder Engagement** is essential for legitimacy, fair distribution of 'pains and gains' as well as informed decision-making in bioeconomy-related processes. However, often the underlying decision processes still rely on top-down planning with limited opportunities for meaningful input from affected communities, practitioners, or marginalized groups. Where engagement does occur, it may be tokenistic or overly narrow in scope. This can lead to a perception of exclusion, reduce policy effectiveness, and foster resistance. Another group of social innovation related barriers addresses **Social Capital and Collaboration**. A successful bioeconomy transformation relies on networks of trust, shared goals, and cross-sectoral cooperation. Yet in practice, many regions lack the institutional structures or social cohesion needed to support collaboration across different parts of the system. Siloed thinking and weak horizontal ties can inhibit collective learning and joint innovation efforts. These barriers are particularly challenging in fragmented regional contexts where historic or institutional divisions persist. Finally, transformative change depends on the availability of individuals with the right skills, knowledge, and motivation, or in other words, **Human Capital**. Yet skill mismatches, limited vocational and continuing education programs, and low public awareness of bioeconomy careers remain common. In some regions, youth outmigration or sectoral brain drain further exacerbates workforce shortages. These deficits not only limit implementation capacity but also weaken the broader societal foundations for long-term transformation.

2.3 Bioeconomy as a Boundary Object

The contested and multifaceted nature of a bioeconomy becomes particularly salient at the regional level, where actors with diverse mandates, priorities, and resources are called upon to collaborate toward shared transformation goals. While policy strategies often represent the bioeconomy as a cohesive and strategic domain, the empirical reality is one of framing conflicts, competing interpretations of what the bioeconomy entails, who it should serve, and how it should be governed. These discursive struggles are not merely semantic; they shape investment priorities, governance structures, and coalition dynamics (Avelino et al., 2017). Within and across regions, stakeholders variously frame the bioeconomy through economic, ecological, or justice-oriented lenses. For some, the central aim is regional competitiveness and industrial innovation; for others, it is environmental restoration, climate neutrality, or social inclusion, among other goals. These diverging narratives produce tensions in agenda-setting, especially in contexts where governance capacity is weak or fragmented. For instance, efforts to promote biomass-based industries may clash with biodiversity concerns, or public funding for technology pilots may be perceived as privileging incumbent actors over cooperative or community-led initiatives. Such tensions are further exacerbated by the lack of clear definitions and metrics, which complicates the alignment of strategies across sectors and scales, especially if we consider a future bioeconomy to be ecologically, economically, and socially *sustainable*.

Within this context of conceptual ambiguity and strategic divergence, the question arises if the bioeconomy may function as a boundary object, meaning a concept that is sufficiently flexible to allow different actors to attach their own meanings, yet robust enough to facilitate coordination and joint

action (Bugge et al., 2016; Janssen et al., 2023; Pülzl et al., 2014; Staffas et al., 2013; Star & Griesemer, 1989). In fact, the interpretive flexibility of the bioeconomy concept can be an asset: it enables stakeholders from various backgrounds, such as agriculture, industry, science, and civil society, to converge around a common reference point, even in the absence of full agreement. It also allows regional strategies to remain open-ended and adaptive, accommodating locally specific goals and experimentation.

This conceptual elasticity is not coincidental. The bioeconomy emerges at the intersection of multiple societal ambitions: technological renewal, environmental sustainability, economic resilience, and social equity. As such, it carries with it the normative weight of addressing several grand challenges simultaneously, while being promoted through diverse policy domains including agriculture, energy, research, and regional development. It is precisely this cross-cutting ambition that renders the bioeconomy both attractive and unstable: it invites engagement from a wide array of actors yet provides limited guidance on how to resolve competing priorities or translate abstract goals into coherent strategies. Without a shared framework or institutional structures to manage this diversity, the risk is not only conceptual vagueness but also strategic incoherence and counter-effective policy.

If the multiplicity of meanings associated with the bioeconomy is ignored or superficially glossed over, several problems can emerge. First, policy efforts may become fragmented or contradictory—supporting innovation in one domain while undermining it in another. Second, stakeholders may lose trust in the agenda if they perceive it to be dominated by particular interests or disconnected from local realities. Third, the absence of clearly articulated trade-offs and value hierarchies can stall decision-making, as actors hesitate to commit to contested pathways. In the worst case, the bioeconomy may devolve into a symbolic or technocratic label, evoked rhetorically but lacking transformative traction.

Understanding whether and how the bioeconomy functions as a boundary object is therefore not an academic exercise, but a practical concern for inter- and intra-regional governance. It requires sensitivity to how concepts are used in everyday interactions, how narratives travel between policy and practice, and how institutional arrangements can either facilitate or obstruct constructive ambiguity. In this context, the challenge is to preserve the generative openness of the concept—its ability to mobilize diverse actors—without allowing that openness to collapse into incoherence or depoliticization.

3. Methodological Approach

The methodological design of Task 2.2 is structured to reflect the complexity and contextual variability of regional bioeconomy ecosystems across Europe. The approach was intentionally exploratory and iterative, applying a mixed-method approach combining structured stakeholder engagement, quantitative and qualitative survey insights, and secondary data analysis for all ten RIBES regions. This methodology allows us to build an understanding of regional bioeconomy systems that is grounded in local realities while at the same time maintaining analytical coherence across cases.

The process began with a series of three regional workshops organized and facilitated by project partners in collaboration with local actors under Task 2.1 (“Literature Review and Conceptual Framework”) in 2024 and 2025. These workshops were not designed as data collection events in a narrow sense but functioned as participatory spaces for reflection, sense-making, and early-stage ecosystem exploration. Through guided discussions and thematic inputs, participants were invited to share their perspectives on key regional dynamics, including the meaning of transformation, the relevance of social innovation, and the role of the bioeconomy in addressing socio-environmental challenges. The workshops played a dual role: they enabled the identification of local reference points, good practices, and relevant actors, and they served as informal mechanisms for deriving criteria, indicators, and thematic priorities that would later inform the survey work.

To meet the Grant Agreement requirement to apply a common set of indicators across all regions, Task 2.2 translated the inputs from the three workshops into the structure and the analytical dimensions used within the stakeholder survey. In other words, the survey items and mapping criteria together form a standardized indicator framework that was consistently applied in all ten regions. The survey therefore functioned not only as a data collection tool but as an indicator framework, applied uniformly across all ten regions. The resulting indicators cover:¹

- (1) bioeconomy orientations and sustainability visions,
- (2) actor ecosystem structure and collaboration patterns,
- (3) biomass availability and technological capacities,
- (4) transformation barriers,
- (5) governance and regulatory conditions,
- (6) fiscal support,
- (7) human capital and skills, and
- (8) social capital and networks.

¹ Appendix A presents the full list of indicators, their operationalization, and measurement scales. The full survey instrument from which these indicators were derived is provided in Appendix B.

For the survey we followed a purposive, expert-based sampling strategy. The sampling frame consists of stakeholders who are actively involved in, or knowledgeable about, the regional bioeconomy ecosystem. The coordinating team provided a uniform procedure: each regional MTF manager distributed the survey link to approximately fifteen regional experts, including MTF members and additional stakeholders from public authorities, civil society, research, cooperatives, and private-sector organizations (see Figure 2).

The survey focused on eliciting perceptions regarding regional transformation needs, perceived innovation barriers, governance structures, and the role of bioeconomy-related activities in supporting inclusive and sustainable development. In terms of content, the survey invited respondents to reflect on their expectations and interpretations of the bioeconomy. Specifically, participants were asked which strategic vision of the bioeconomy they found most compelling: a **substitutional model**, focused on replacing fossil resources with biomass within existing structures; a **technological model**, centered on innovation in biotech and bio-based materials; or a **systemic model**, which frames the bioeconomy as a deeper transformation of economic and social systems. Respondents were also asked to indicate which types of benefits they associated with bioeconomy development (**economic, social, or environmental**) and to what extent they believed these goals were currently being realized in their region. In addition, the survey included items on perceived institutional capacities, collaboration dynamics, and the inclusiveness of decision-making processes. The survey tool was developed in English and included a combination of closed-ended questions, Likert-scale items, open-text fields, and compositional data. Responses were collected online via a standardized survey platform between January and March 2025. In total, 150 valid responses were collected.



Figure 2: Number of Stakeholders per Region Overview

While primarily exploratory, the survey enabled a preliminary analysis that revealed noteworthy patterns for barrier prioritization, albeit with caution due to the limited sample size. For instance, stakeholder engagement was generally rated low across the board, particularly among respondents focused on economic objectives within the bioeconomy (*)¹. Access to funding emerged as a high-priority factor, especially for policy stakeholders (*), while regulatory frameworks were seen as more influential by those emphasizing social sustainability goals (*). Education and skills development tended to be deprioritized by both policy actors (*) and those who conceptualize the bioeconomy in biotechnology-driven terms (***). Interestingly, social capital and collaboration did not show strong variation across stakeholder groups, suggesting a broadly shared understanding of its relevance.

In contrast, infrastructure was perceived differently across regions (**) and appeared to correlate with more technology-oriented interpretations of the bioeconomy (*). Technological solutions themselves were only weakly associated with the prioritization of economic sustainability, indicating that even among economically oriented stakeholders, technological innovation is not seen as a panacea. Overall, the survey findings complement and nuance the insights from the workshops, highlighting both shared challenges and regionally differentiated perspectives that will inform the next phases of the project.

In parallel, a desk-based analysis of regional participation in EU-funded research and innovation projects was carried out using data from the CORDIS database. This analysis focused on identifying relevant projects in the domains of the bioeconomy and social innovation, mapping the institutional landscape of participating actors, and examining patterns of collaboration at the regional level (see also Appendix C). The search query included key terms such as “bioeconomy,” “social innovation,” and related terms. Further filtering was based on the Nomenclature of Territorial Units for Statistics (NUTS) codes of the regions, which were validated through regional MTF managers via email exchange. In total, the analysis identified 128 distinct projects involving 305 unique organizations.

The results from these three primary methodological streams were brought together to construct region-specific ecosystem profiles. Each ecosystem map consists of three main sections. First, the **Ecosystem Overview** provides information on the perceived actor presence in the region, benchmarked against the average of all regions on a five-point Likert scale ranging from very weak to very strong. This section also lists the core actors (public authorities, research institutions, private sector, and civil society) and summarizes the general agreement of survey participants with three bioeconomy visions (biomass-substitutional, biotechnology-driven, and systemic), alongside their individual perceptions of the economic, social, and environmental benefits of bioeconomy development. In addition, it outlines the current usage and potential of different biomass types, highlighting which resources are already being valorized and where untapped opportunities remain. The second section presents the **perceived barriers**, thematically structured around stakeholder engagement, education and training, funding

¹ Significance levels: $p < 0.001$: ***; $p < 0.01$: **; $p < 0.05$: *; $p < 0.0999$: (*)

support, infrastructure, regulations, technological solutions, and social capital. Finally, the third section captures **best practices** through the current level of collaboration through an adjacency matrix across different actor types, elaborating on the sectoral focus, examples for social innovation, value chains, policy and strategy, as well as the institutional and project landscape. Though no formal scoring system or benchmark comparison was applied, the synthesis process allowed for the identification of cross-cutting themes, regional archetypes, and structural patterns.

Finally, the preliminary ecosystem mappings and regional survey results were validated through a structured, two-stage process involving the ten regional MTFs. Validation took place during an inter-regional MTF meeting held on the 25th of June, attended by members of RIBES WP2 team and regional MTF managers. During this meeting, the WP2 team presented a preliminary analysis for each of the ten regions, including: the regional actor ecosystem overview, biomass availability and use patterns, perceived barriers and transformation needs, governance and regulatory assessments, and cross-regional comparisons derived from the stakeholder survey.

Regional MTF representatives were then invited to validate the accuracy, completeness, and contextual relevance of the findings for their respective regions through the following MTF meeting. Several regions submitted detailed follow-up feedback, including: clarification of actor roles, correction or refinement of collaboration assessments, additions to biomass or value-chain descriptions, re-prioritisation of barriers or governance challenges based on regional knowledge, and identification of missing practices or initiatives. All feedback received was systematically reviewed and incorporated into the final ecosystem profiles.

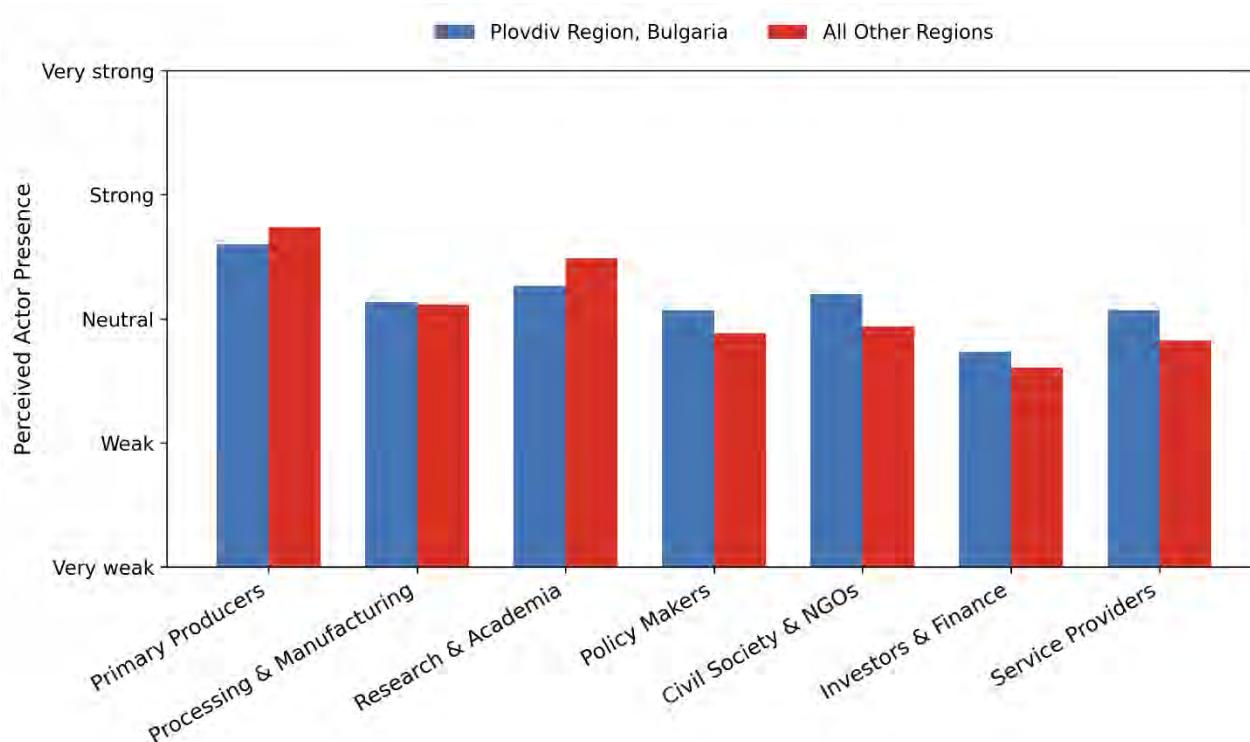
4. Regional Ecosystem Mapping

4.1 Regional Ecosystem Profiles

4.1.1 Plovdiv Region

Fact Sheet – Plovdiv Region (n = 15)

Ecosystem Overview



Core Actors:

Public Sector & Government Bodies: Local authorities, local government, government body responsible for agricultural subsidies, regional paying agency, National Agricultural Advisory Service (NAAS), national agency for agricultural services, NGO/policy maker.

Research & Education: Agricultural University – Plovdiv, research institute.

Private Sector & Industry: Agricultural biomass producers (vegetables, fruits, aromatic crops), PlantataSyst, industrial parks and incubators.

Civil Society & Networks: Farmers unions, Local Action Groups (LAGs), Regional Bioeconomy Hub.

Agreement with:

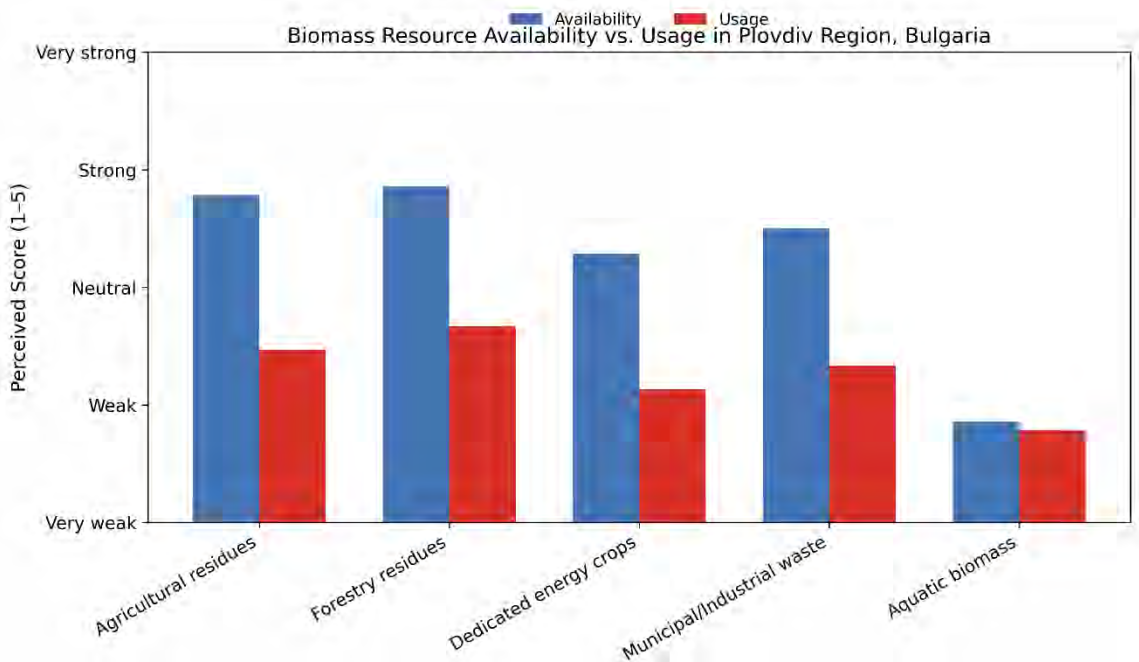
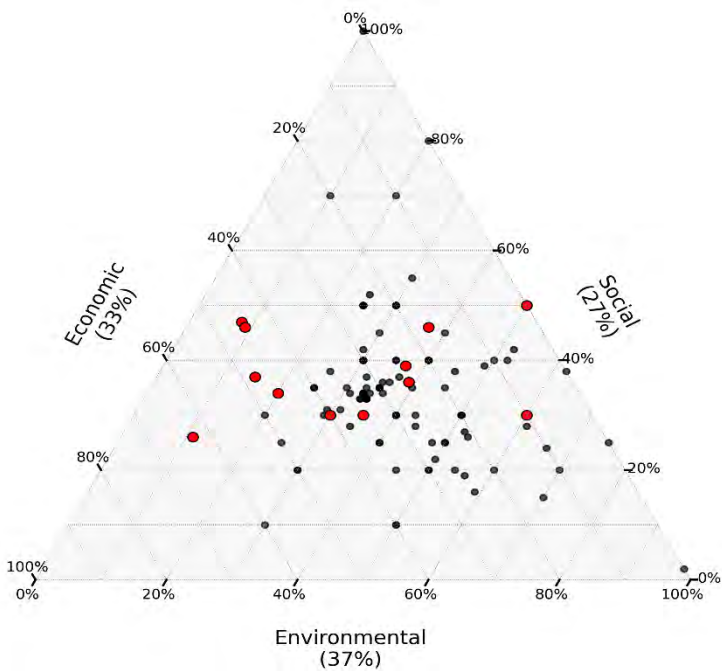
Biomass focus: 5.3 (5.95*)

Biotech focus: 4.0 (5.18*)

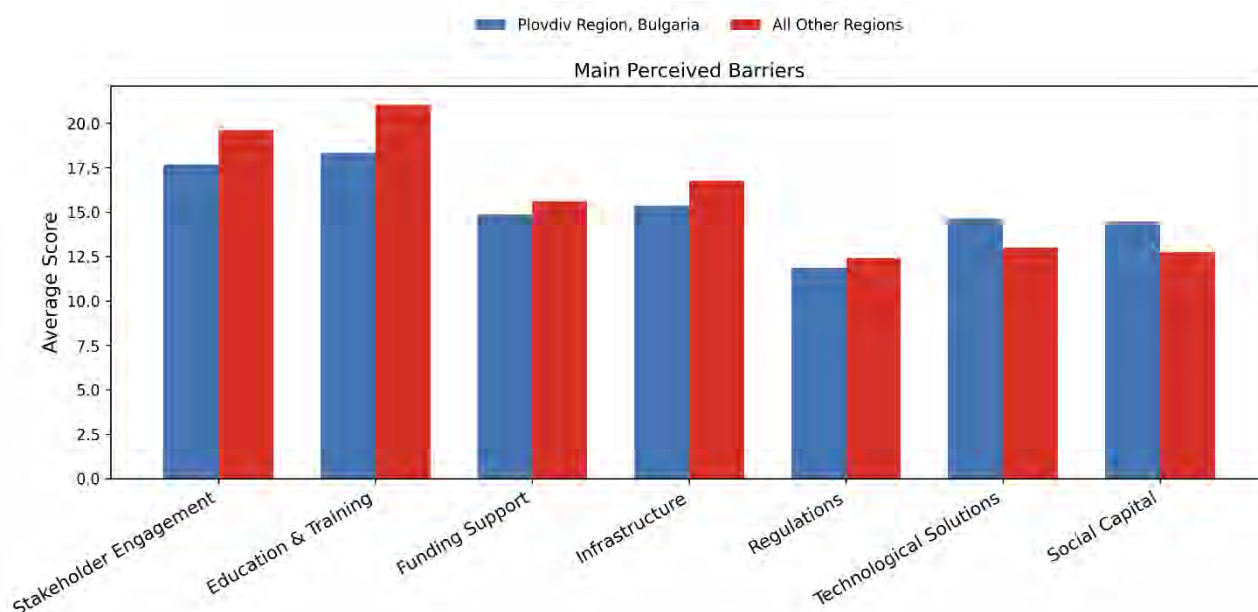
Systemic focus: 4.33 (5.13*)

1:strongly disagree -7:strongly agree

* Average All Regions



Perceived Barriers



Stakeholder Engagement: Public-private cooperation is weak, with poor knowledge transfer and low awareness of bioeconomy initiatives • Bioeconomy is not widely seen as a priority • Public perception remains skeptical, and its role is often misunderstood.

Education & Training: There is a lack of knowledge among key actors expected to drive bioeconomy efforts • Educational support for marginalized groups and training in entrepreneurial skills are minimal.

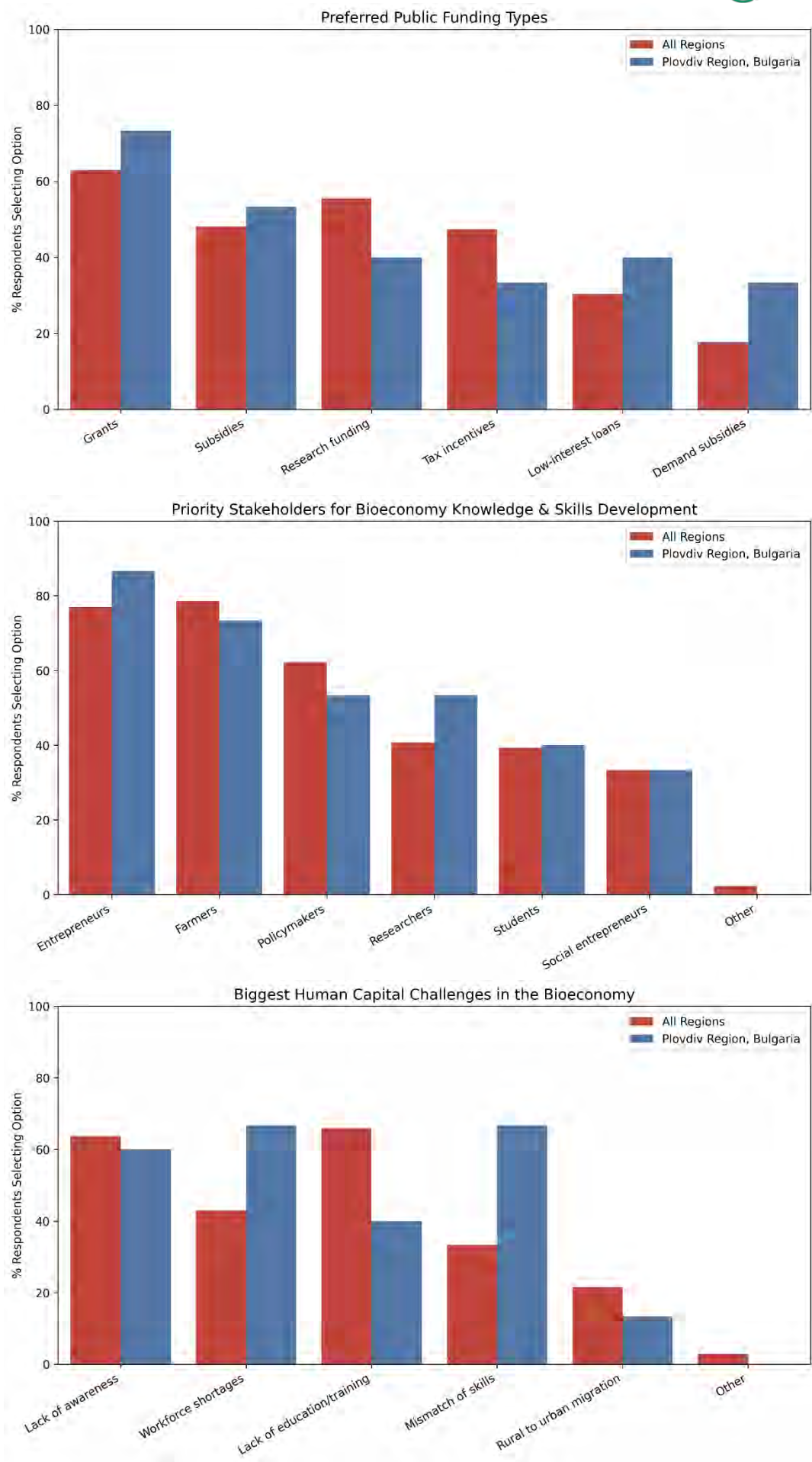
Funding Support: Financial resources and incentives are insufficient • Bureaucratic delays and complex EU funding procedures create additional barriers • Existing funding mechanisms are often hard to access or navigate.

Infrastructure: Local administrations face capacity and staffing shortages, limiting their ability to support or implement bioeconomy-related projects • Technical and institutional support structures remain underdeveloped.

Regulations: There is no adapted national or regional strategy with a clear legal and operational framework • Governance is fragmented and lacks coordination • Bureaucratic complexity, policy instability, and the absence of action plans hinder progress • Regional needs are often overlooked due to top-down governance structures.

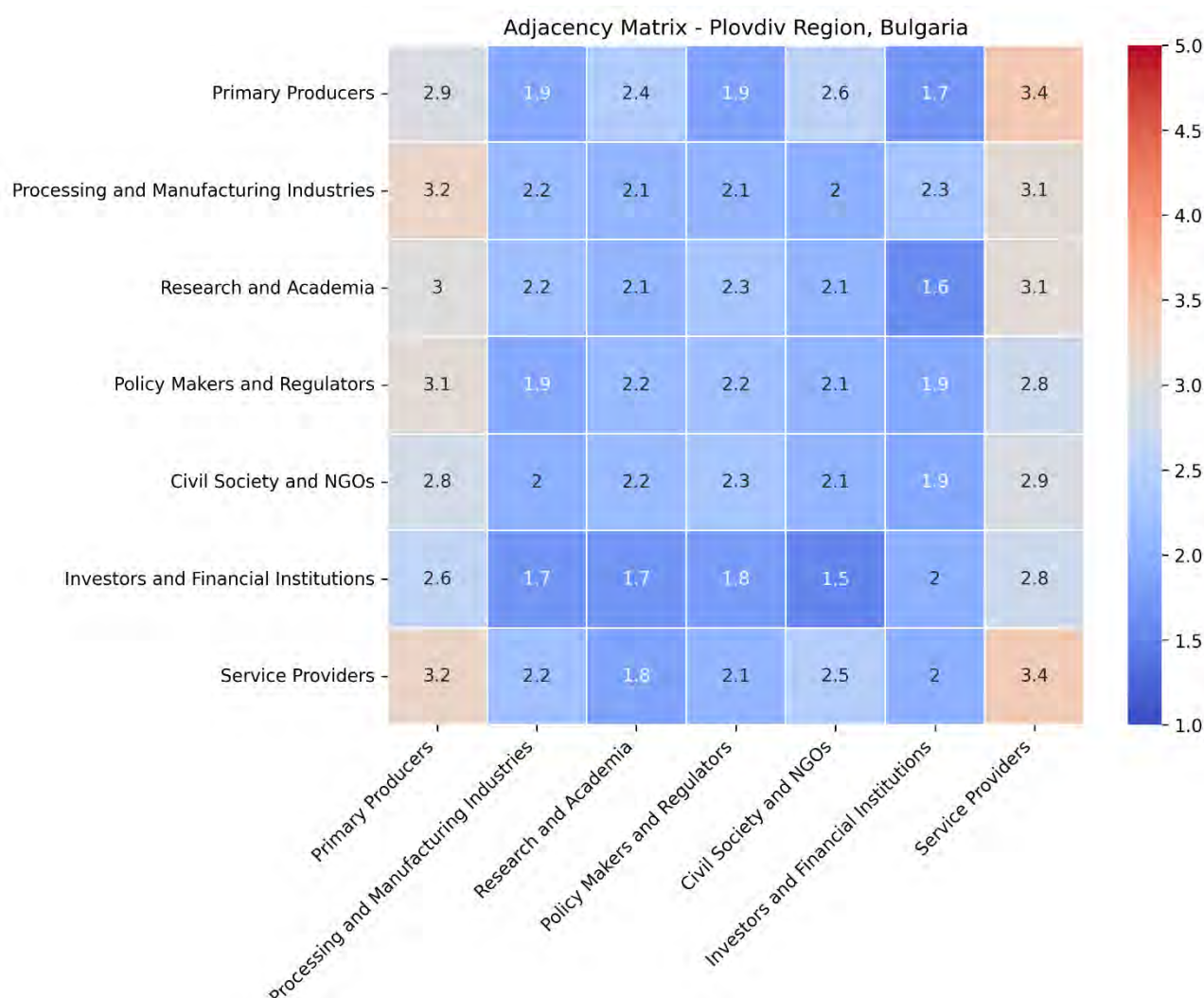
Technological Solutions: Innovation is slowed by limited knowledge exchange and weak links between research and practice • Deployment of technological solutions is indirectly constrained by systemic governance issues.

Social Capital: Bioeconomy often competes with other priorities and lacks long-term political support. Agricultural production and policy are poorly understood • Inclusion of marginalized groups is rare, and opportunities for community-driven initiatives are limited.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The region's bioeconomy strengths lie primarily in agri-food systems, forestry, and waste valorization. Key areas include: Primary biomass production (agriculture, animal products) • Food processing and wine production • Forest and wild products • Emerging use of agri- and animal waste for biogas • Pellets from sunflower oil processing

Local bio-refineries are seen as essential to adding value to primary agricultural biomass. Although tourism and organic food are strong, waste valorization remains underexploited.

B. Social Innovation

Social innovation is limited but identified as a potential growth area: Marginalized groups (seasonal workers, low-income families, etc.) are rarely involved in structured bioeconomy initiatives. • Few initiatives exist to equip these groups with entrepreneurial skills (e.g.,

through forest harvesting, agri-food microbusinesses). Local tourism offers untapped potential for community-based development tied to bioeconomy.

C. Value Chains

Bioeconomy-related activities are concentrated around: Grape-wine, cereal, and sunflower oil production • Organic food and catering sectors

D. Policy and Strategy

There is no dedicated regional bioeconomy strategy, but relevant sectoral policies do exist: • Regional Development Strategy 2014–2020 prioritized healthy lifestyles, biotechnology, and tourism. • In the updated Innovation Strategy for Smart Specialisation (3SSS) 2021–2027, 19 out of 28 regional administrations identified “Industry for healthy living, biotechnology, and bioeconomy” as a priority.

E. Institutional and Project Landscape

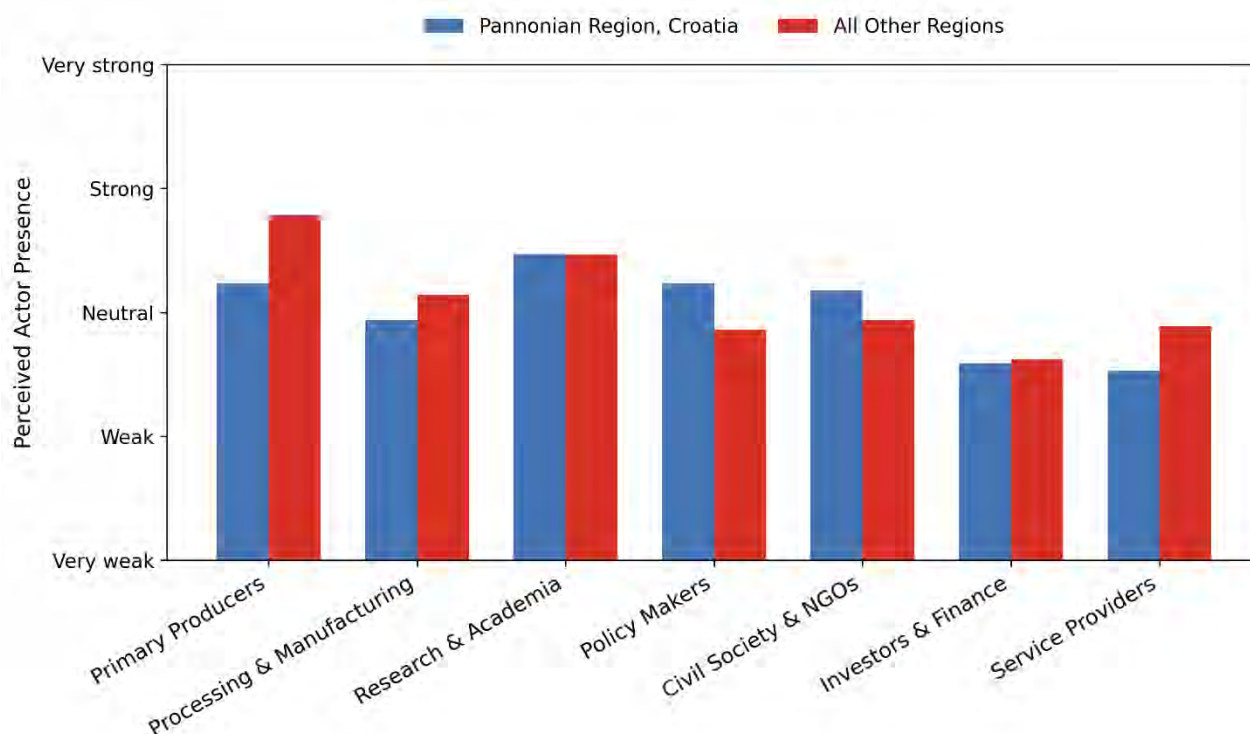
Several institutions in Plovdiv are actively involved in EU and national projects:

- **Agricultural University - Plovdiv:** BEAMING, BIOLOC, CARINA, CLAIM, COOPID, MainstreamBIO, RIBES, RefreSCAR, Rural BioReFarmeries
- **Institute of Fruit Growing - Plovdiv:** DIVAGRI
- **Medical University - Plovdiv:** RESONATE
- **Plovdiv Chamber of Commerce and Industry:** FOODRUS
- **Plovdiv University “Paisiy Hilendarski”:** 4P-CAN
- **Regional Energy Agency of Pazardjik (REAP):** BIOCIRCULARCITIES

4.1.2 Pannonian Region

Fact Sheet – Pannonian Region (n = 17))

Ecosystem Overview



Core Actors:

Primary Producers:

Farmers, small family farms, agricultural cooperatives, producers such as Agro-Tovarnik d.o.o. (Tovarnik), Osatina grupa d.o.o. (Semeljci), PPK Valpovo d.o.o. (Valpovo), Šerif grupa d.o.o. (Našice), Žito grupa d.o.o. (Osijek), Belje d.o.o./d.d. (Darda), Spačva d.d. (Vinkovci), Slavonija DI d.o.o. (Slavonski Brod)

Processing and Manufacturing Industries:

Food and wood processing industries, fertilizer producer (Petrokemija d.d.), Enerгия Naturalis (ENNA)

Research and Academia:

Faculty of Agrobiotechnical Sciences Osijek (FAZOS), Institute for Bioeconomy and Rural Development (Osijek), Energy Institute Hrvoje Požar, other research institutions

Policy Makers and Regulators:

Ministry of Agriculture, Forestry and Fisheries, Croatian Chamber of Agriculture, Croatian Chamber of Economy, policy makers, governmental bodies leading bioeconomy strategy development

Civil Society and NGOs:

NGOs, environmental NGOs, clusters, operational groups, EU programs

Service Providers and Intermediaries:

BIOS business incubator (Osijek), legal representatives of agricultural producers, intermediaries linking producers, research, and policy, providers of business intelligence, state institution for energy and stakeholder coordination

Agreement with:

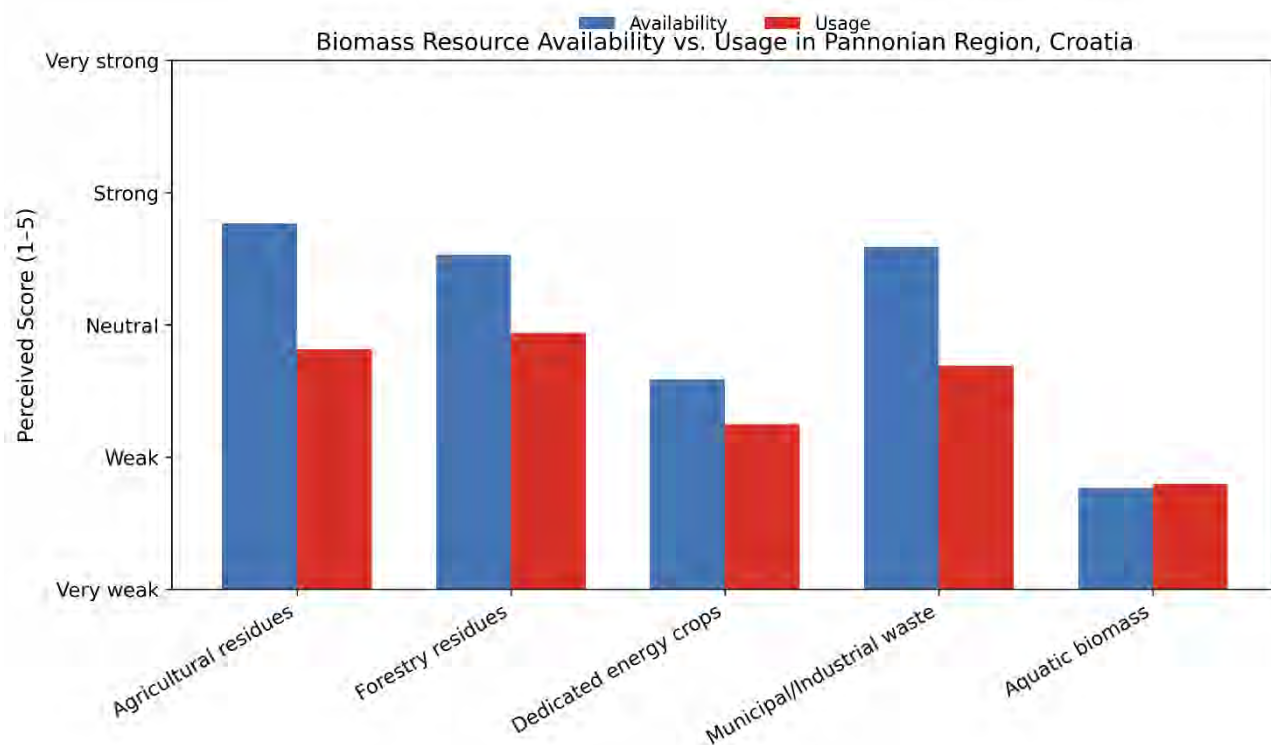
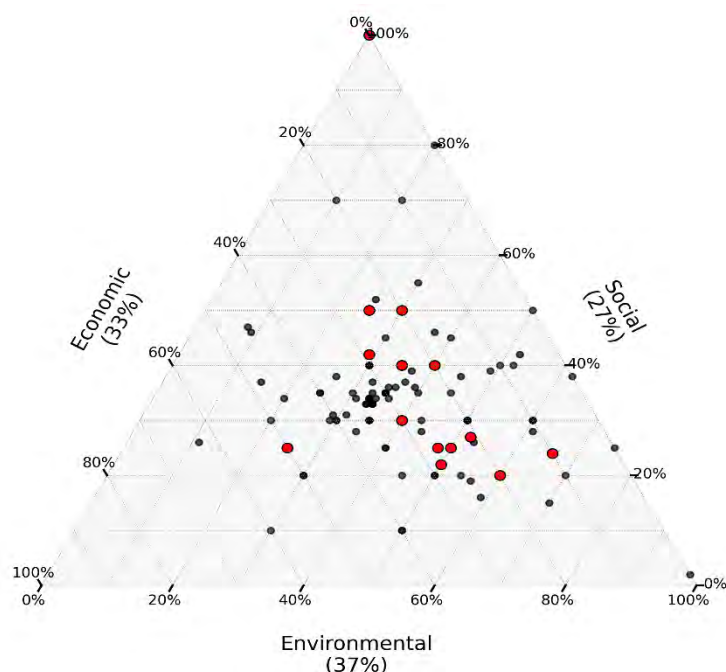
Biomass focus: 5.88 (5.95*)

Biotech focus: 5.64 (5.18*)

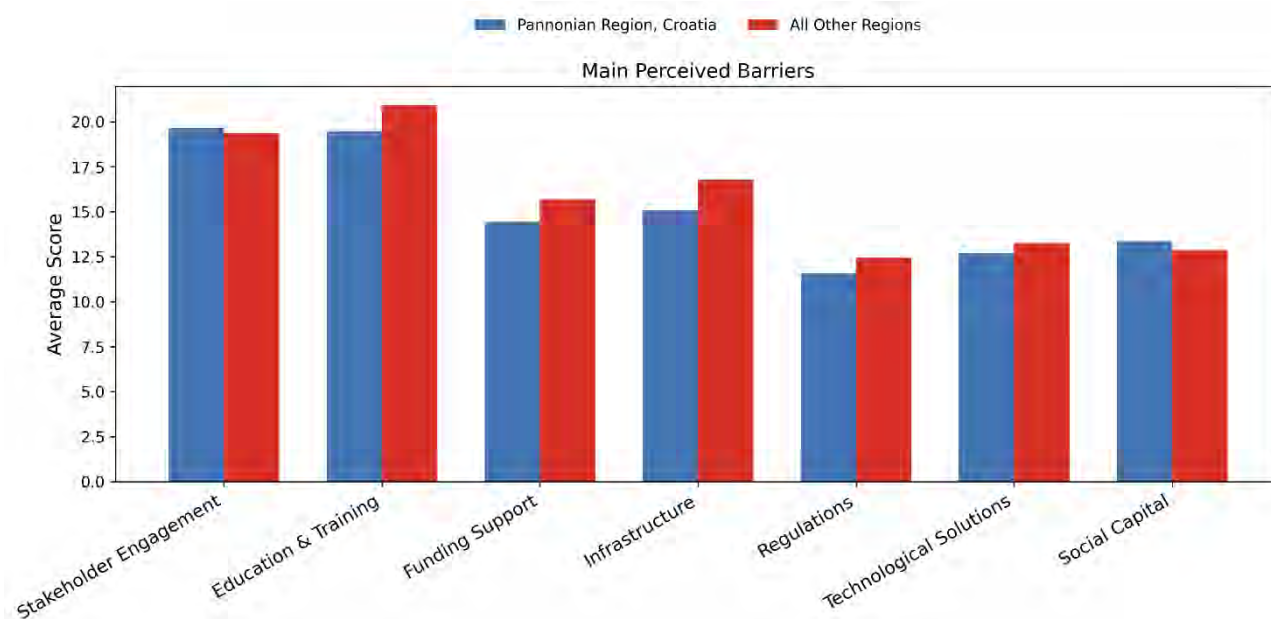
Systemic focus: 5.29 (5.13*)

1:strongly disagree -7:strongly agree

* Average All Regions



Perceived Barriers



Stakeholder Engagement: Public-private cooperation is weak, with limited collaboration and poor knowledge transfer • The role of bioeconomy is poorly understood, and it is not treated as a priority • Public perception is mostly indifferent or negative

Education & Training: • There is a clear lack of knowledge among those expected to initiate or manage bioeconomy activities • Capacity-building efforts and technical training are largely absent.

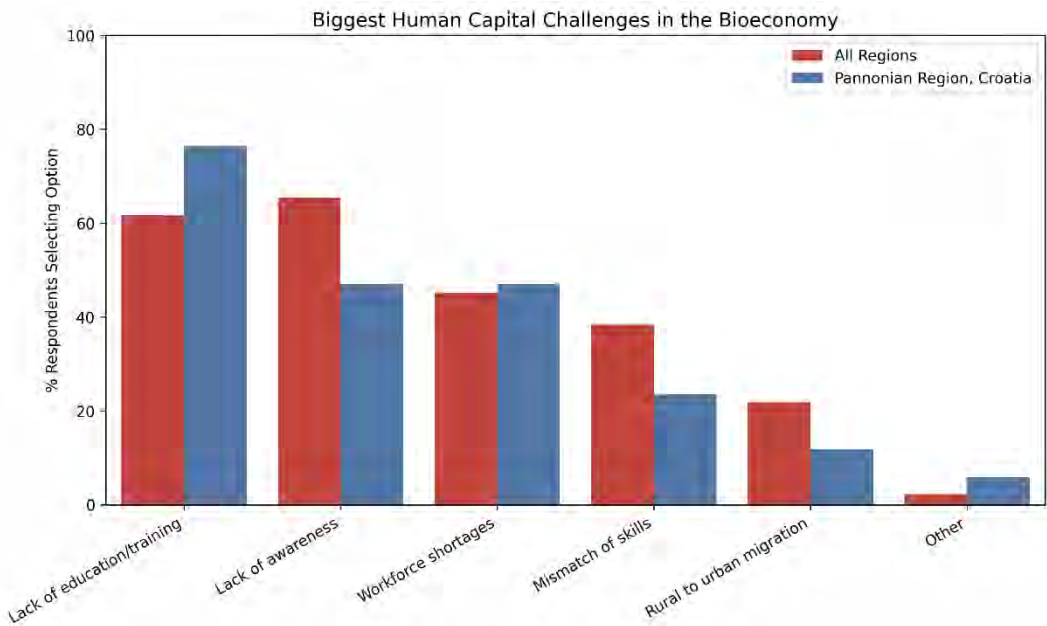
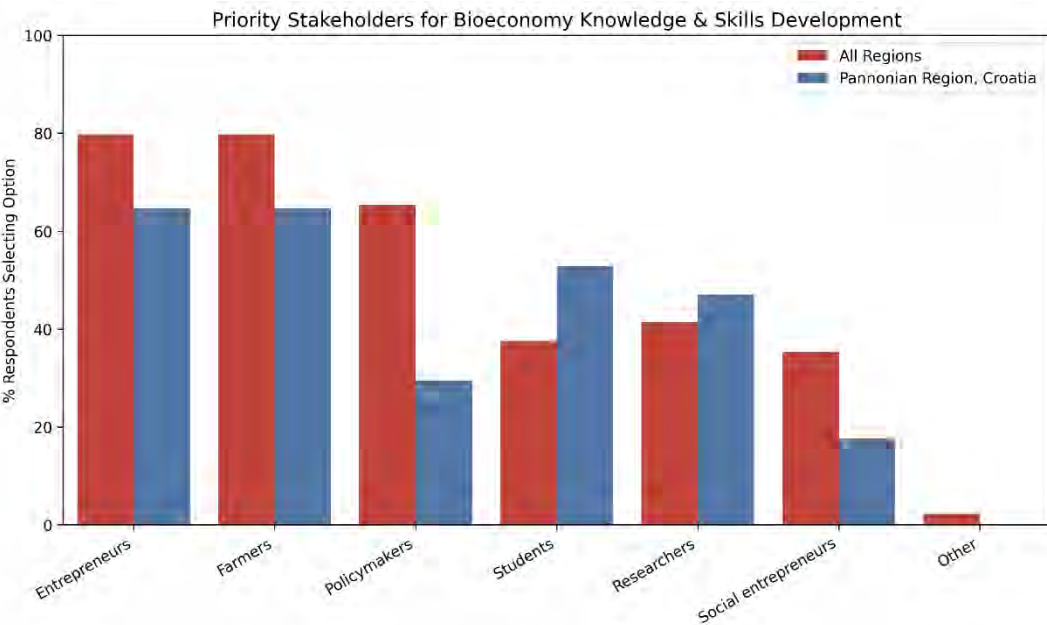
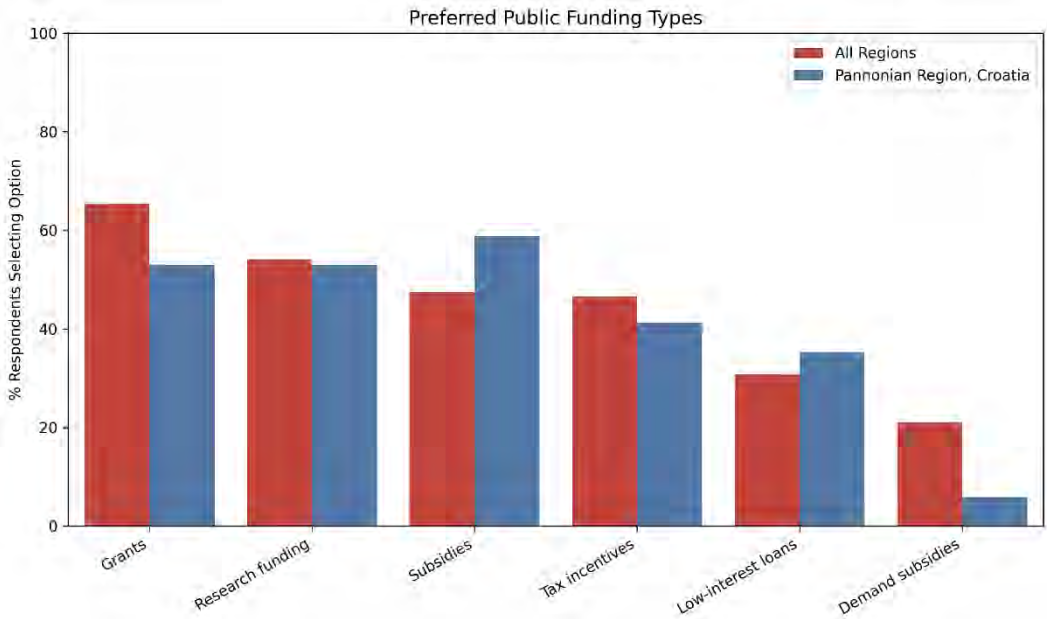
Funding Support: • Financial incentives are insufficient, and access to funding is complicated by bureaucratic processes and EU funding complexity • Limited investment discourages long-term planning and innovation.

Infrastructure: • Administrative capacity is low, particularly at the regional and local levels • Expertise is scarce, and local institutions are under-resourced to support bioeconomy development.

Regulations: • There is no adapted national strategy or legal framework to support implementation • Governance is fragmented and lacks a coordinated, long-term vision • Bureaucratic delays and political instability further obstruct progress • No regional or national action plans exist, and local priorities are often overlooked.

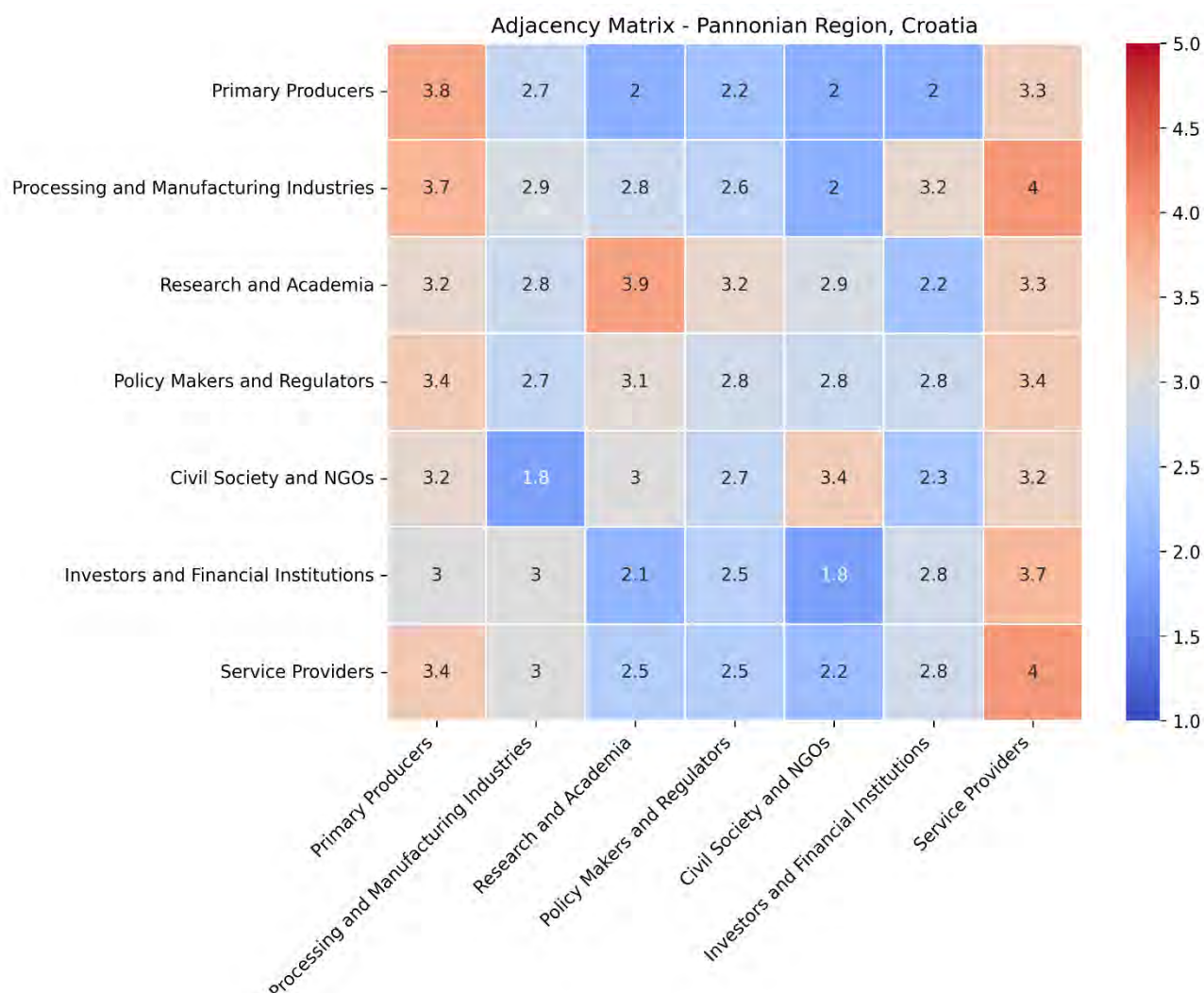
Technological Solutions: • Innovation is hampered by the absence of supportive structures and poor communication between institutions • Opportunities for technical advancement are limited by systemic governance issues.

Social Capital: • Agricultural policy and production are poorly understood • Bioeconomy is often displaced by more pressing issues in political agendas • Governance changes frequently, disrupting continuity and long-term investment.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The region's bioeconomy is rooted in **agriculture and forestry**, with growing attention to bio-based innovation. Key areas include: Crop and livestock production • Biomass derived from cereals, maize, oilseeds, and forest resources • Use of agricultural residues for biogas, biofuels, and bio-based materials • Precision and organic farming as emerging practices • Sustainable forestry ensuring a steady flow of timber and non-timber products. Efforts are ongoing to enhance forest management and integrate bio-based processing into traditional agri-production systems.

B. Social Innovation

Social innovation plays a supporting role in the regional bioeconomy through: Agrotourism and community-supported agriculture • Cooperative business models and farmer associations • Educational and training programs that build capacity for bio-based entrepreneurship • Local efforts to include citizens and small producers in value chain activities.

C. Value Chains

The Pannonian region supports a broad and diverse set of bio-based value chains: Biogas and biofuels from agricultural waste and manure • Biomass pellets from wood and crop residues • Bio-plastics from starch and cellulose • Organic and speciality food products and extracts for cosmetics and pharma • Animal feed from processing by-products • Bio-based fertilizers from composted organic matter.

D. Policy and Strategy

Bioeconomy development is supported through several aligned policies and initiatives: • National Rural Development Program (EU + national co-funded) promoting sustainable agriculture and rural innovation • Draft Croatian Bioeconomy Strategy emphasizing sustainability, research, and circular use of resources • Access to EU funding programs including Horizon 2020, EAFRD, and Interreg • Public-private partnerships (PPPs) between local authorities, academia, and private actors strengthen implementation.

Despite strong foundations, wider stakeholder engagement and operational clarity remain in development.

E. Institutional and Project Landscape

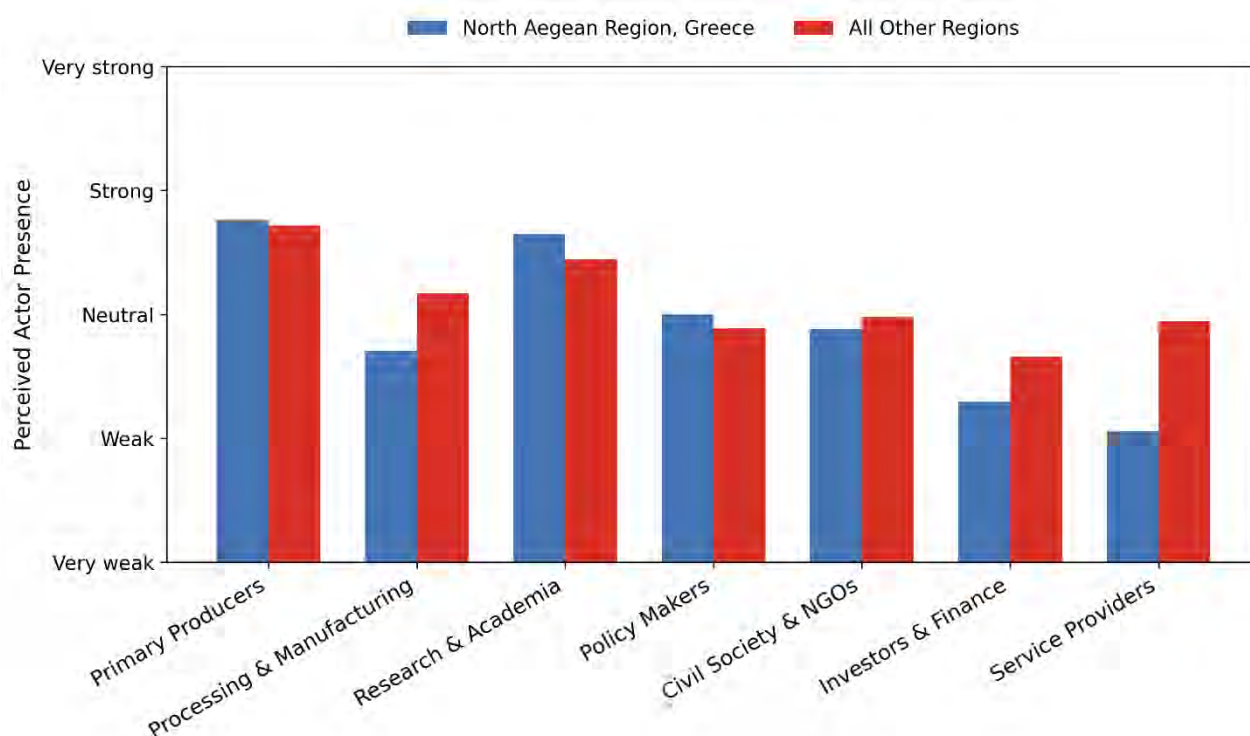
Several institutions and organizations in the Pannonian region are actively involved in EU-funded bioeconomy projects:

- **Centar Kompetencija d.o.o. za Istraživanje i Razvoj:** ROSEWOOD, ROSEWOOD4.0
- **Grad Osijek:** EHHUR
- **Gradski Prijevoz Putnika d.o.o.:** EHHUR
- **Obnovljivi Izvori Energije Osijek d.o.o.:** EHHUR
- **Općina Draž:** EcoDaLLi
- **Saponia – Kemijska, Prehrambena i Farmaceutska Industrija d.d.:** CIRCALGAE, FUNGUSCHAIN
- **Josip Juraj Strossmayer University of Osijek – Faculty of Civil Engineering and Architecture:** EHHUR
- **Josip Juraj Strossmayer University of Osijek – Faculty of Food Technology:** BEAMIN
- **Udruga Breza:** EHHUR
- **Unikom d.o.o. za Komunalno Gospodarstvo:** EHHUR

4.1.3 North Aegean Region

Fact Sheet – North Aegean Region (n = 17)

Ecosystem Overview



Core Actors:

Primary Producers:

Agricultural cooperatives (e.g., those involved in pilot applications), livestock farmers (wool of sheep), fisheries (discarded fish), pruning from orchards and vineyards, slaughterhouse byproducts, cheese factory byproducts

Processing and Manufacturing Industries:

Existing small-scale companies such as Aegean Organics and the Poriazi family (bio-based production and valorization), Refeelme (reusable cups initiative on Samos Island), olive press operators (some use olive mill waste as fertilizer), Modousa social cooperative enterprise (using olive leaves for pharmaceuticals), Ifestio Anemotias social cooperative enterprise (using pruning to produce biochar)

Research and Academia:

University of the Aegean – Center of Sustainable and Circular Bioeconomy (Lesvos Island), Department of Food Science and Nutrition (Lemnos Island)

Policy Makers and Regulators:

Ministry of Environment and Energy

Civil Society and NGOs:

Sporos Regenerative Institute (as an NGO involved in agroecology and education),
Epimilides (NGO about using sheep wool),

Agreement with:

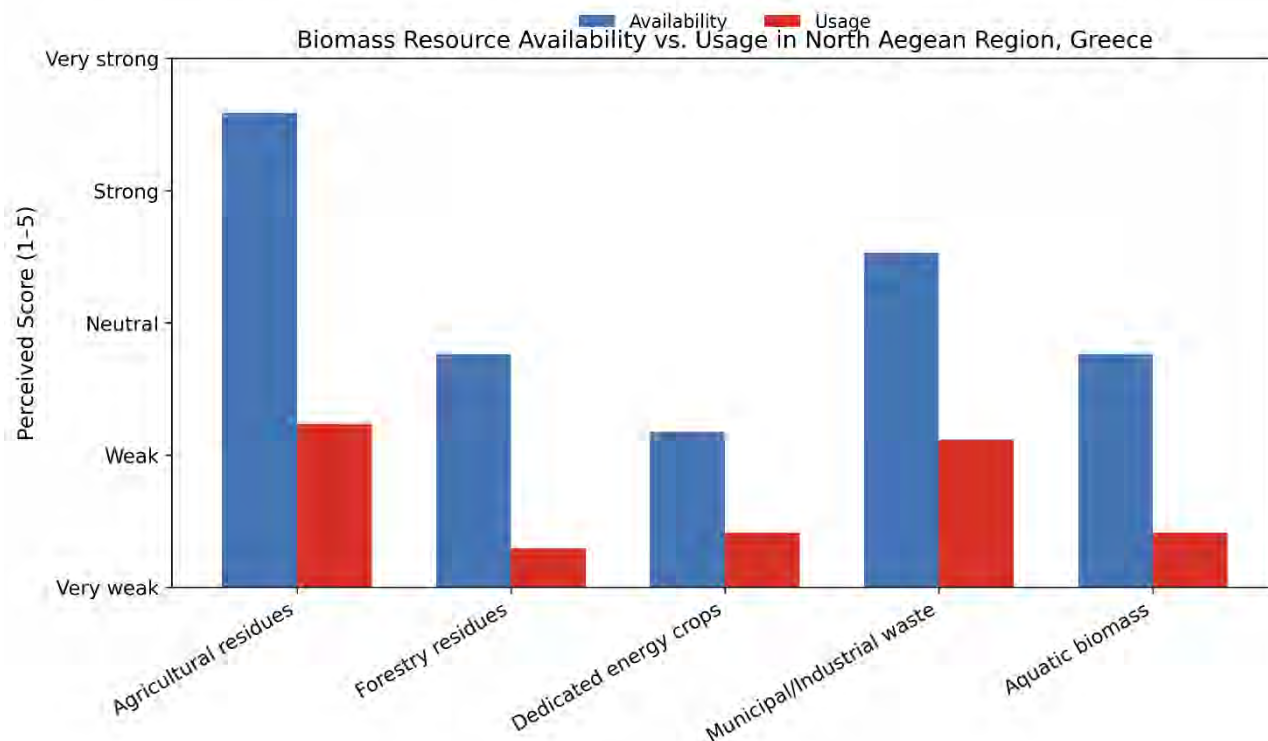
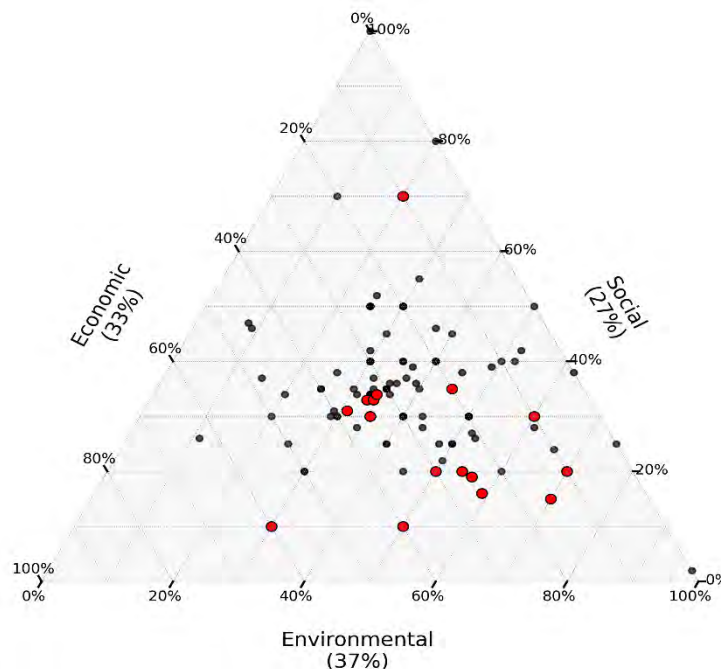
Biomass focus: 6 (5.95*)

Biotech focus: 4.29 (5.18*)

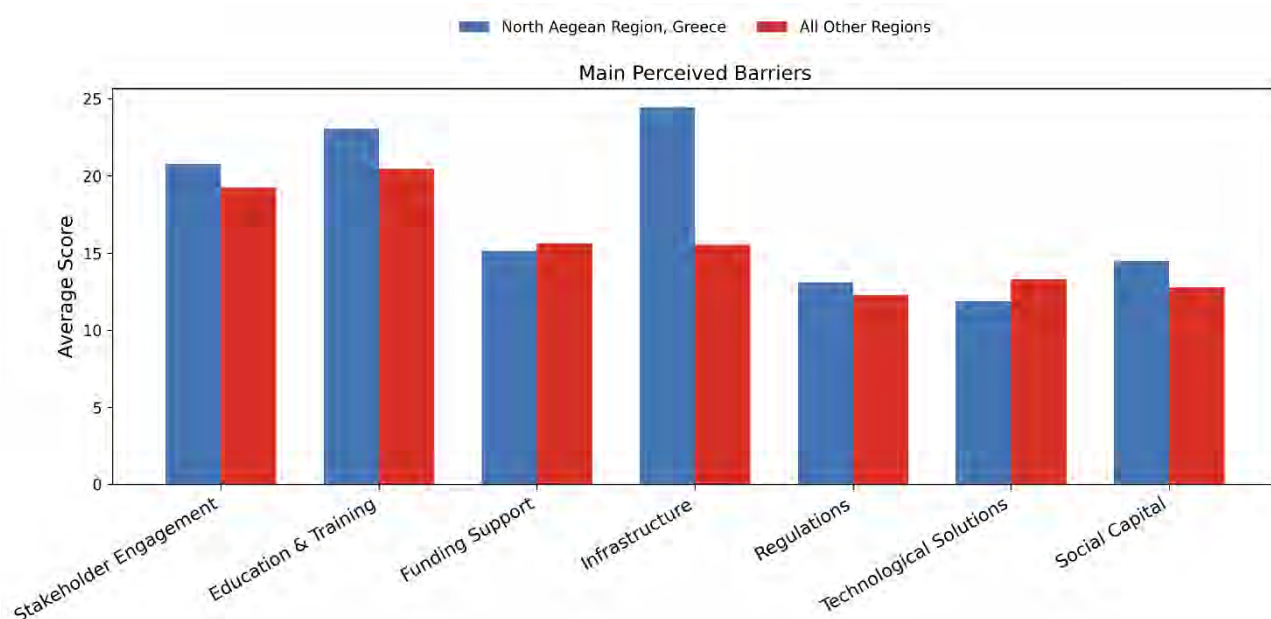
Systemic focus: 4.52 (5.13*)

1:strongly disagree -7:strongly agree

* Average All Regions



Perceived Barriers



Stakeholder Engagement: Political focus is driven by clientelism rather than professional, strategic planning • Bioeconomy is not prioritized in the regional agenda, which weakens stakeholder involvement and alignment around bioeconomic goals.

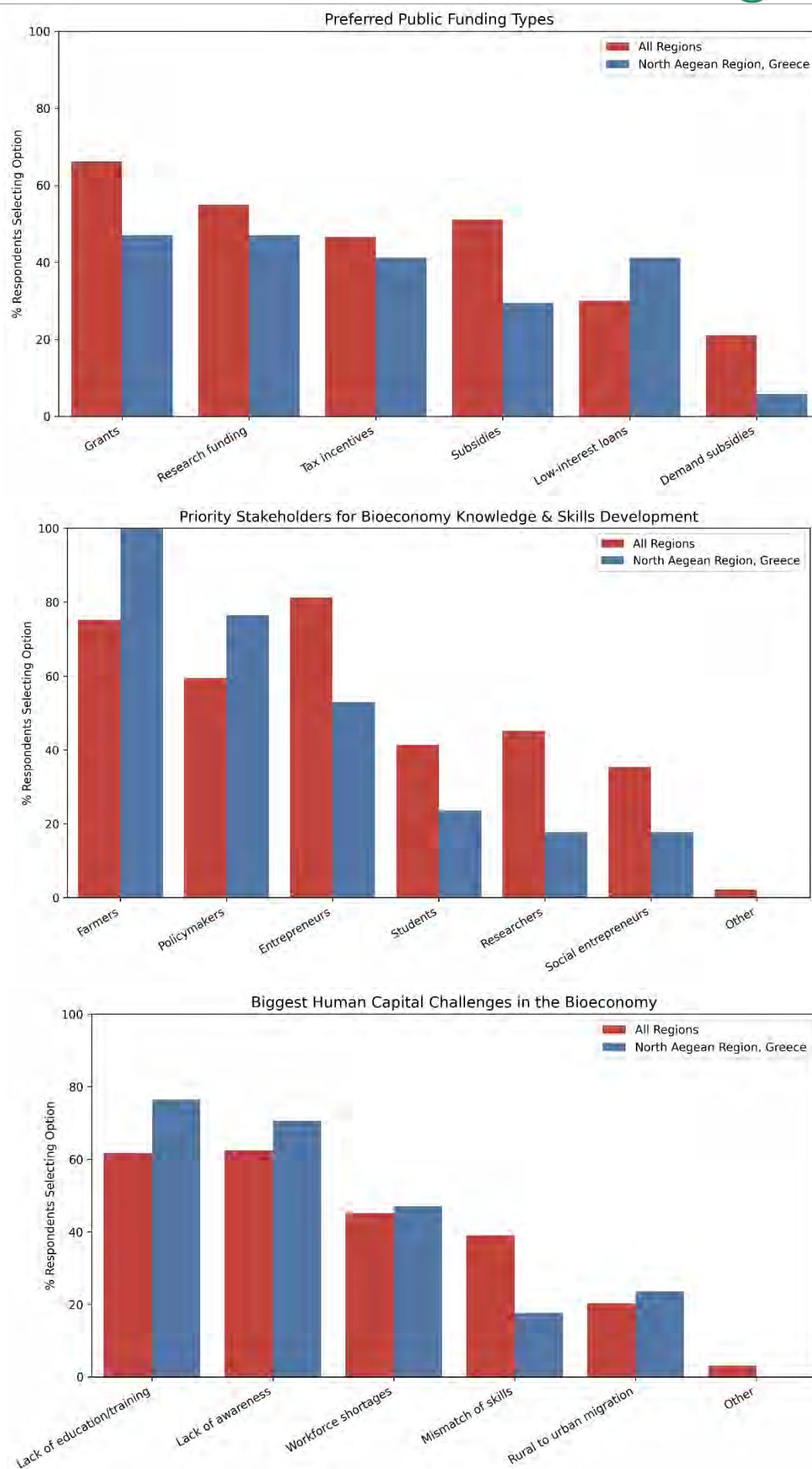
Education & Training: No direct barriers identified in this area, though limited policy attention may indirectly affect education and awareness related to bioeconomy.

Funding Support: Investment is directed primarily toward basic infrastructure and transportation, leaving little support for bioeconomy initiatives • Limited public funding availability for bio-based innovation and sector development.

Infrastructure: Government efforts are concentrated on improving island connectivity with the mainland, rather than building infrastructure supportive of bioeconomy sectors.

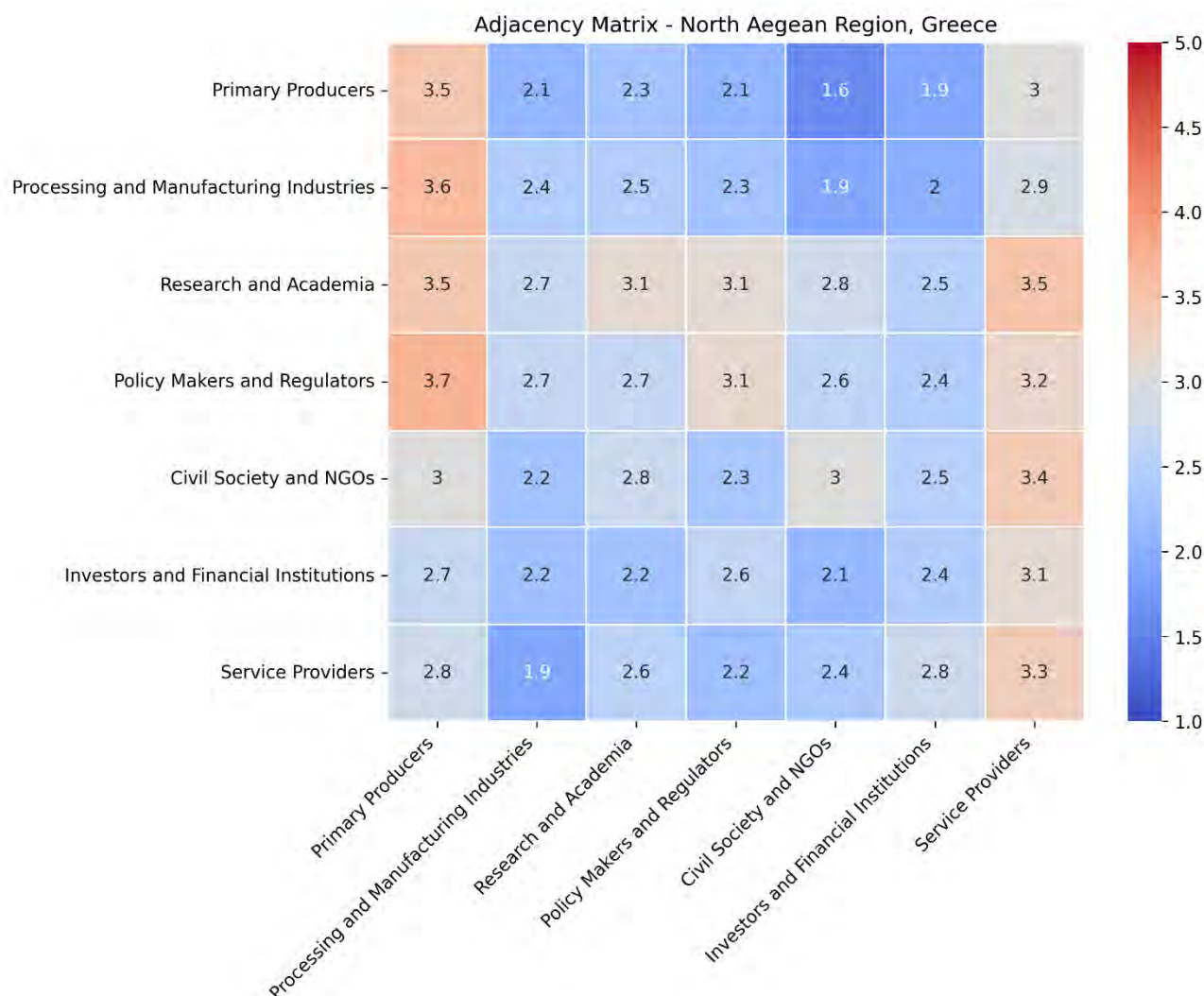
Regulations: Bioeconomy-related actions are not currently aligned with regional development priorities • Existing legislation has yet to translate into concrete implementation, but this is expected to evolve in the future.

Social Capital: Economic concerns and competing priorities overshadow sustainable development goals • Public and institutional focus is diverted toward more immediate infrastructure needs.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The region's bioeconomy is grounded in traditional agriculture and small-scale manufacturing, with strong links between primary production and local processing. Key chains include: Olive groves → olive oil production • Vineyards → wineries and distilleries • Sheep/goat farming dairies. Each of these sectors produces biomass and waste, and circular bioeconomy efforts focus on valorizing these outputs for energy, fertilizer, and feed. While agri-tourism and conservation are emerging themes, structured CBE strategies are still limited.

B. Social Innovation

Several innovation initiatives are active across the region: The NGO MedINA promotes agroecological practices, seed-to-table value chains, and the "Terra Vita - Agricultural

Tradition & Biodiversity” certification • Activities include food trails, farm tourism experiences, and heritage safeguarding and valorisation efforts • Community cooperatives have had success particularly in product marketing • Cultural events like the Kournos festival blend food and arts, showcasing local identity and linking it to bioeconomy.

C. Value Chains

The region features both active and emerging bio-based value chains:

Existing: Oregano leftovers → essential oil, aromatic water • Olive mill waste → biogas, advanced bio-fertilizer, biochar (pilot phase)

Ideas in development: Barley/wheat straw + grape pomace → mushroom substrate → compost (biofertilizer) • Seaweed → biofertilizers • Winery pomace → animal feed, vinegar • Dairy waste → biogas, fertilizer, animal feed • Sheep wool → liquid biofertilizers • Fruit tree pruning → energy, biogas

D. Policy and Strategy

Bioeconomy governance remains underdeveloped at the regional level. However, the University of the Aegean has emerged as a key institutional driver, having established the Centre of Circular Bioeconomy. No formal governance framework for innovation currently exists, and regional policies prioritize tourism over circular bioeconomy. That said, informal practices and academic leadership are beginning to shape a more circular approach, especially within agriculture.

E. Institutional and Project Landscape

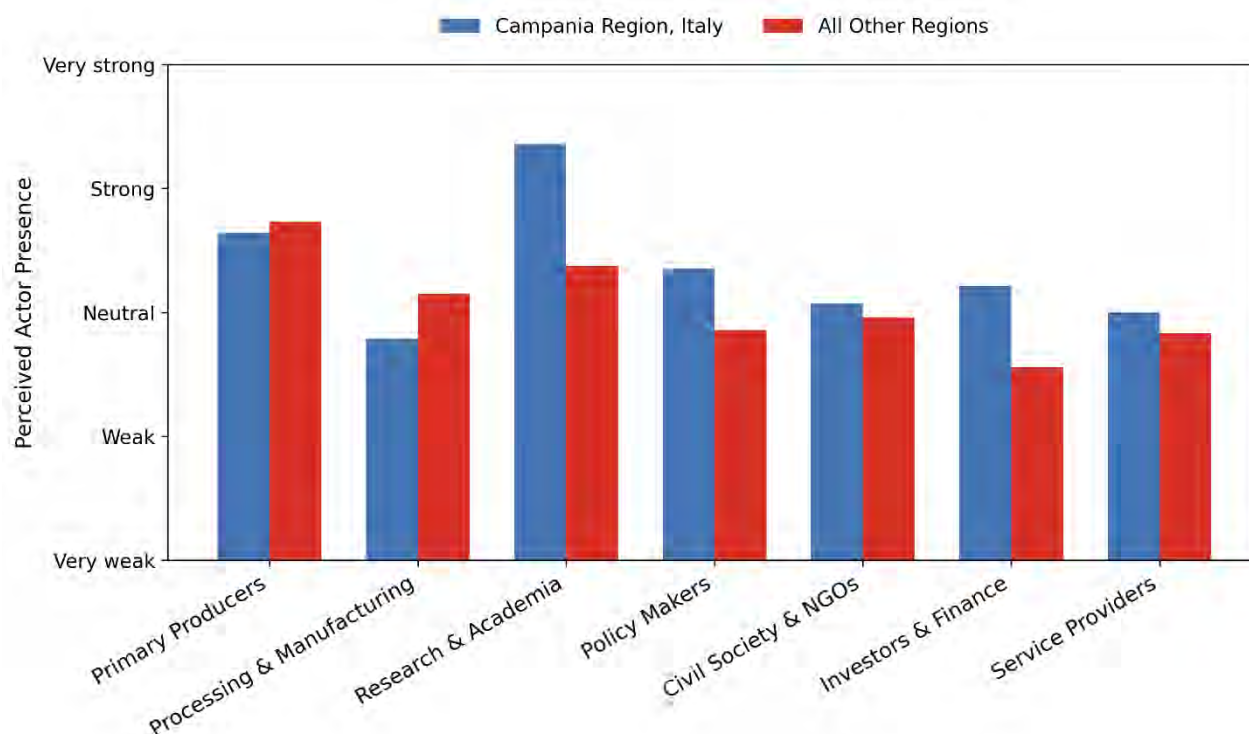
Two actors are involved in EU-funded projects with bioeconomy relevance:

- **Municipality of Mytilene:** CircHive
- **University of the Aegean (Panepistimio Aigaiou):** BioFairNet, CREA, GEMINI, GREEN-LOG, IDEAL, RURACTION

4.1.4 Campania Region

Fact Sheet – Campania Region (n = 14)

Ecosystem Overview



Core Actors:

Primary Producers:

Small farmers, livestock farmers, forestry stakeholders, producer Organizations/Cooperatives (agricultural cooperatives, Coldiretti, Legacoop, Le Terre di Don Peppe Diana - Libera Terra s.c.s)

Processing and Manufacturing Industries:

Biopox S.r.l., Iavarone Wood Technology S.R.L., Isuschem, Novamont (including facility at Piana di Monte Verna), OLON (API manufacturing), Rienergy E.S.Co. S.r.l. Leather and Tanning Materials Experimental Station

Research and Academia:

Universities: University of Naples Federico II, University of Naples Parthenope, University of Salerno, University Suor Orsola Benincasa, University of Campania Luigi Vanvitelli, LUISS, doctoral programs linked to design for Made in Italy;
Research bodies: CNR (Consiglio Nazionale delle Ricerche), ENEA, CEINGE – Biotecnologie Avanzate, BioTekNet, Materias

Policy Makers and Regulators:

Campania regional government, Assessorato alla Ricerca, Innovazione e Startup, Assessorato all'Agricoltura

Civil Society and NGOs:

Legambiente Campania, Social cooperatives (Terra Felix), Local Action Groups (LAGs), Bioeconomy cluster

Business Networks and Support Entities:

Confindustria Campania, ENCO, CU2 – Sustainable Innovation Hub, Agency for Territorial Innovation, Development and Security, Agrorinasce, Distretto Tecnologico Aerospaziale della Campania – DAC scarl, Terra Next Accelerator

Agreement with:

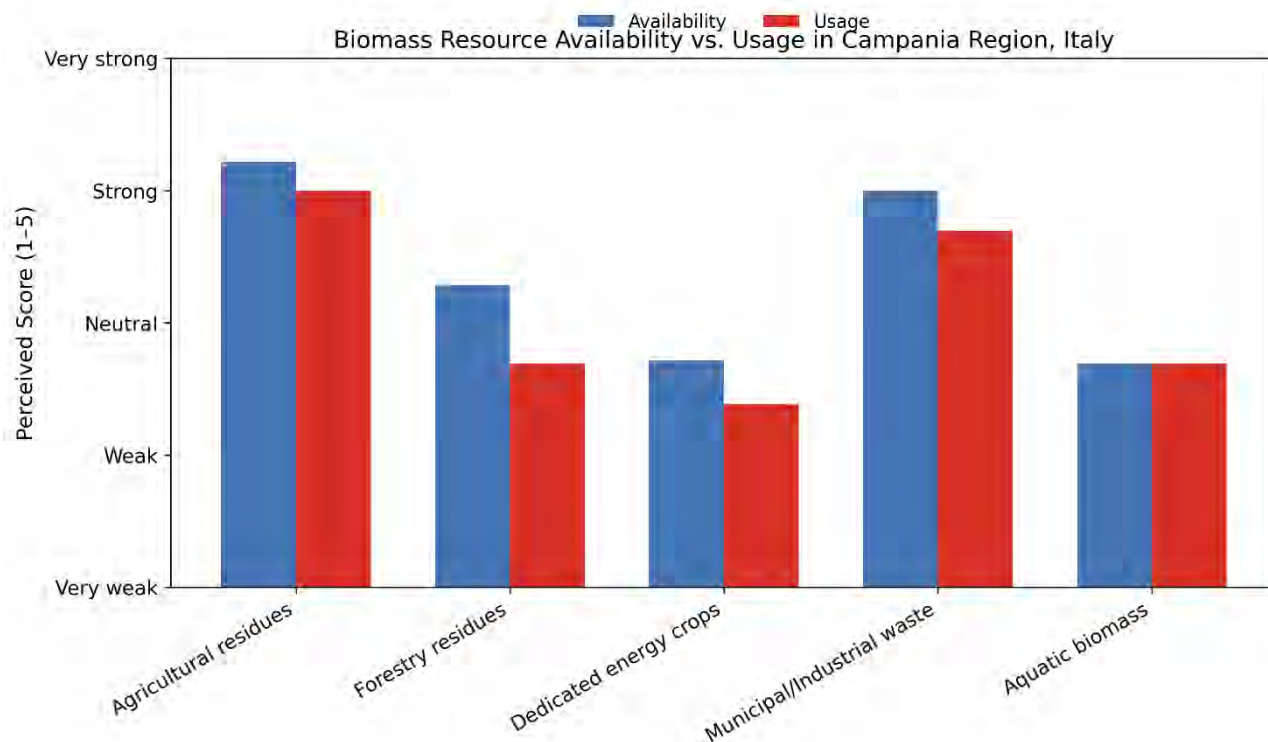
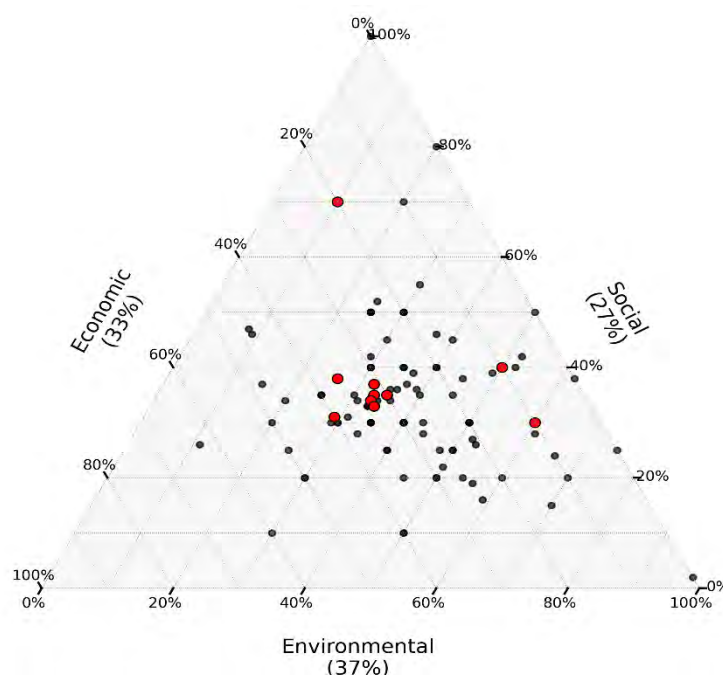
Biomass focus: 6.57 (5.95*)

Biotech focus: 5.85 (5.18*)

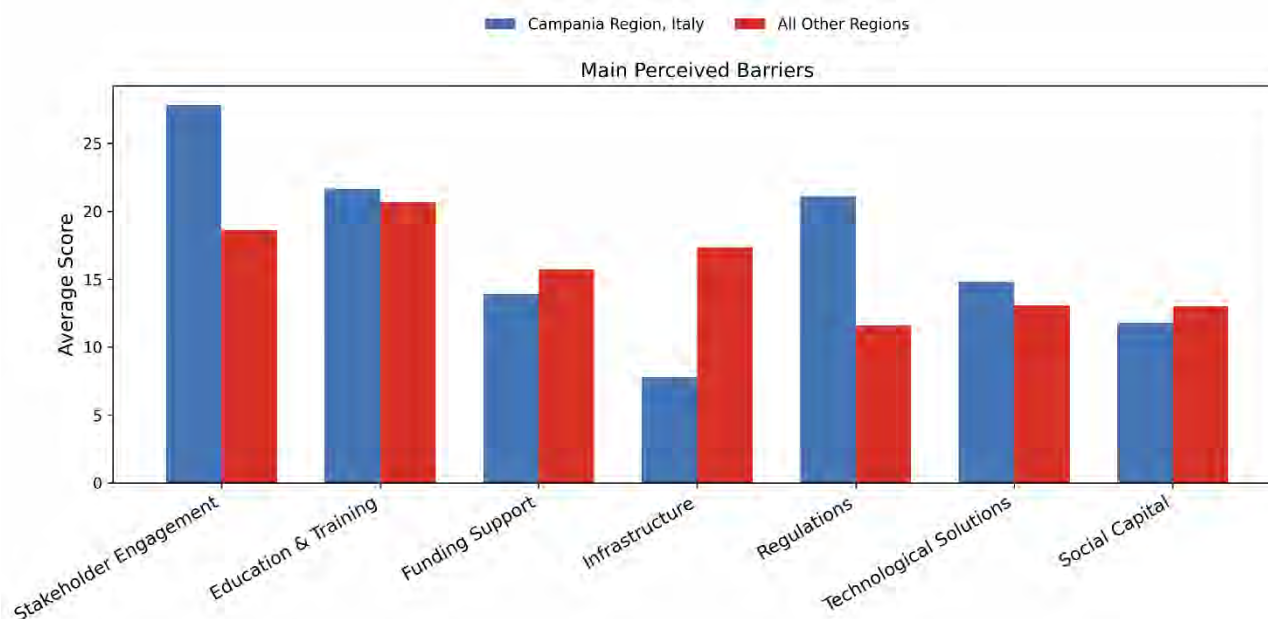
Systemic focus: 6.14 (5.13*)

1:strongly disagree -7:strongly agree

* Average All Regions



Perceived Barriers



Stakeholder Engagement: Low public awareness limits acceptance of sustainable products and weakens market demand • Collaboration between public institutions, local businesses, and universities is insufficient, leading to inefficiencies and missed synergies • Resistance to change is common, especially among traditional industries and local companies hesitant to invest in sustainable practices.

Education & Training: Lack of awareness affects both citizens and businesses, reducing understanding of bioeconomy opportunities and limiting participation in innovation or transition efforts.

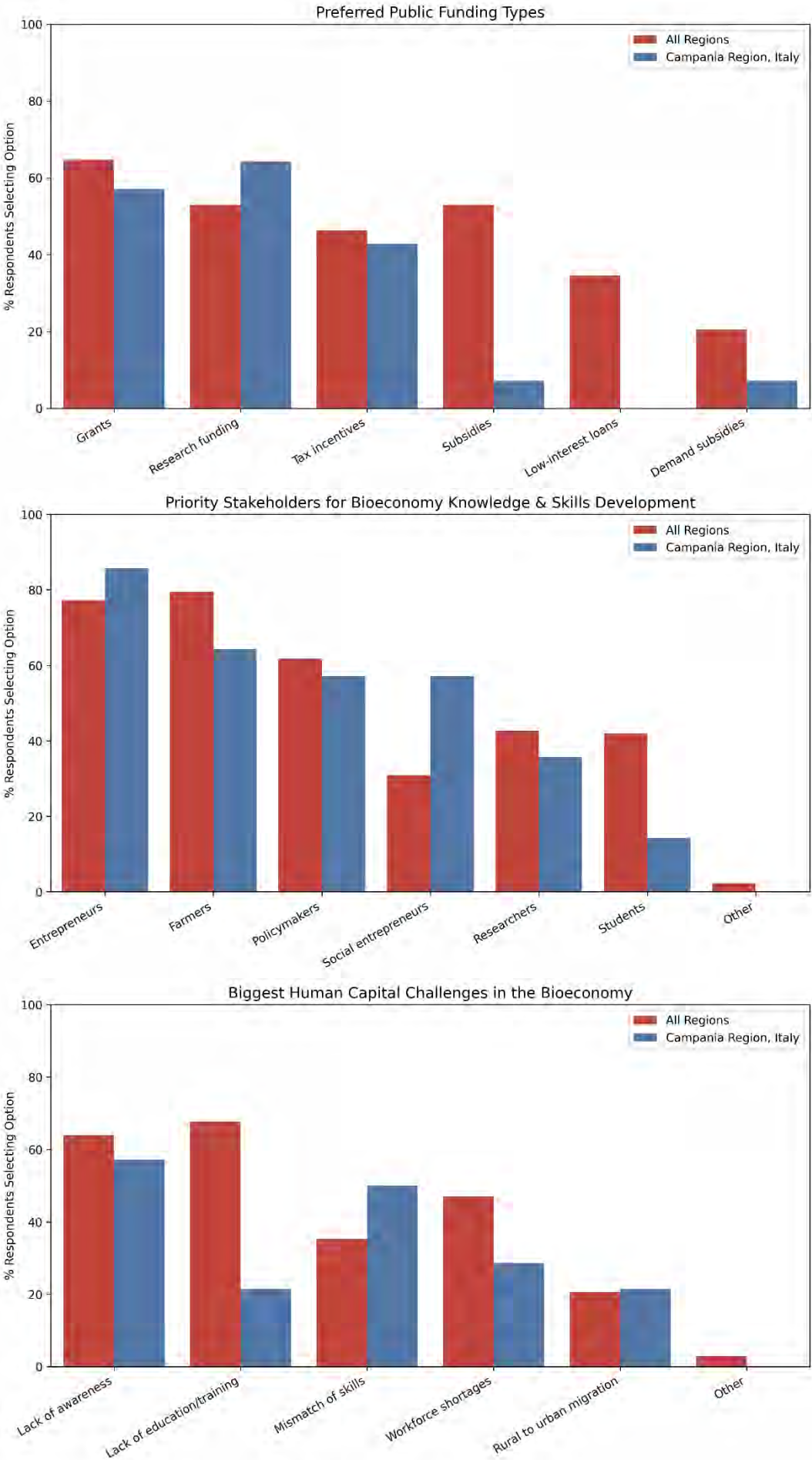
Funding Support: Small businesses face difficulties accessing funding for innovation and sustainability-related investments • Limited financial support acts as a disincentive for adopting new technologies and processes.

Infrastructure: Facilities for biomass recovery and natural resource utilization are often outdated or lacking • Broader infrastructure gaps limit the practical rollout of bioeconomic activities.

Regulations: Regulatory complexity and bureaucratic delays hinder project approvals and discourage private sector involvement • Laws related to bioeconomy are often unclear, inconsistent, or poorly aligned between regional and national levels, creating confusion and slowing down implementation.

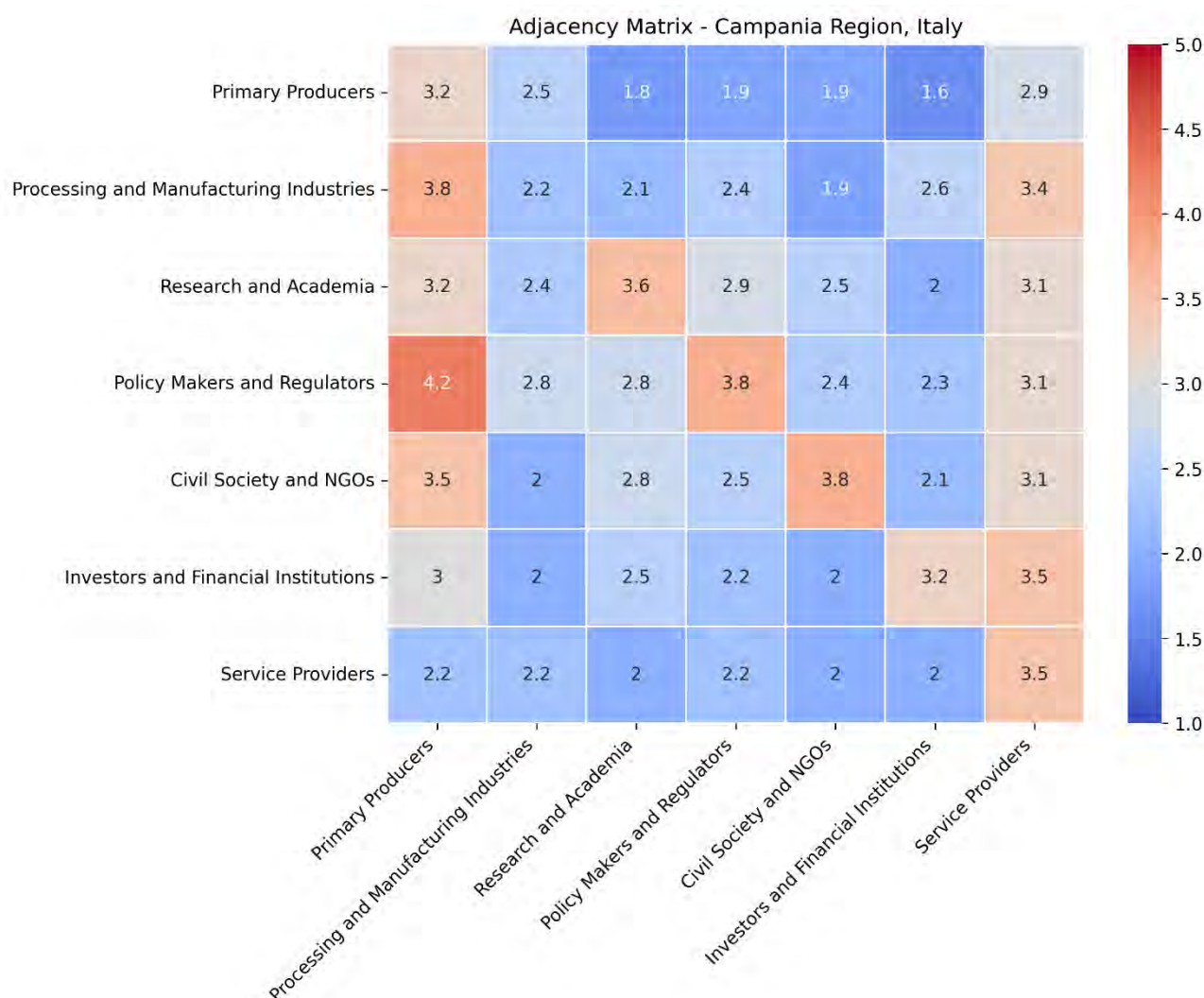
Technological Solutions: Adoption of sustainable technologies is limited by cost concerns and institutional inertia • Infrastructure and funding constraints further restrict the deployment of innovative solutions.

Social Capital: Traditional industry structures and cultural resistance to change limit enthusiasm for transition to a bio-based economy • The slow cultural shift reduces openness to sustainable alternatives in both production and consumption.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

Campania's bioeconomy is primarily driven by its strong agricultural base, which supports sustainable farming practices and the production of a wide array of bio-based products. Key focus areas include: Agri-food production • Bioplastics and biofuels • Biogas from organic waste • Organic fertilizers • Tanning industry • Nutraceuticals and functional foods • Marine biotechnology applied to industry, food, medicine, and environmental solutions. Core value chains revolve around agriculture, agri-food processing, dairy, and forestry.

B. Social Innovation

The region promotes social innovation through: Projects that reduce waste and advance the circular bioeconomy • Education and training programs that raise awareness among professionals and the general public • Social farming initiatives

that provide employment for marginalized groups through agricultural activities • Local initiatives exploring plant-based materials for textiles.

C. Value Chains

Agri-food and agro-industrial chains • Bioplastics and biofuels from agricultural and marine sources • Biogas from organic and agricultural waste • Organic fertilizers • Nutraceutical and functional food production • Marine biotechnology for pharmaceutical, industrial, and environmental use • Short supply chains and biomass recovery in circular economy models • Tanning industry

D. Policy and Strategy

The region's strategic framework strongly supports the bioeconomy: • Campania's Research and Innovation Strategy for Smart Specialization (RIS3) integrates bioeconomy with regional and EU priorities • Policies include the Rural Development Program and targeted support for circular economy and innovation • The region hosts acceleration programs, incubators, and funding instruments for startups and SMEs • Collaboration between public institutions, academia, and private companies is actively promoted

E. Institutional and Project Landscape

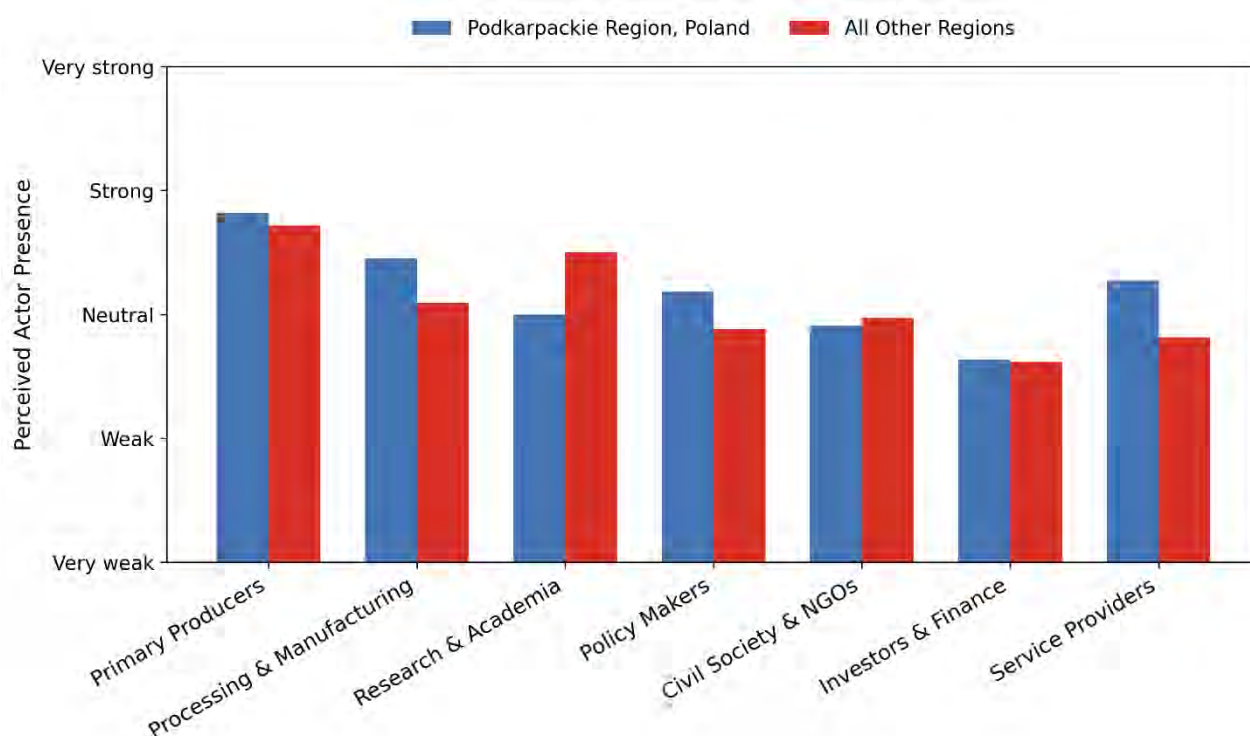
Numerous institutions in Campania are engaged in bioeconomy-related projects:

- **Arterra Bioscience S.p.A.:** InnCoCells
- **Città Metropolitana di Napoli:** BIOCIRCULARCITIES
- **Consorzio per lo Sviluppo e il Trasferimento di Tecnologie e per la Realizzazione di Servizi nel Mezzogiorno nel Settore del Recupero Edilizio:** BIM-SPEED
- **CyberEthics Lab SRLS:** COMFORTAGE
- **ENCO SRL:** ATRIUM, BIONtop, BRILIAN, BioeconomyVentures, ELLIPSE, FoodCoP, MERLIN, SYMBA
- **Fondazione MEDES:** SHui, iSQAPER
- **ICIMENDUE SRL:** MERLIN
- **Latitudo 40 SRL:** URBREATH
- **Project Ahead SC:** CHESS
- **Stazione Zoologica Anton Dohrn:** EMBRIC, EUREMAP
- **Sviluppo Tecnologie e Ricerca per l'Edilizia Sismicamente Sicura ed Ecosostenibile SCARL:** BIM-SPEED
- **Università degli Studi di Napoli Federico II:** BioFairNet, BioINSouth, M2EX, MASTER, SEIZMIC, YOUCOUNT
- **SPRING Cluster:** BIOLOC

4.1.5 Podkarpackie Region

Fact Sheet – Podkarpackie Region (n = 11)

Ecosystem Overview



Core Actors:

Public Sector & Government Agencies:

Marshal's Office of the Podkarpackie Region • Ministry of Agriculture • Agency for Restructuring and Modernization of Agriculture • Podkarpackie Region Development Agency • National Fund for Environmental Protection and Water Management (Rzeszów branch) • Podkarpackie Agricultural Advisory Center (PODR) • Municipalities and municipal companies (e.g., Krosno, Jasło, Leżajsk, Rzeszów, etc.)

Research & Education:

University of Rzeszów • Rzeszów University of Technology • Experimental Station of the National Research Institute of Animal Production (Odrzechowa) • Institute of Agricultural Sciences Conservation and Environmental Management

Private Sector & Industry:

Polish Biogas Group • ENERBIO ECO Leżajsk Sp. z o.o. • NEO BIO ENERGY • PGB Energetyka 11 • Magazyn Biomasa • Small and medium-sized enterprises (e.g., dairies, breweries)

Associations & Networks:

Bio-based Industries Consortium • Polish Biomass Chamber • ProCarpathia Association • ENRD • Green Velo Network

Other Key Actors:

Local food and beverage producers • Biogas plants (e.g., Stare Miasto near Leżajsk, Odrzechowa) • Municipal waste management companies • Regional Directorate of State Forests (Krosno)

Agreement with:

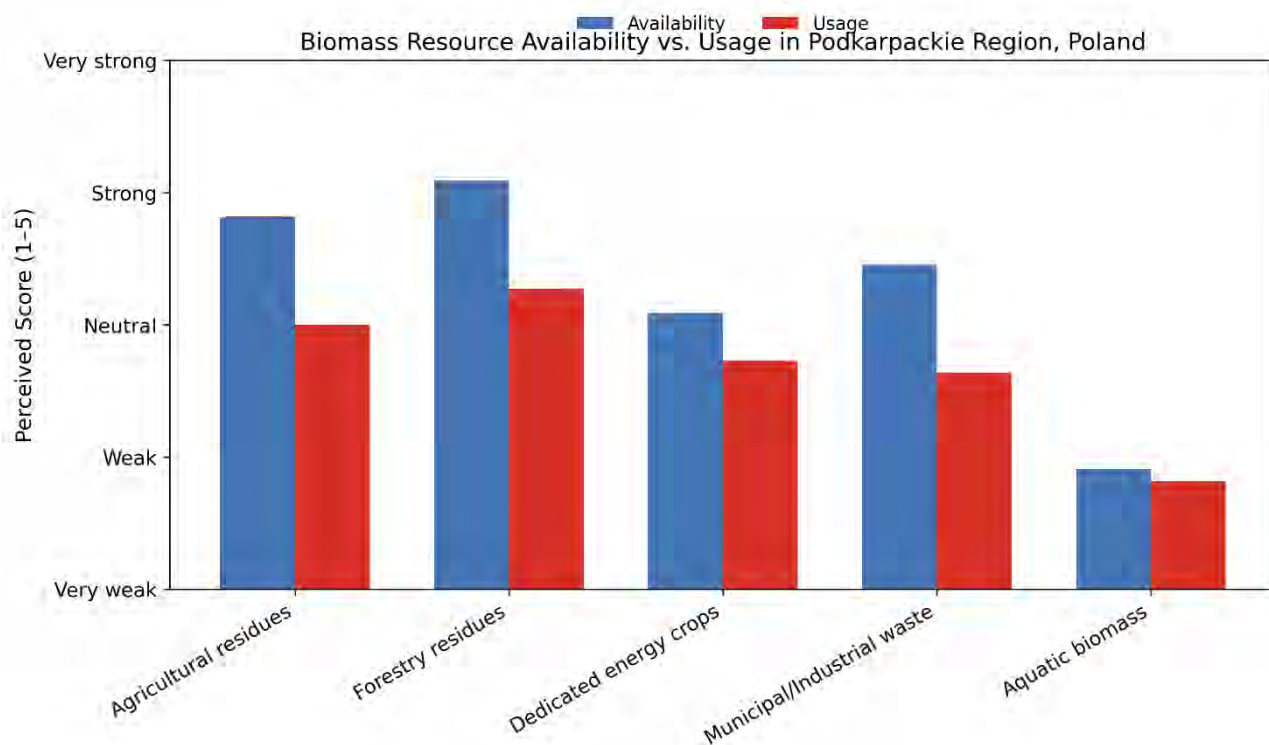
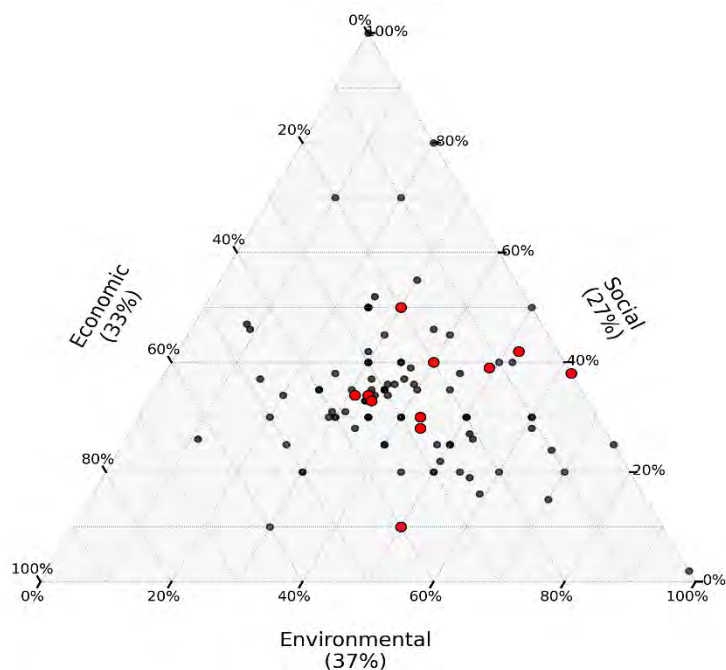
Biomass focus: 5.63 (5.95*)

Biotech focus: 5.81 (5.18*)

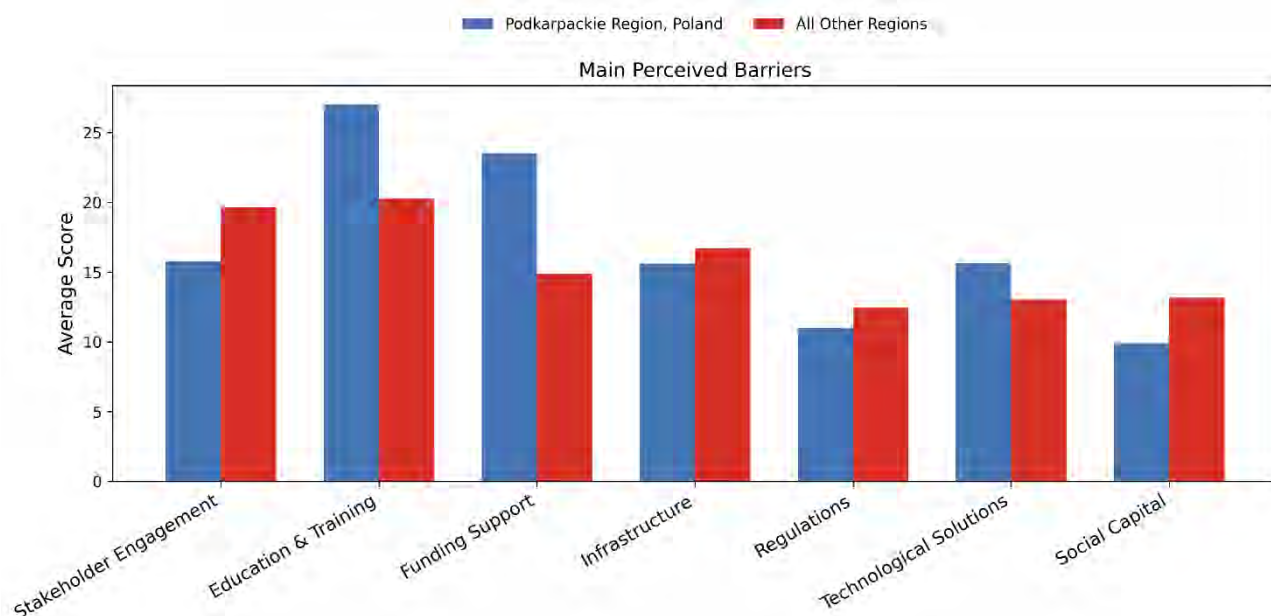
Systemic focus: 6.09 (5.13*)

1:strongly disagree -7:strongly agree

* Average All Regions



Perceived Barriers



Stakeholder Engagement: Public opposition to bioeconomy infrastructure—especially biogas plants—is a major barrier, driven by concerns over environmental, health, and aesthetic impacts • Collaboration is weak, limiting innovation and joint initiatives • The fragmented nature of agriculture further complicates action and planning.

Education & Training: Capacity-building efforts are limited, and awareness of bioeconomy opportunities remains low • Expertise in bioeconomy sectors is underdeveloped, making it harder to implement or scale up initiatives effectively.

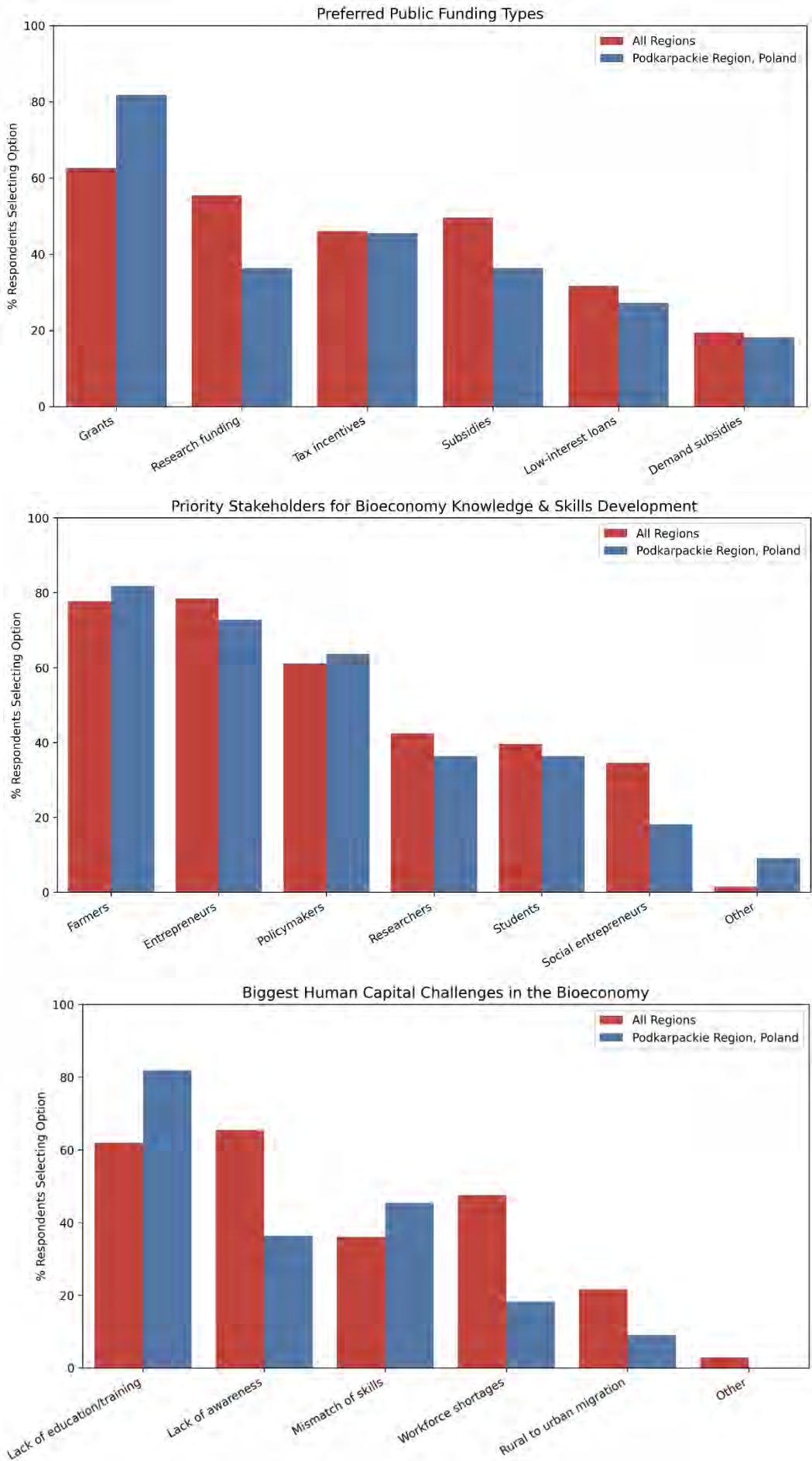
Funding Support: High investment costs, especially for technologies like biogas, are a major barrier for smaller businesses and farmers • No sustained funding stream for bioeconomy development, restricting both innovation and infrastructure expansion.

Infrastructure: The region lacks adequate infrastructure to support the bioeconomy—particularly for distribution (e.g. biogas via gas networks) and biomass processing • Fragmented farm structures make it harder to aggregate feedstock for large-scale energy or materials production.

Regulations: Regulatory complexity and unclear rules discourage private sector involvement and slow down project development • There is no cohesive or region-specific strategy for bioeconomy growth, resulting in fragmented actions and poor alignment • Lack of process continuity in governance weakens long-term planning.

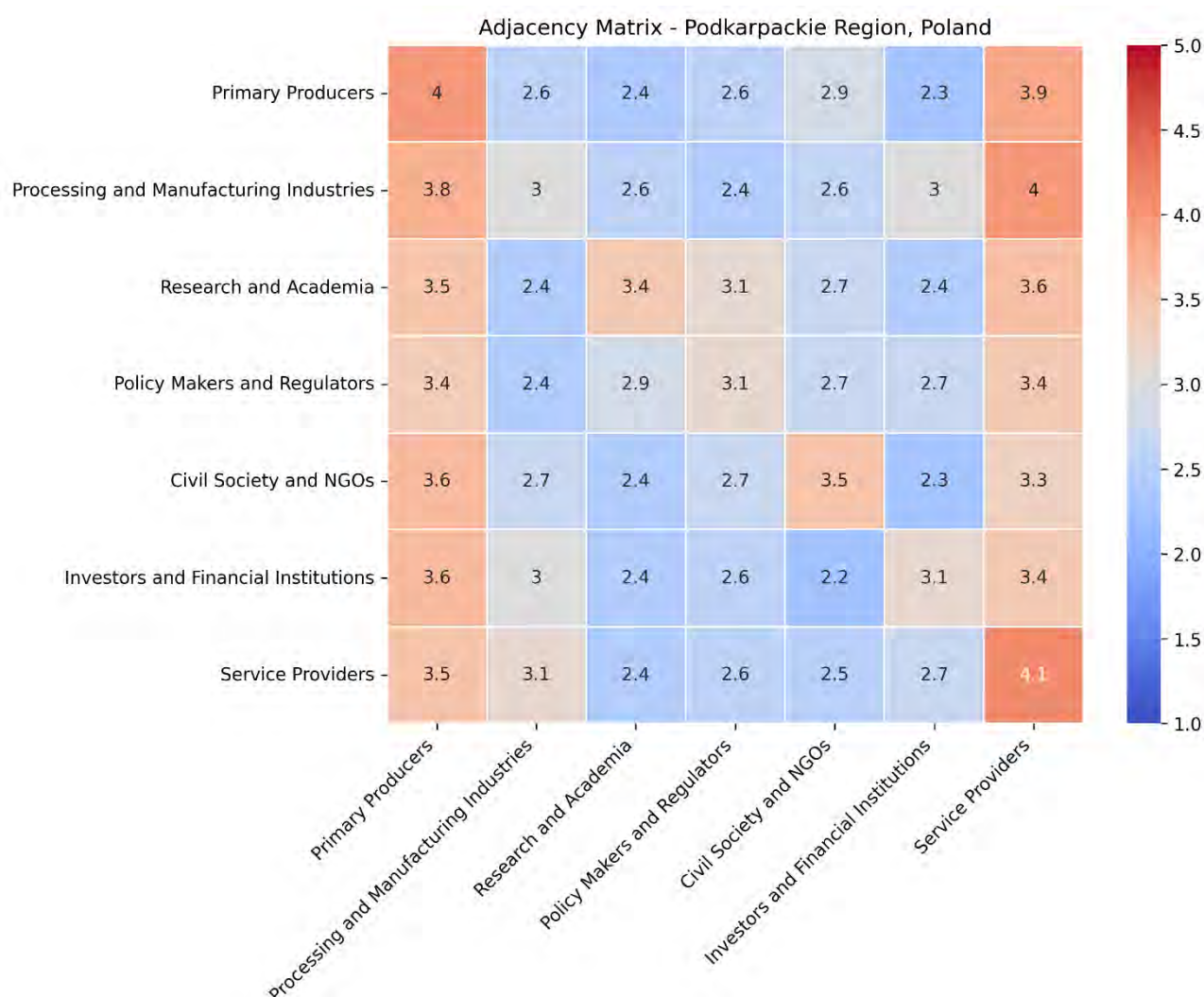
Technological Solutions: High capital costs of bioeconomy technologies, especially relative to other renewable energy options • Infrastructure and funding gaps limit opportunities for testing or deploying new technologies in real-world settings.

Social Capital: Public protests against bioeconomy facilities reflect a gap in trust and communication • Local characteristics such as agricultural fragmentation and resistance to land-use change pose challenges to implementation.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The regional bioeconomy in Podkarpackie is primarily based on agriculture and forestry. Key areas include: Agricultural bioeconomy focused on biomass and organic waste • Forest-based sectors providing timber and residues • Biogas production from agricultural waste and animal excrement • Pellet production for heating and energy. While these areas show potential, integration into cohesive bioeconomy frameworks remains limited, and broader sectoral transformation has yet to take shape.

B. Social Innovation

No notable social innovations have been identified so far in the context of bioeconomy. The region lacks established mechanisms for addressing social needs through bio-based initiatives. Further research is needed to identify potential community-driven models, educational strategies, or inclusive entrepreneurship activities related to the bioeconomy.

C. Value Chains

The region's existing bio-based value chains are modest and underdeveloped: Biogas from agricultural and food processing residues • Pellet production from forestry waste.

Raw materials from agriculture and forestry are still largely directed to conventional industries (e.g., food, timber), with little circular integration. There is no operational biorefinery infrastructure, and most agricultural production is not yet tied into circular or value-added processing chains.

D. Policy and Strategy

There is no dedicated regional bioeconomy strategy. However: • The Regional Innovation Strategy of Podkarpackie (2021–2030) includes circular economy and social innovation under the broader goal of improving quality of life • Proposed actions include supporting circular transformation of enterprises, product lifecycle extension, and capacity building in CE solutions • Some EU funding is available to promote circularity in businesses and municipalities • A national-level expert group on bioeconomy operated until 2022 under the Ministry of Agriculture, but public results are lacking. Despite the absence of direct bioeconomy policy, the strategic orientation toward sustainability provides a foundation for future development.

E. Institutional and Project Landscape

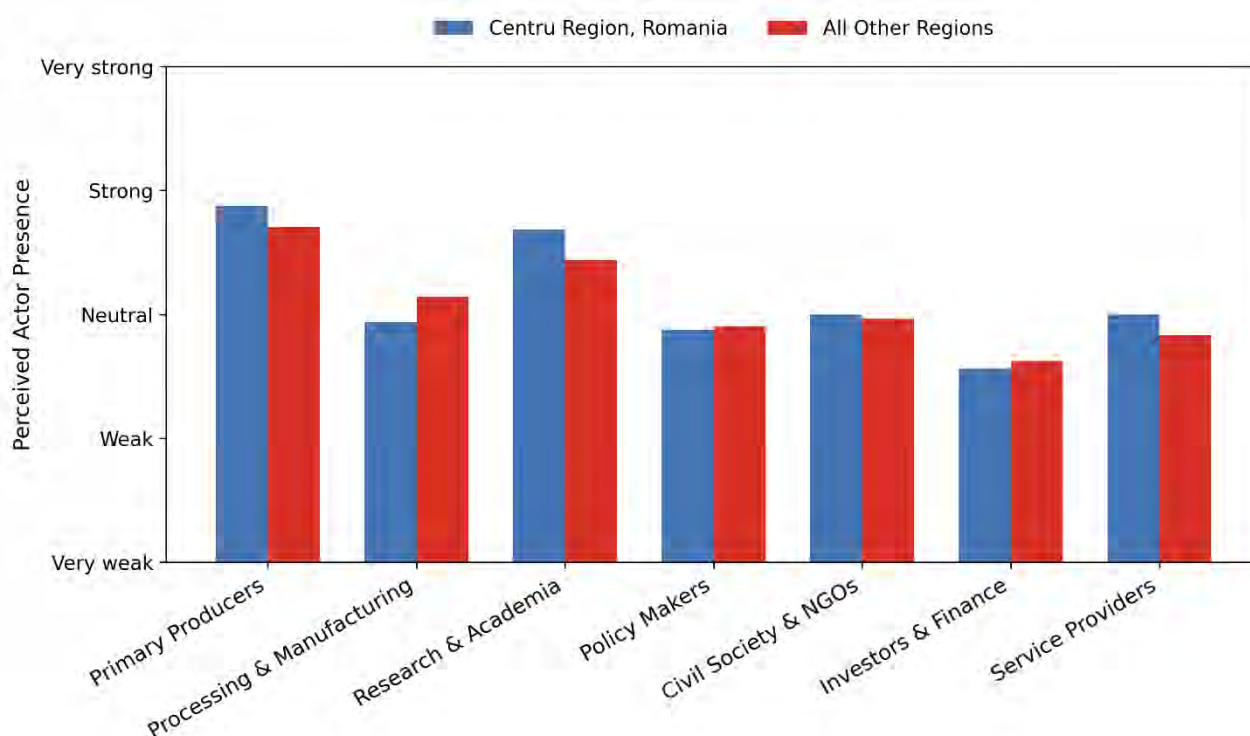
Bioeconomy-related activity in the Podkarpackie region is emerging, supported by a small number of EU-funded initiatives and institutions:

- **Rzeszowska Agencja Rozwoju Regionalnego S.A.:** RIBES
- **Agency for Restructuring and Modernization of Agriculture:** Strategic Plan for the Common Agricultural Policy for 2023-2027:
 - Intervention I.10.2 Investments in farms in the field of renewable energy sources and energy efficiency improvement, Area A - investments in agricultural biogas plants
 - Intervention I.10.1.1 Investments in farms to increase competitiveness
- **Podkarpackie Voivodeship:** Regional Innovation Strategy of the Podkarpackie Voivodeship for 2021-2030 - Horizontal Goal 2: Transformation of enterprises enabling the implementation of circular economy solutions, including in the area of bioeconomy
-

4.1.6 Sibiu County of Centru Region

Fact Sheet – Sibiu County of Centru Region (n = 16)

Ecosystem Overview



Core Actors:

Public Sector & Administration:

County Council • County Hall • Governmental agencies overseeing agri-food, waste management, and rural development • SC Apa Canal Sibiu • A.D.I. Eco Sibiu • Apa Tarnavei Mari Medias

Research & Education:

Universities and research institutes (covering bioeconomy fields) • Academia • Education & research • Research institutions and academia • Training and capacity building in biological resource management

Private Sector & Industry:

DN Agrar (dn-agrar.eu) • Eco Bihor (ecobihor.ro) • Agriculture, industry, marketing, and manufacturing in the bioeconomy sector • Service providers • Consultancy in project development • Industry

Civil Society & Networks:

NGOs • Society • Green Energy Biomass Cluster • Groups of Local Action (GAL)

Primary Producers & Value Chain Actors:

Farmers • Primary producers • Farmers and food industry actors (including associations and clusters) • Farmers, forestry stakeholders

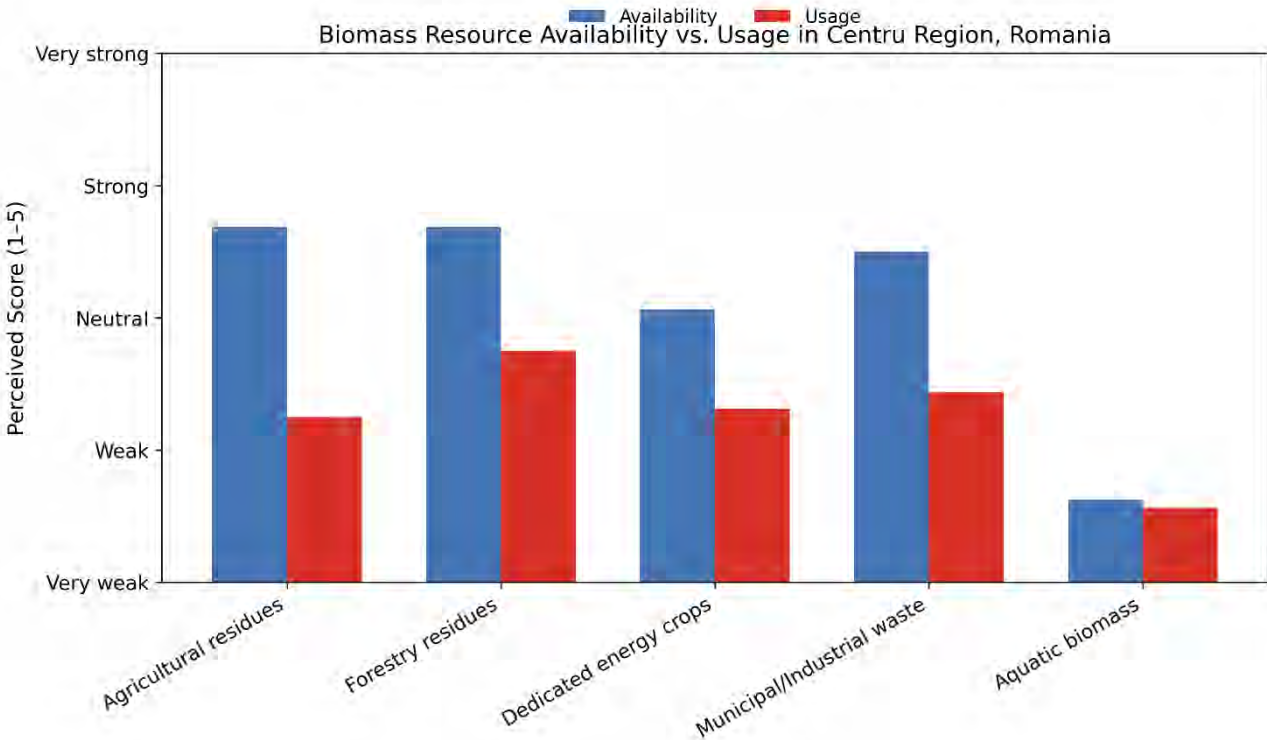
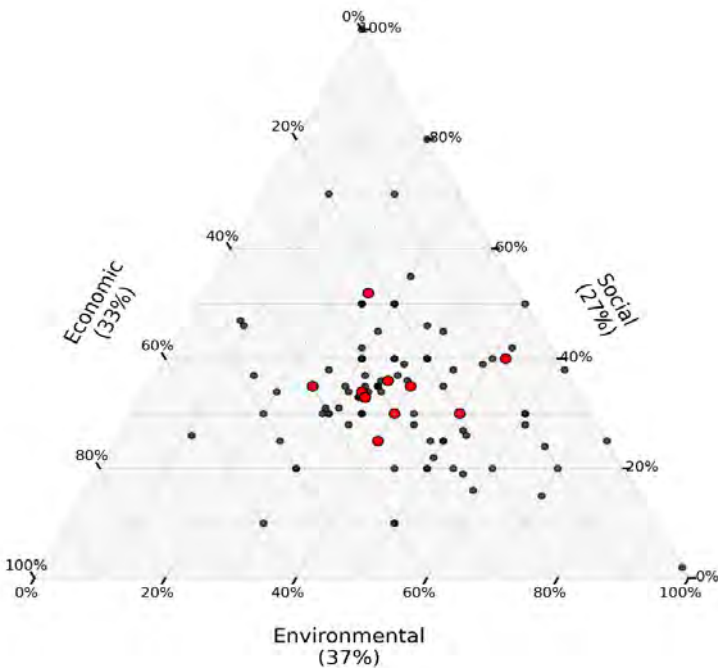
Agreement with:

Biomass focus: 6.37 (5.95*)

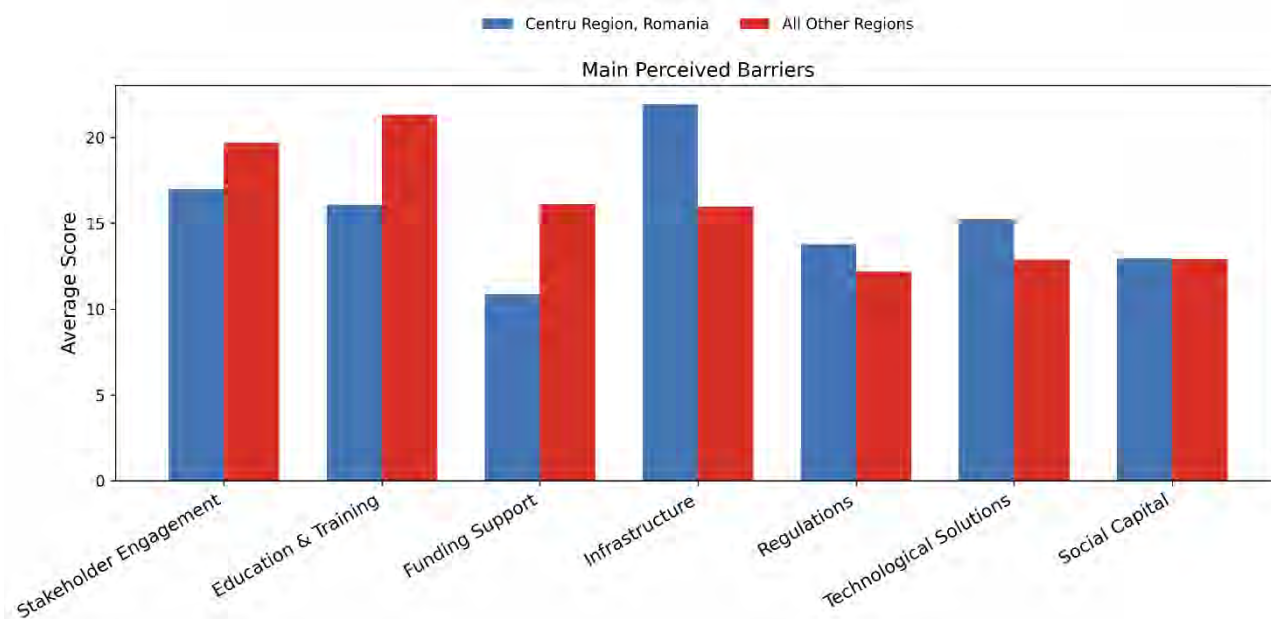
Biotech focus: 5.18 (5.18*)

Systemic focus: 4.75 (5.13*)

1:strongly disagree -7:strongly agree
* Average All Regions



Perceived Barriers



Stakeholder Engagement: Regional and local decision-makers are often unaware of the relevance and potential of the bioeconomy • The governance structure, while in place, lacks proactivity and needs a catalyst to drive engagement • Weak communication tools and channels contribute to a disconnect between different governance levels and local actors.

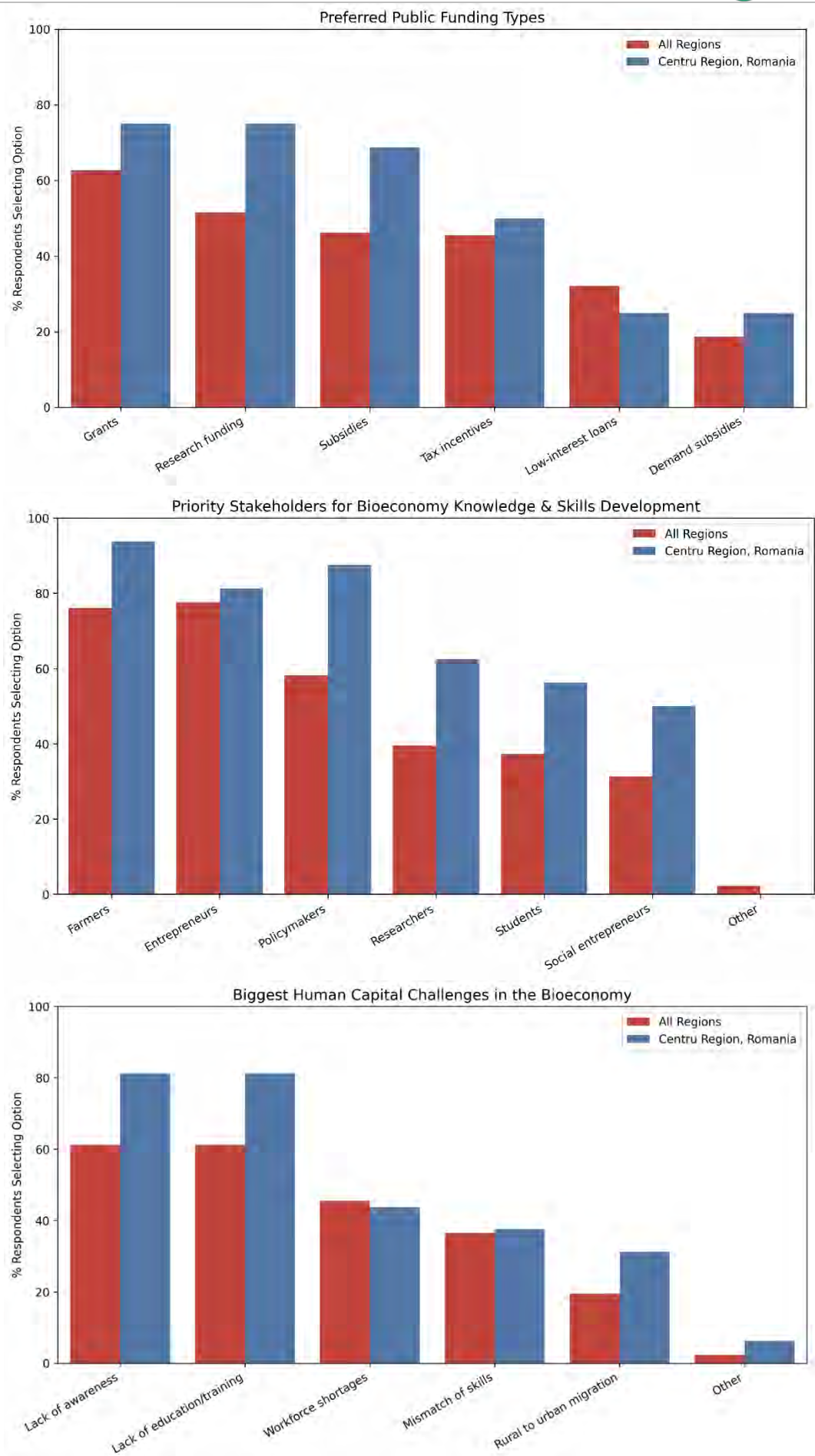
Education & Training: Information about the importance of the bioeconomy is insufficient, particularly among authorities responsible for reporting and implementation • Training and awareness-raising are needed to build a shared understanding of circular bioeconomy goals and benefits across governance levels. Entrepreneurial skills development in the field of bioeconomy is not supported

Funding Support: No direct mention of funding issues, although the passive role of governance may hinder access to or prioritization of funding streams.

Regulations: A key barrier is the poor integration of EU-driven legislation with national development strategies and regional conditions • Misalignment between frameworks creates uncertainty and limits effective implementation at the local level. Capacity building is needed to fill the gaps and avoid overlapping as well as implementing monitoring indicators in a more comprehensive monitoring system.

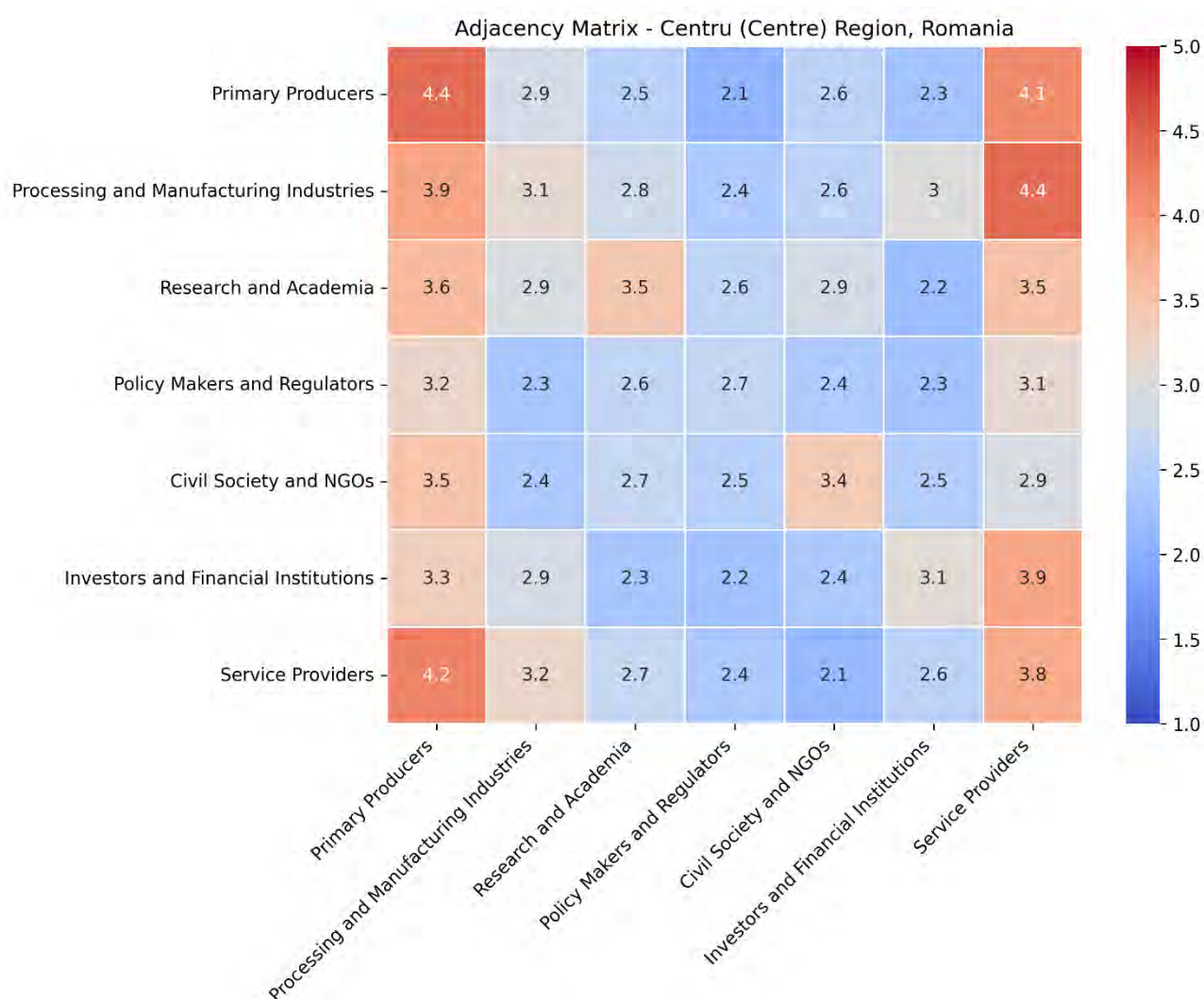
Technological Solutions: No direct obstacles mentioned, though governance inaction may delay or block uptake of available innovations.

Social Capital: The lack of local-level understanding and involvement highlights the need for more inclusive communication strategies and bottom-up participation in bioeconomy planning.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The bioeconomy in Sibiu County of the Centru Region is anchored in basic agriculture, forestry, and fisheries, with emerging opportunities in wastewater management and food waste valorization. Notable sectors include: Agriculture (vegetables, fruits, vineyards, sheep farming) • Forestry and wood industry for traditional construction and crafts • Food waste from the HoReCa sector • Anaerobic wastewater treatment and biogas production (notably in Mediaș, Sibiu County) • Engineering and IT sectors in Sibiu's industrial platform offer potential for bio-based innovation. Currently, at the national level there is a bioeconomy strategy starting in 2022 that should cover all the country. However, at the regional and county levels no dedicated bioeconomy strategy, blueprint, or regional policy instrument is in place, although there are several promising initiatives and tools at the national, regional or county levels.

B. Social Innovation

Social innovation is emerging in connection with waste management projects and awareness-building initiatives. Highlights include: Campaigns tied to the European

Region of Gastronomy 2019 title that promoted traditional knowledge and local product marketing • Development of social innovation tools at the regional level (not yet connected to bioeconomy) • Local food hubs and cooperatives that preserve traditional practices, especially in rural and semi-subsistence farming systems.

C. Value Chains

The region's bio-based value chains are developing, with a few standout examples: Sheep farming and wool valorization into organic fertilizer • Food production (vegetables, fruits, wine) not yet integrated into circular models • Forestry and wood industries well-established and culturally embedded • Limited presence of agricultural biogas or biorefineries in Sibiu County, though biogas facilities exist or are in development in the counties. Academic and research institutions have proposed new biomass value chains from marginal land and organic waste for biorefinery and land remediation.

D. Policy and Strategy

While no specific regional bioeconomy strategy exists, national-level frameworks are in place: • Romania's National Strategy for Circular Economy (2022) includes an action plan supporting green transformation ([link](#)) • National Integrated Energy and Climate Change Plan 2023–2030 (under negotiation with the European Commission) • Academia is involved in developing bioeconomy indicators, capacity building, and governance support tools for CBE alignment with EU objectives (e.g., Green Deal, RED II, One Health).

E. Institutional and Project Landscape

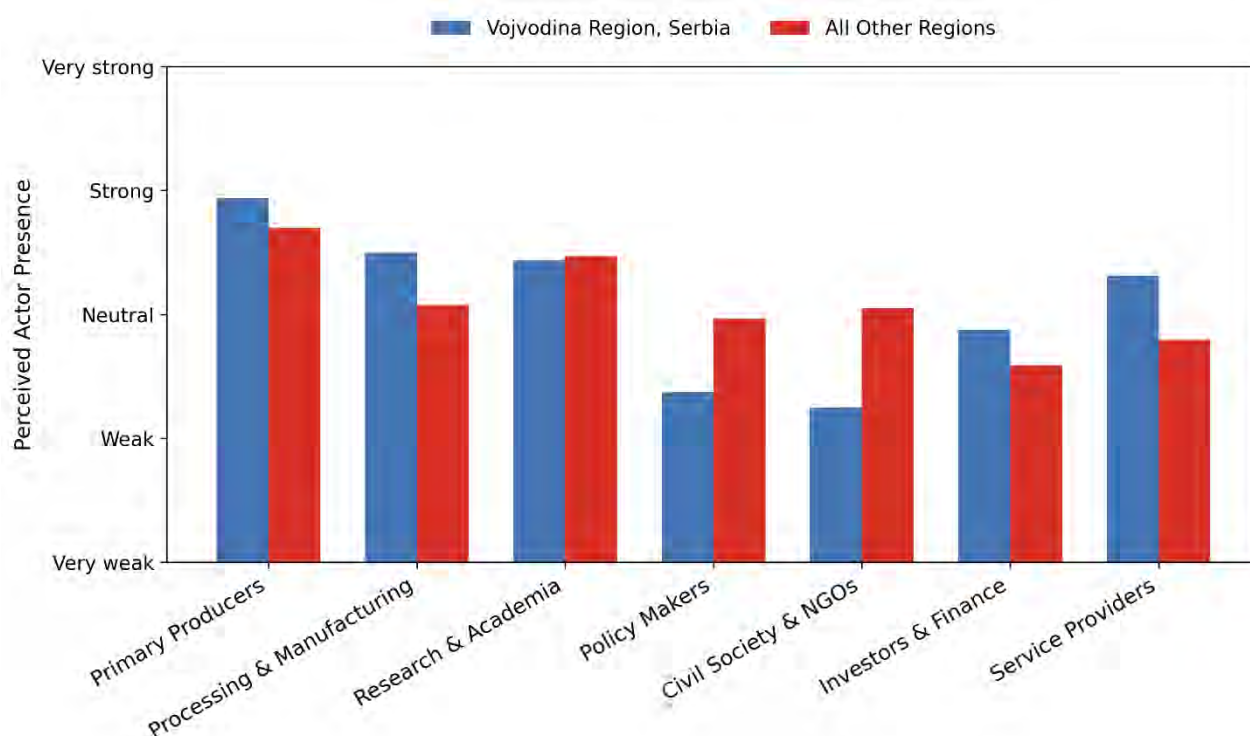
A range of institutions across the Centru Region participate in EU-funded bioeconomy-related initiatives:

- **Asociația Green Energy:** BioEnergyTrain, BioRural, Phoenix, thERBN
- **Asociația Întreprinderilor Mici și Mijlocii Covasna:** CEE2ACT
- **Asociația KO-FA:** ROSEWOOD, ROSEWOOD4.0
- **Asociația Proprietarilor de Păduri din România:** Small4Good
- **Asociația Ținutul Bârsei:** FARMWELL
- **Asociația – Agenția pentru Managementul Energiei și Protecția Mediului Brașov:** HUB-IN
- **Comuna Râu Sadului:** MountResilience
- **Forest Design SRL:** Small4Good
- **Highclere Consulting SRL:** FARMWELL, trans4num
- **Institutul de Cercetare-Dezvoltare pentru Montanologie Cristian – Sibiu:** MountResilience
- **Municipiul Brașov:** Consolid8
- **Municipiul Sfântu Gheorghe:** IMPACTPapeRec
- **Ropardo SRL:** COMFORTAGE
- **TEGA S.A.:** IMPACTPapeRec
- **Universitatea Lucian Blaga din Sibiu:** RIBES, VALUES
- **Universitatea Transilvania din Brașov:** BioEnergyTrain, HoliSoils, Small4Good

4.1.7 Vojvodina Region

Fact Sheet – Vojvodina Region (n = 16)

Ecosystem Overview



Core Actors:

Public Sector & Government Bodies:

Ministry of Agriculture, Forestry and Water Management • Ministry of Environmental Protection • Public enterprises managing national parks (Đerdap, Fruška Gora, Tara, Kopaonik) • PE Srbijasume • PE Vojvodinasume

Research & Education:

University of Novi Sad (Faculties of Agriculture, Sciences, Technology, Technical Sciences) • Faculty of Technical Sciences, Novi Sad • Faculty of Technology • Faculty of Sciences • Faculty of Agriculture, Novi Sad • Institute of Forestry, Belgrade • Institute of Lowland Forestry and Environment • Academia • Open City Biotechnology Laboratory • Research and support

Private Sector & Industry:

Esotron doo (Novi Sad) • Sojaprotein • Company producing biofuel from waste • Manufacturers of appliances for converting resources into energy • Biogas plant operators

Networks & Clusters:

Bioeconomy Cluster (bioeconomy.rs) • National HUB for Bioeconomy • Serbian Chamber of Commerce

Primary Producers & Other Stakeholders:
Farmers • Horizon project CEE2ACT • Institutes

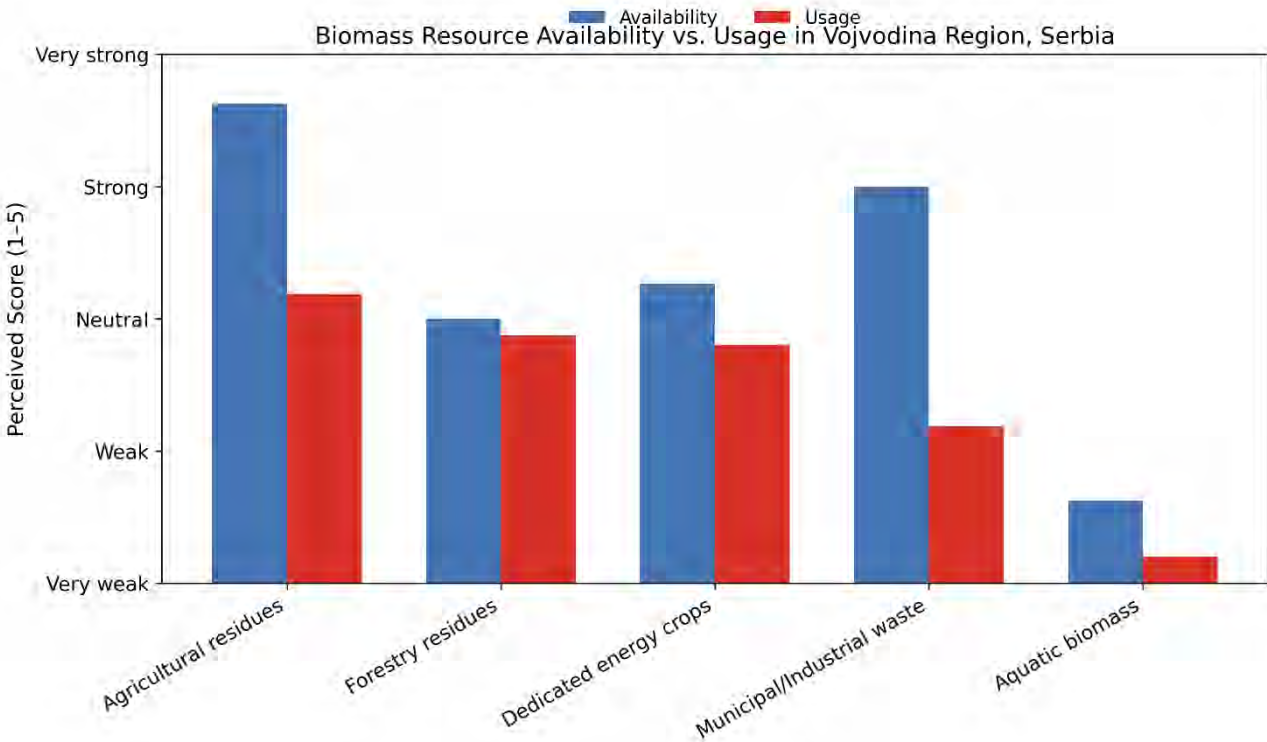
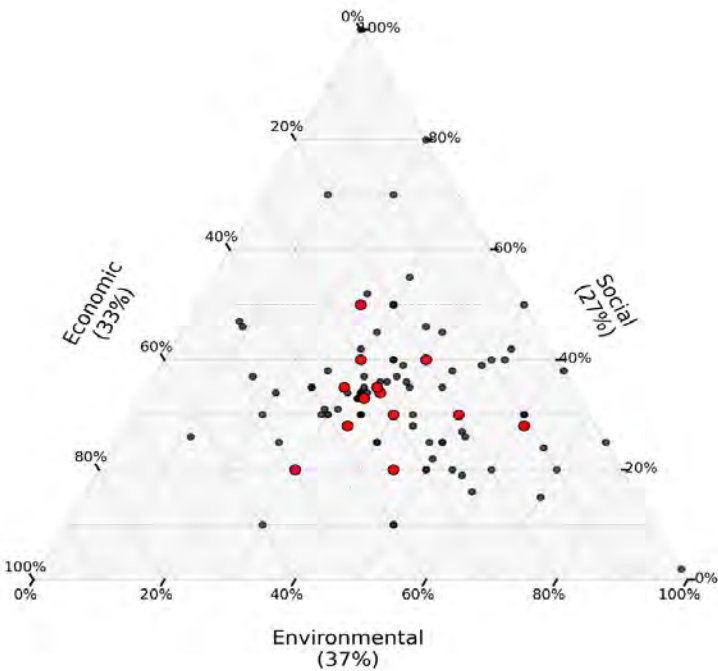
Agreement with:

Biomass focus: 5.93 (5.95*)

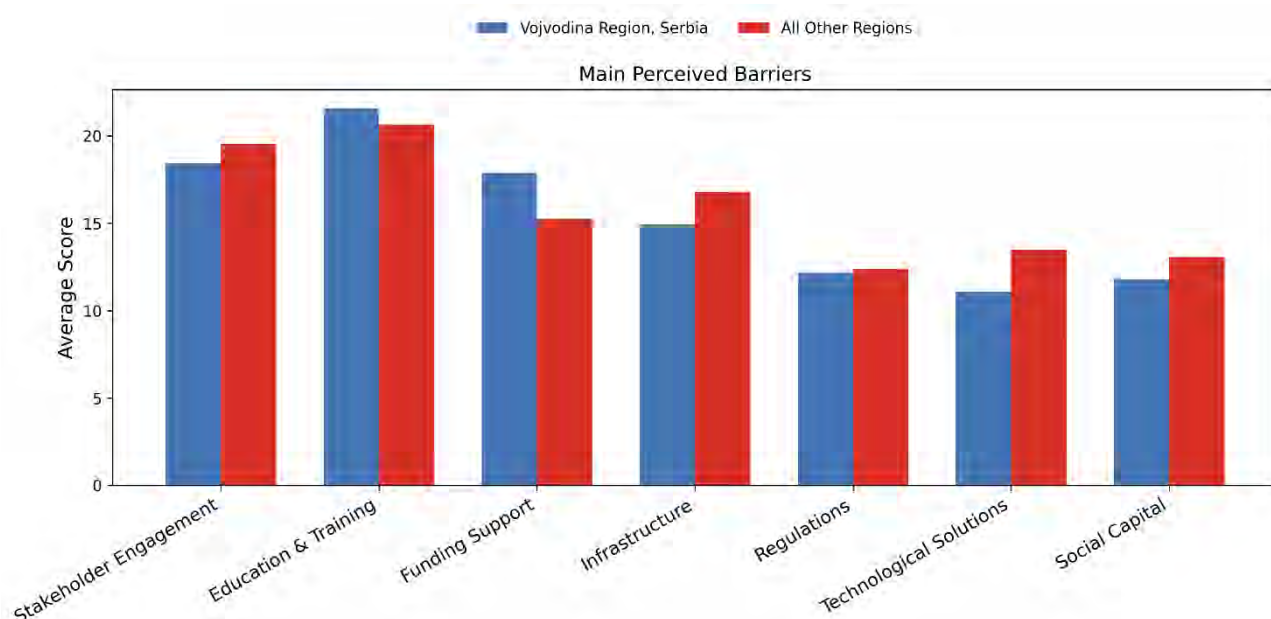
Biotech focus: 5.93 (5.18*)

Systemic focus: 5.56 (5.13*)

1:strongly disagree -7:strongly agree
* Average All Regions



Perceived Barriers



Stakeholder Engagement: Institutional culture is marked by limited international collaboration and poor communication with knowledge holders such as researchers and scientists • Decision-making is heavily influenced by political party interests, with appointments often based on affiliation rather than expertise • A culture of consultation is largely absent, weakening informed, transparent policy development.

Education & Training: Capacity gaps are significant, with limited institutional competence and responsibility in managing bioeconomy-related processes • Compared to other regions, education and training efforts are underdeveloped, limiting technical readiness and broader awareness.

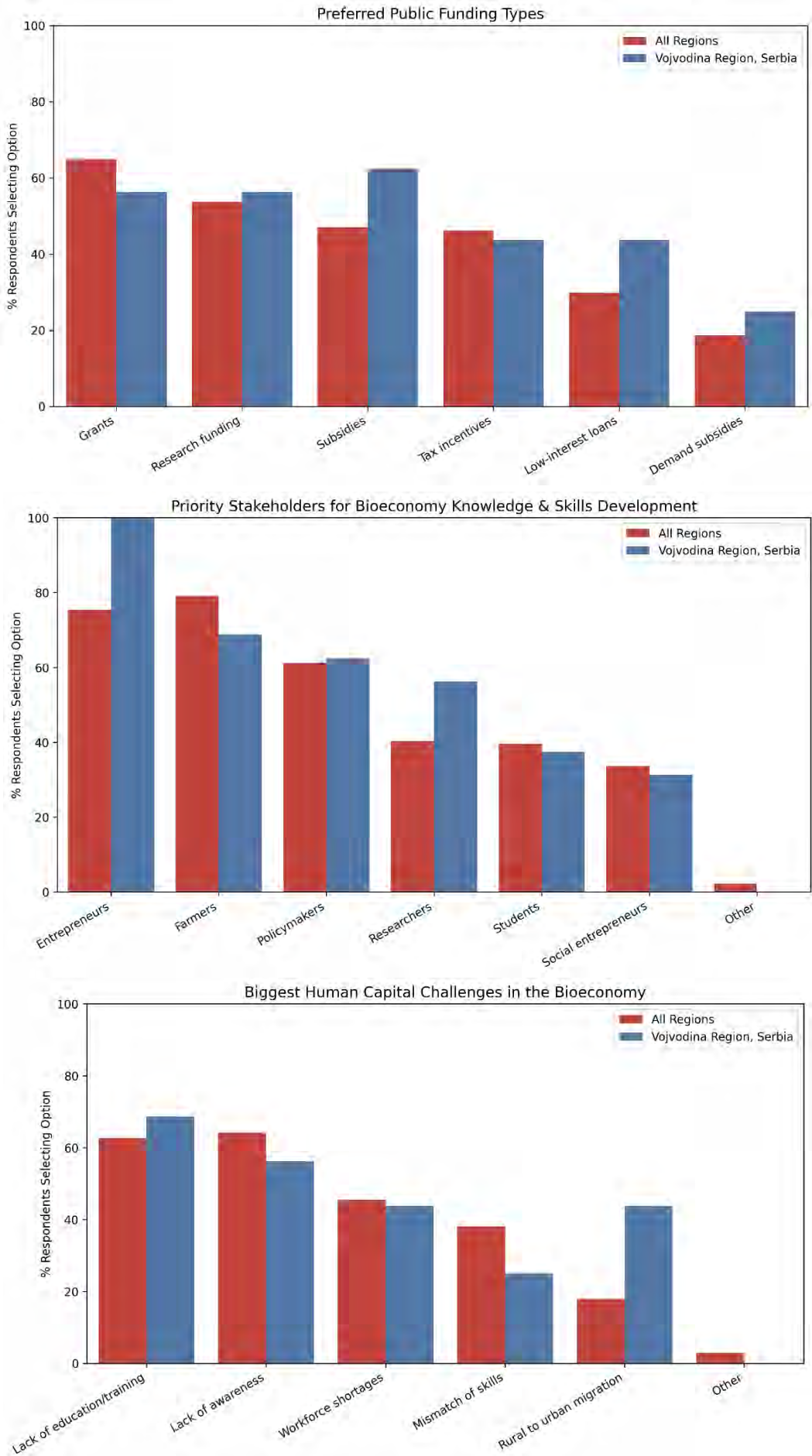
Funding Support: There is a lack of national funding specifically directed toward bioeconomy projects • Weak institutional support further restricts access to and utilization of potential financial resources.

Infrastructure: Broader institutional capacity constraints extend into infrastructure development, with many foundational systems and support mechanisms either lacking or underperforming.

Regulations: No national bioeconomy strategy or roadmap is currently in place, though one is in development • The legislative and strategic framework is incomplete, hindering coordinated action and long-term investment.

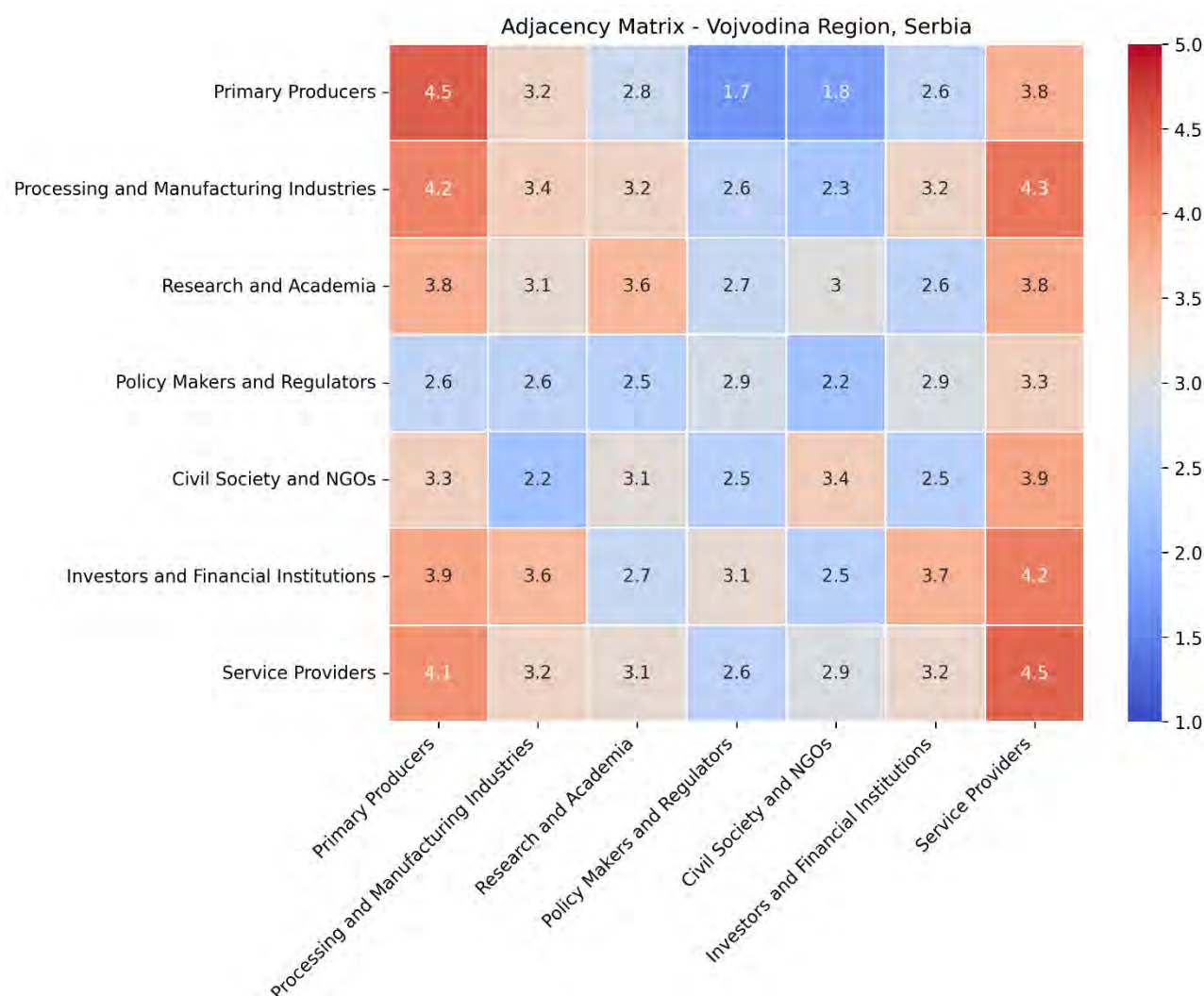
Technological Solutions: Slow administrative adaptation and reluctance to embrace change impede the uptake of innovative technologies • Public institutions are generally resistant to reform and slow to implement modernization.

Social Capital: Agriculture, a key component of bioeconomy, is not prioritized in Serbia's development agenda • Public institutions lack accountability and operate in a politically charged environment that discourages professional merit and strategic vision.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The bioeconomy in Vojvodina is primarily rooted in agriculture, which is the region's economic backbone. Key areas include: Crop production (dominant) • Vegetable cultivation • Vineyards and wine production • Moderate activity in fishery production • Broad food and beverage processing industries. Bioenergy is the most developed segment, particularly biogas from energy crops, crop residues, and organic waste from agro-industrial processes. Solid biofuels are also produced from agricultural products.

B. Social Innovation

No formal social innovations connected to bioeconomy have been identified yet in the region. There is a need for further exploration of inclusive, community-based

practices and education initiatives that could support social transformation in bio-based sectors.

C. Value Chains

Bio-based value chains in the region are focused on: biogas production using manure, energy crops, and organic waste from the food and beverage sector • Solid biofuels derived from crop residues • Traditional food processing chains dominate, while integration into modern bioeconomy models is in early stages.

D. Policy and Strategy

There are no dedicated regional or national bioeconomy policy instruments in place beyond **support for renewable electricity from biomass**. However: • Several general initiatives exist, particularly in the field of bioenergy • A **Bioeconomy Cluster** and a **National Bioeconomy Hub** (linked to the Horizon project CEE2ACT) have been established to foster ecosystem development • The **Center for Circular Economy** also plays a supportive role in regional coordination and awareness-raising • Serbia's ongoing **EU accession process** promotes alignment with EU policy and funding structures.

E. Institutional and Project Landscape

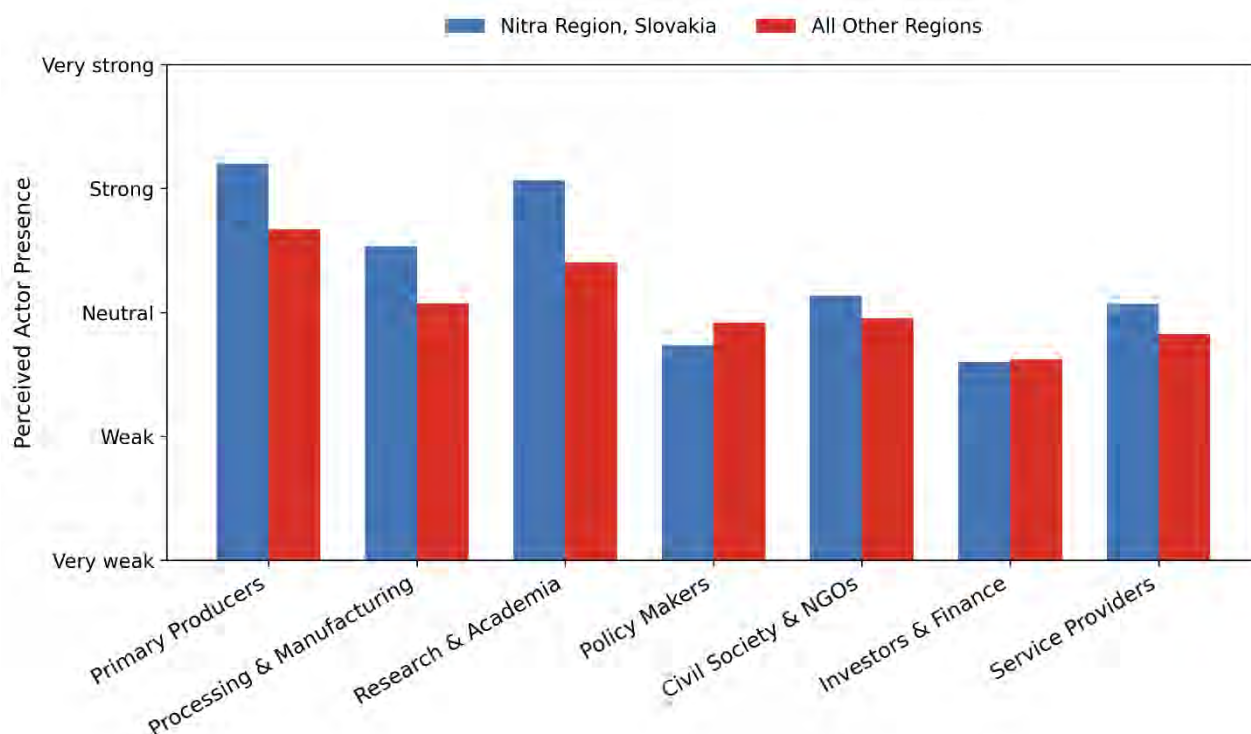
Numerous institutions in Vojvodina are involved in EU-funded research and innovation projects relevant to the bioeconomy:

- **BioSense Institute – Research and Development Institute for IT in Biosystems:** Climate Farm Demo, SISCODE
- **Fondacija Vizlore Labs:** ARGONAUT
- **Institut za Ratarstvo i Povrtarstvo:** CARINA
- **Institut za Veštačku Inteligenciju Srbije:** SEISMEC
- **NS Web Development d.o.o. Novi Sad:** SEISMEC
- **Tehnološki Fakultet Novi Sad:** Polymers-5B
- **Udruženje Eko-Inovacija na Balkanu:** ENFASYS, PRUDENT
- **Udruženje za Preduzetništvo i Inovacije Foodscale Hub:** BioeconomyVentures, MPowerBIO, RefreSCAR
- **Univerzitet Educons u Sremskoj Kamenici:** BEAMING
- **Univerzitet u Novom Sadu – Fakultet Tehničkih Nauka:** EcoDaLLi, RIBES
- **Univerzitet u Novom Sadu – Poljoprivredni Fakultet:** BEAMING

4.1.8 Nitra Region

Fact Sheet – Nitra Region (n = 15)

Ecosystem Overview



Core Actors:

Public Sector & Government Bodies:

Ministry of Agriculture and Rural Development of the Slovak Republic • Ministry of the Environment of the Slovak Republic • Nitra Region Waste Management Association • Association of Municipalities for Waste Management

Research & Education:

Slovak University of Agriculture in Nitra • Research Centre AgroBioTech • Food Incubator (Slovak University of Agriculture) • • University of Constantinus the Philosopher • • National Agricultural and Food Centre • National Forestry Center • Agricultural Knowledge and Innovation Institute

Private Sector & Industry:

BIOGRADA / Zdroje Zeme (biochar producer) • PANARA s.r.o. (bioplastics producer) • Ekolive (biostimulants) • Peda Vita (compost) • Veles Farming (vertical farming) •

Clusters, Networks & Projects:

Bioeconomy Cluster • HEMP Cluster • Slovak Agriculture and Food Chamber • Slovak Association of Regenerative Agriculture • Slovak Biogas Association • Association of Organic Fertilizers' Producers

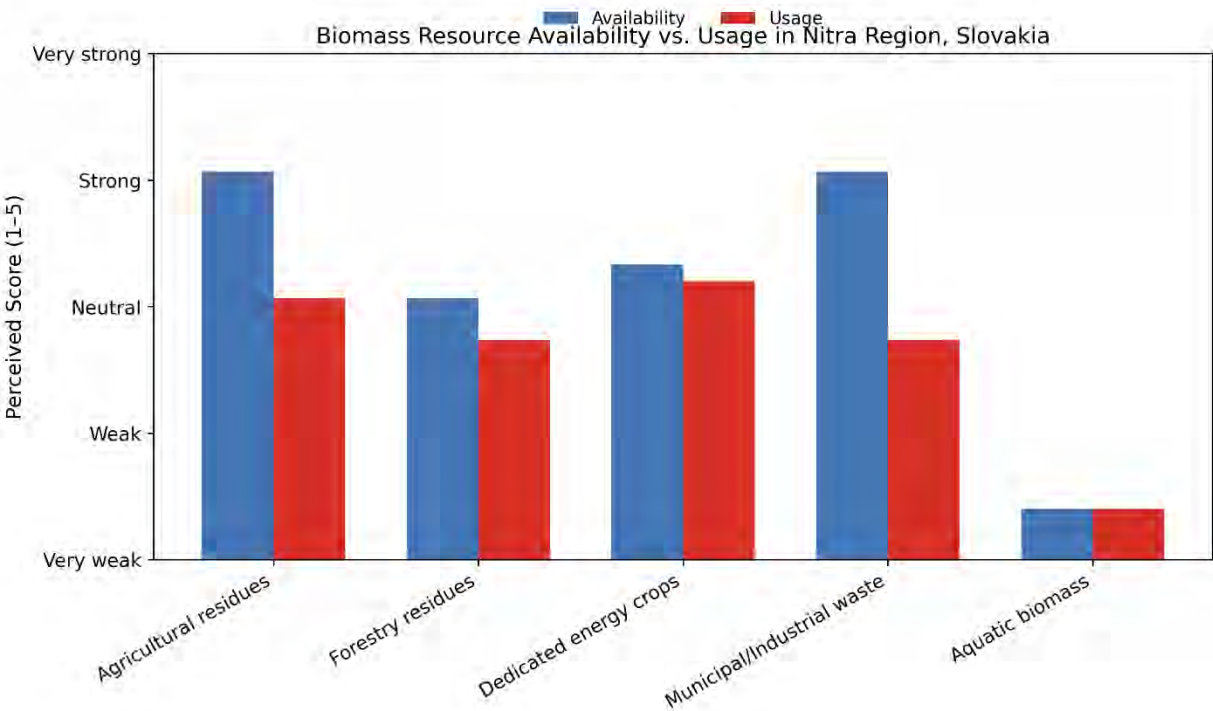
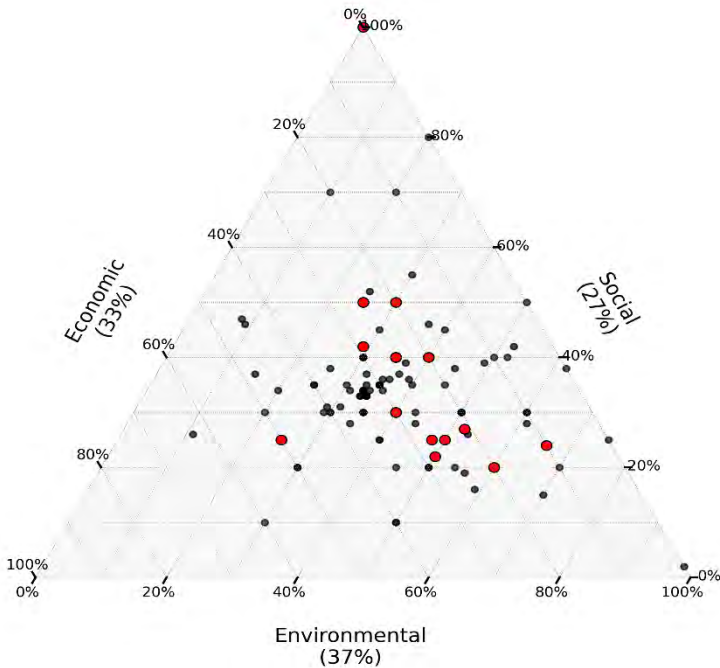
Other Stakeholders:

Technical universities • Pulp and Paper Research Institute • Slovak Academy of Sciences •
Slovak Bioeconomy Valley • Ekopolis Foundation

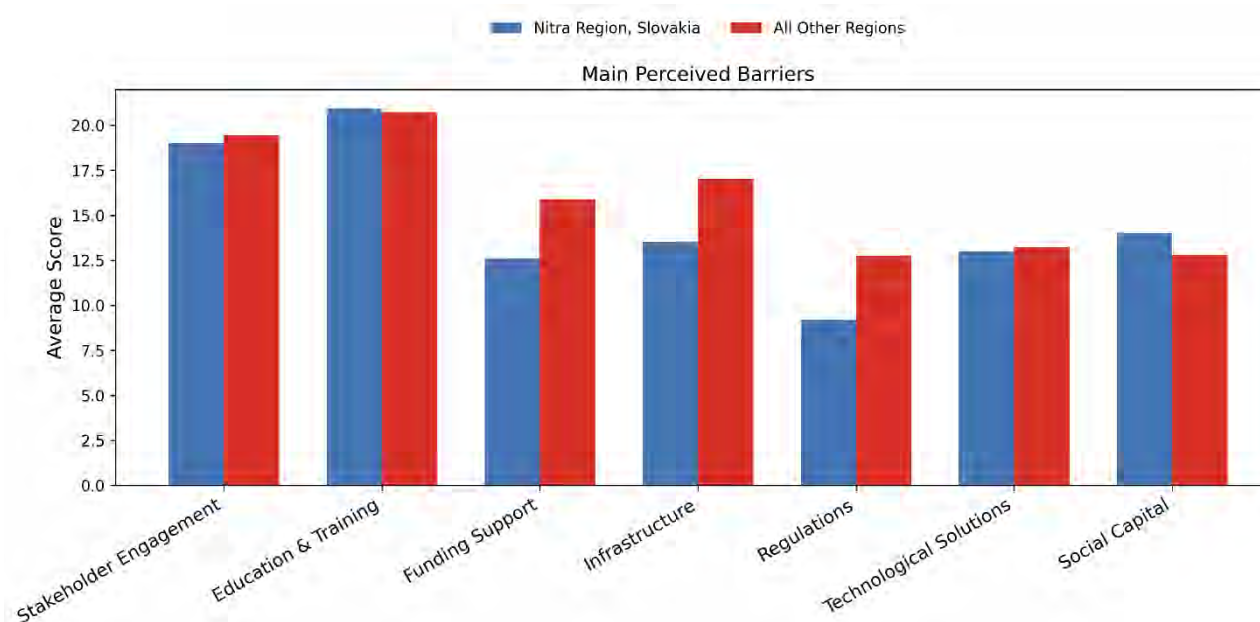
Agreement with:

Biomass focus: 6.33 (5.95*)
Biotech focus: 5.4 (5.18*)
Systemic focus: 5.0 (5.13*)

1:strongly disagree -7:strongly agree
* Average All Regions



Perceived Barriers



Stakeholder Engagement: Minimal interest from governance structures in advancing bioeconomy topics • Policy agendas are frequently disrupted due to high turnover in ministerial positions, leading to inconsistent priorities and lack of long-term commitment • Poor cooperation among ministries and departments • A legacy of prioritizing heavy industry and a lack of tradition in bio-based sectors • Local Action Groups lack adequate support, undermining grassroots involvement and regional alignment.

Education & Training: Awareness of the economic and environmental potential of the bioeconomy is low among both policymakers and the public • Education around bioeconomy models is insufficient, limiting broader understanding and support for systemic change.

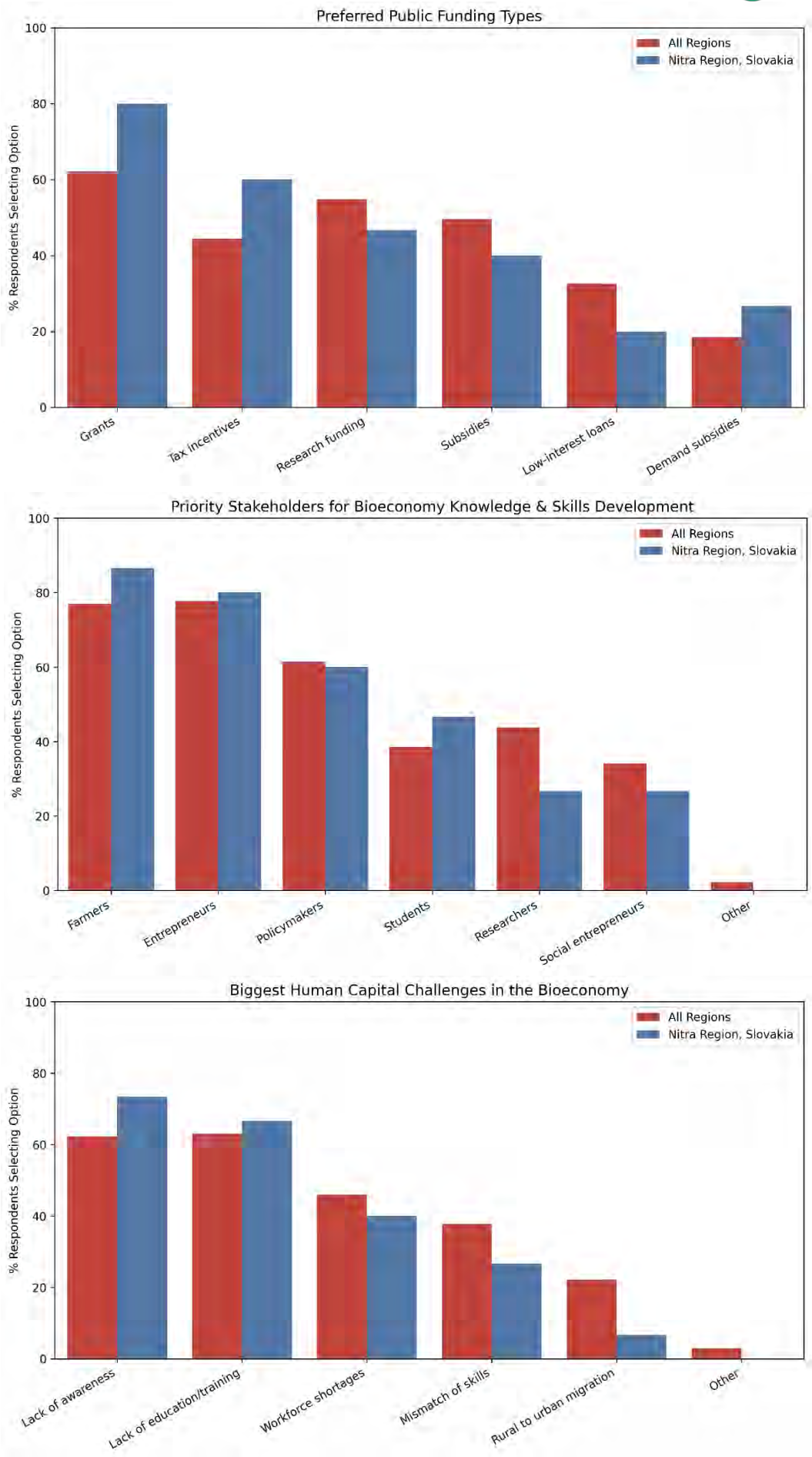
Funding Support: There is limited financial backing for bioeconomy development, compounded by complex administrative and bureaucratic barriers • Higher production costs for bio-based products discourage investment from the private sector in the absence of strong financial incentives.

Infrastructure: The foundational infrastructure to support a shift toward a bioeconomy—including support networks and operational frameworks—is either weak or non-functional • Structural gaps reflect a lack of strategic investment and long-term planning.

Regulations: Slovakia lacks both national and regional bioeconomy strategies • Existing legal frameworks are either missing or inadequate, leaving no clear basis for coordination or implementation • Governance is fragmented and cooperation between ministries is poor, preventing policy coherence.

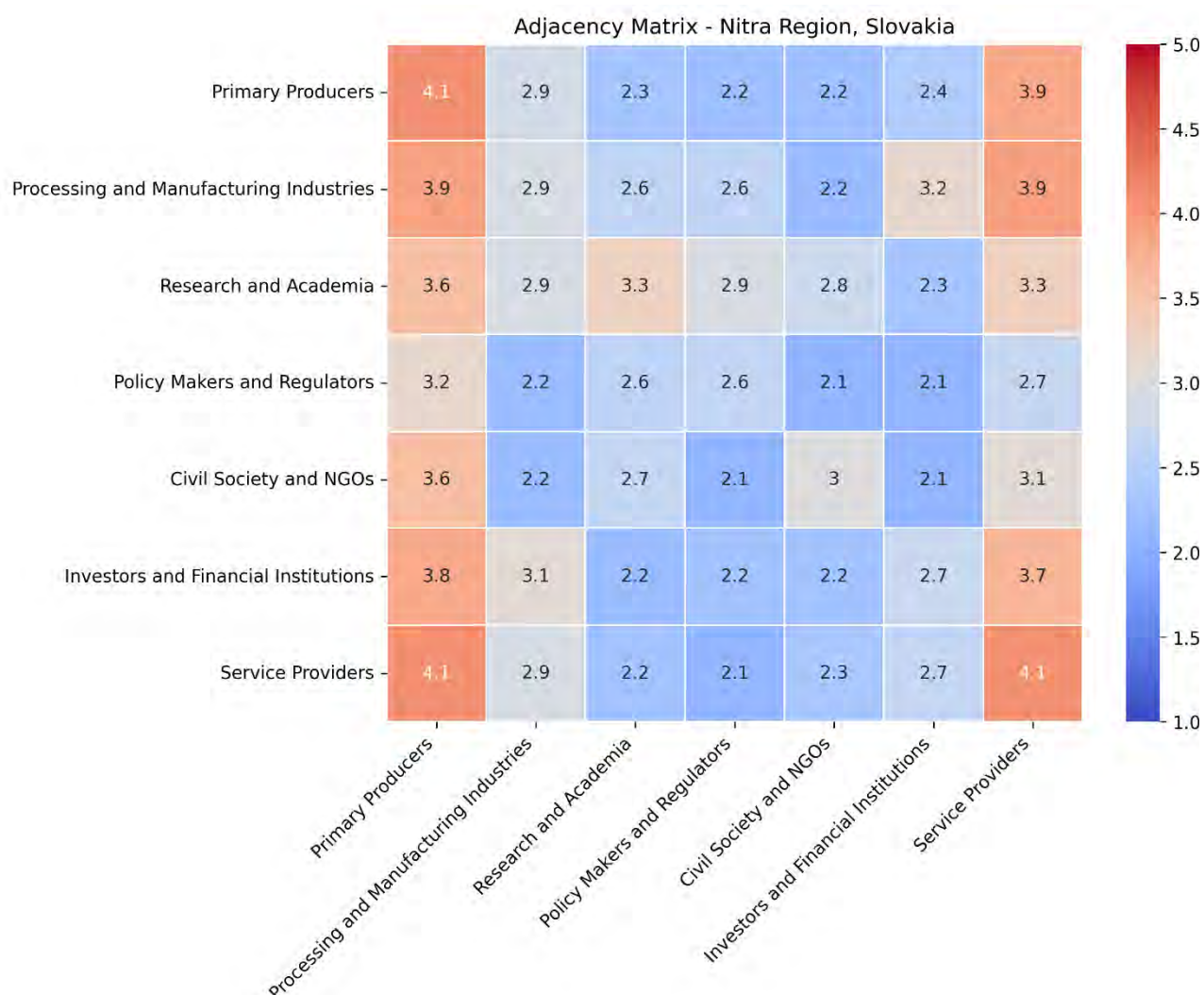
Technological Solutions: Innovation uptake is slow due to lack of interest, strategic support, and coordinated funding • Legacy systems and sectoral bias against environmental transformation further hinder technological progress in bio-based industries.

Social Capital: Public and consumer awareness of bio-based solutions is low, and the societal mindset is shaped by industrial legacies and a lack of environmental accountability • Cultural and historical factors continue to influence resistance to sustainability-oriented change.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The bioeconomy in the Nitra Region is centered on agriculture, food systems, and biowaste processing. Key sectors include: Agricultural bioeconomy involving primary producers • Food production and food waste recovery • Biowaste processing and conversion to biochar and bioenergy • Involvement of industry actors in bioplastics and related technologies. The region is actively engaged in circular bioeconomy themes, leveraging synergies between waste management, organic fertilizer production, and value chain integration.

B. Social Innovation

Social innovation in the region is fostered through: Collaborative and participatory approaches • Focus on educating and involving young people and entrepreneurs • Support for start-ups and SMEs • Awareness-raising activities targeting the general public to strengthen acceptance and understanding of the bioeconomy. This engagement is enabled

through workshops, cluster platforms, and academic initiatives such as the Bioeconomy Innovation Platform at the Slovak University of Agriculture.

C. Value Chains

Traditional food and agricultural chains enhanced with sustainability measures • Biochar from biorefineries • Organic fertilizers derived from processed biowaste • High-value crops such as saffron and mushrooms. These value chains reflect a growing capacity to link production and innovation through both rural and urban actors.

D. Policy and Strategy

Slovakia's small size means national policy plays a dominant role. Relevant frameworks include: • Active involvement in the BIOEAST Initiative, motivating the Ministry of Agriculture and other national bodies to prioritize bioeconomy • Preparation of a Roadmap for Circular Bioeconomy • Inclusion of bioeconomy under RIS3 strategy (domain: Food Competitiveness and Climate Resilience) • Support through the Recovery and Resilience Plan • Strong presence of clusters and hubs, such as the Bioeconomy Cluster, Hemp Cluster, and national bioeconomy hub formed via CEE2ACT and BIOEAST efforts.

E. Institutional and Project Landscape

A wide network of institutions from Slovakia's Nitra Region are involved in EU-funded bioeconomy projects:

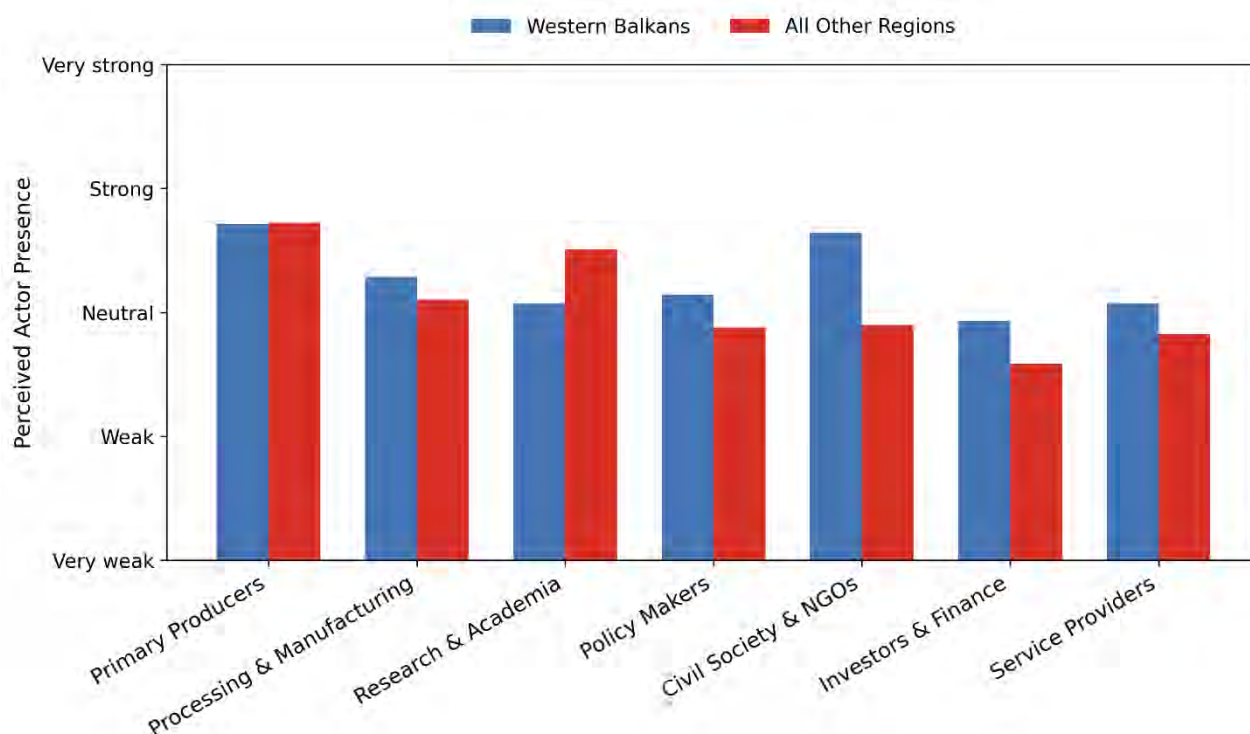
- **BIC Bratislava spol. s r.o.:** BIOLOC, CELEBio, TETRA
- **Bioeconomy Cluster:** BIOMODEL4REGIONS, CEE2ACT, Climate Farm Demo, ClimateSmartAdvisors, RIBES, ToBeReal, thERBN, GREET CE, BIO-INSPIRE, RootLinks, BIOECO-UP
- **Slovak Centre of Scientific and Technical Information:** CARE4BIO, NCP4Missions
- **Chemical Institute of the Slovak Academy of Sciences:** synBIOcarb
- **Centire s.r.o.:** OpenMaker
- **The City of Nitra:** IN-HABIT
- **Ministry of Agriculture and Rural Development of the Slovak Republic:** BIOEASTsUP, BOOST4BIOEAST
- **National Forest Centre:** BIOEASTsUP, BOOST4BIOEAST, DIABOLO, ForestValue2, LignoSilva, ROSEWOOD4.0
- **National Agricultural and Food Centre:** BIOEASTsUP, BOOST4BIOEAST, ECOBREED, EJP Soil, AGROECOLOGY, NanoFEED
- **Pedal Consulting s.r.o.:** BIOVoices, BIOWAYS, BioGov.net, CARINA, GenB, INSPIRE, ROBIN, SUSTRACK, TETRA, Transition2BIO, XTREAM
- **Development Agency of the Žilina Self-governing Region:** ROBIN
- **Slovak Agricultural and Food Chamber:** thERBN
- **Slovak University of Agriculture in Nitra:** BioMonitor, Climate Farm Demo, FOODRUS, GeneBEcon, IN-HABIT, POWER4BIO
- **Technical University in Zvolen:** HoliSoils
- **Triptych:** IN-HABIT
- **Comenius University in Bratislava:** DeCrises, SERIGO

- **Univerzity of Matej Bel in Banská Bystrica:** LIPSE
- **Forest Ecology Institute of the Slovak Academy of Sciences:** SIMRA
- **Pulp and Paper Research Institute:** LignoSilva

4.1.9 Western Balkans

Fact Sheet – Western Balkans Region (n = 14)

Ecosystem Overview



Core Actors:

Public Sector & Government Institutions:

Ministry for Agriculture, Forestry and Water Economy • Ministry for Economy • Municipalities
 • Government institutions (need for national and local level coordination emphasized) •
 Ministry of Environment and Physical Planning

Research & Academia:

Macedonian Academy of Sciences and Arts (MANU) • Institute of Agriculture (Skopje) •
 Academia and research centers • Science

Private Sector & Industry:

Agro-Processing Industries • Food Processing Companies • Textile and Paper Industries •
 Private companies engaged in bio-waste management and processing • Sunilens Skopje •
 Mama Organa BIO Skopje, , Bio-gas plants

Primary Sector & Producers:

Farmers and Foresters • Primary Producers • Farmers, producers, and the broader business
 sector (noted for needing greater inclusion in bioeconomy reorganization)

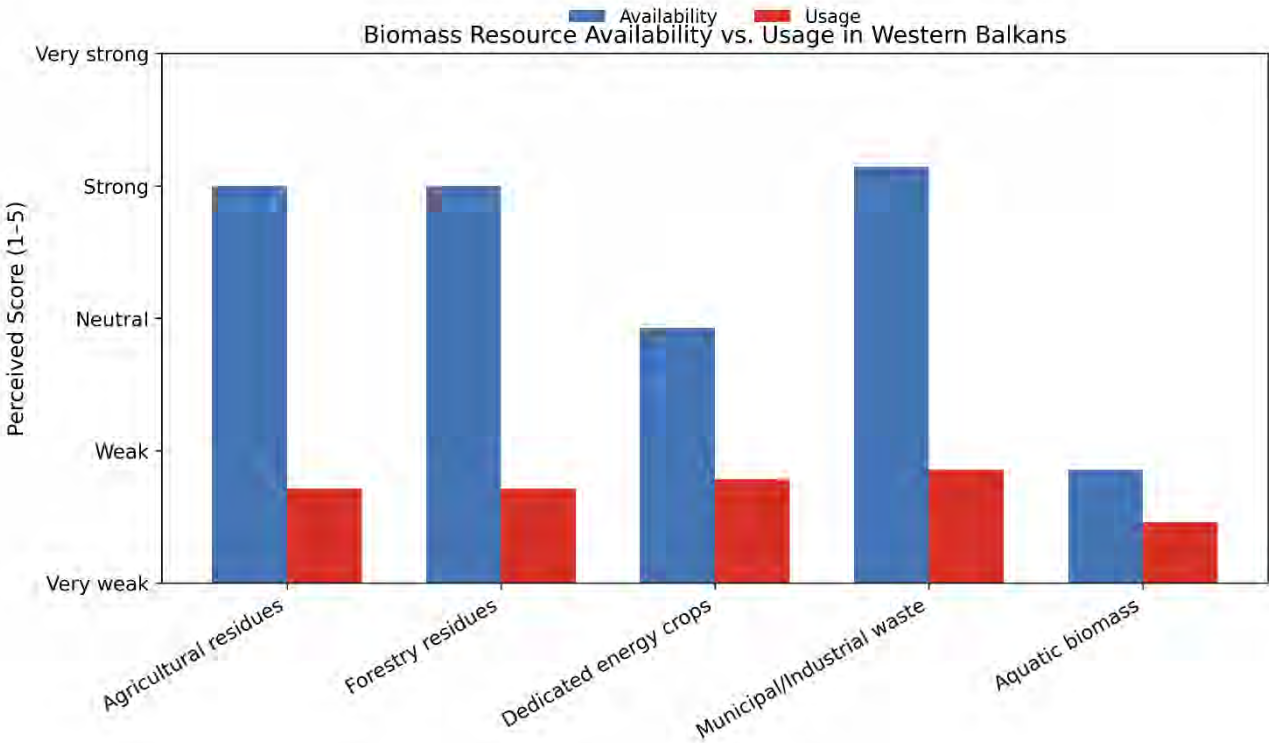
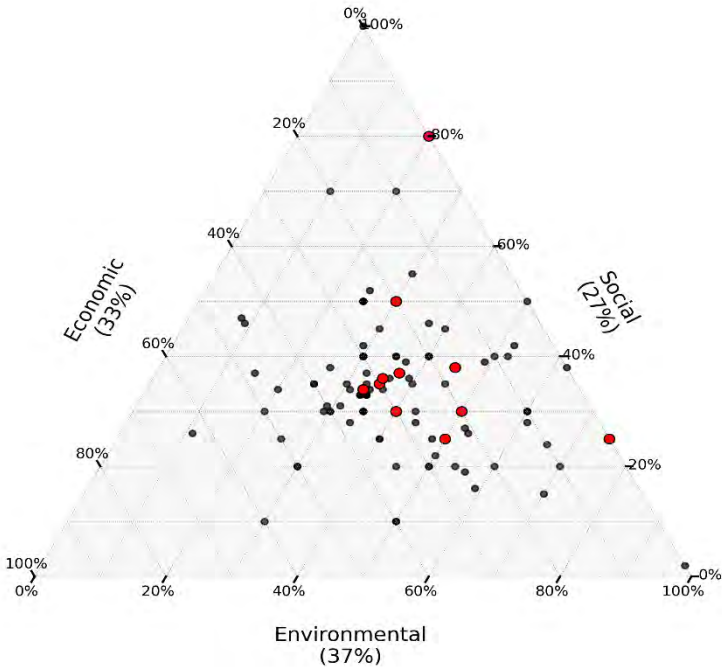
Civil Society & Networks:

Civil Society Organizations (CSOs) • Networks • Green Albania ([link](#)) • EcoAlbania ([link](#)) •
 PAKOMAK ([link](#))

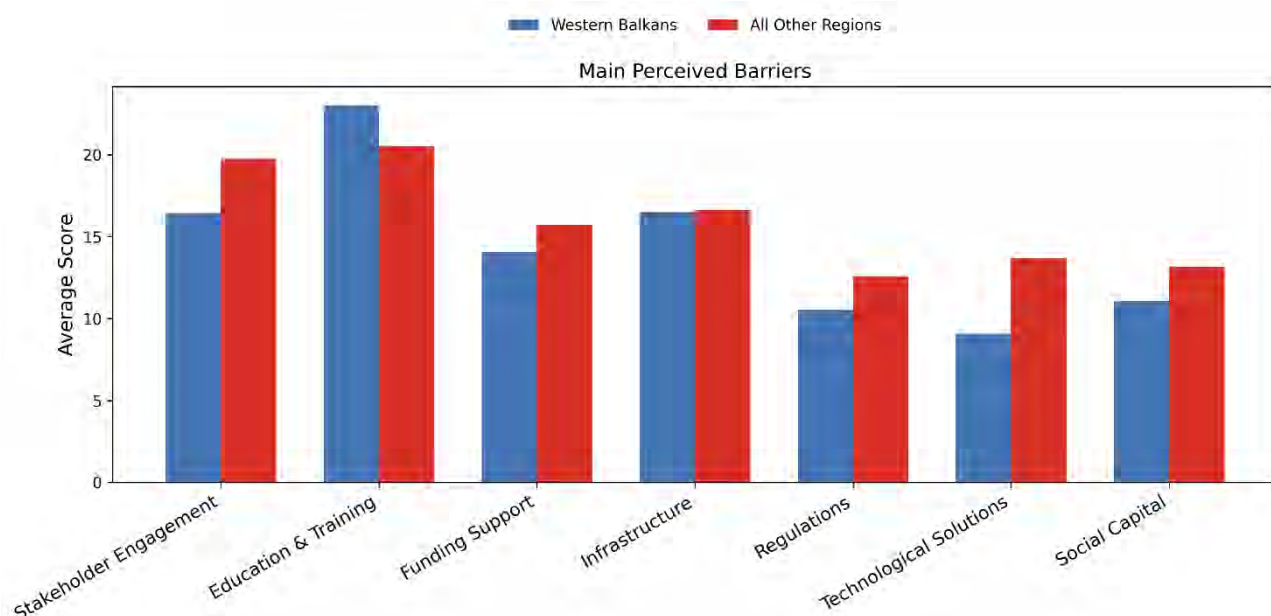
Innovation & Support Initiatives:
BIO Hack Lab UNDP / City of Skopje

Agreement with:
Biomass focus: 6.07 (5.95*)
Biotech focus: 4.78 (5.18*)
Systemic focus: 4.92 (5.13*)

1:strongly disagree -7:strongly agree
* Average All Regions



Perceived Barriers



Stakeholder Engagement: There is a general lack of initiative across governance levels, with bioeconomy not seen as a priority topic on the national agenda • Weak cooperation between institutions and poor enforcement of environmental regulations limit coordinated action • Public awareness and engagement in bioeconomy are low, reducing societal support and participation.

Education & Training: Expertise in bioeconomy is limited, with a lack of dedicated education and training programs • Socio-economic and environmental goals are insufficiently integrated into educational systems and everyday decision-making.

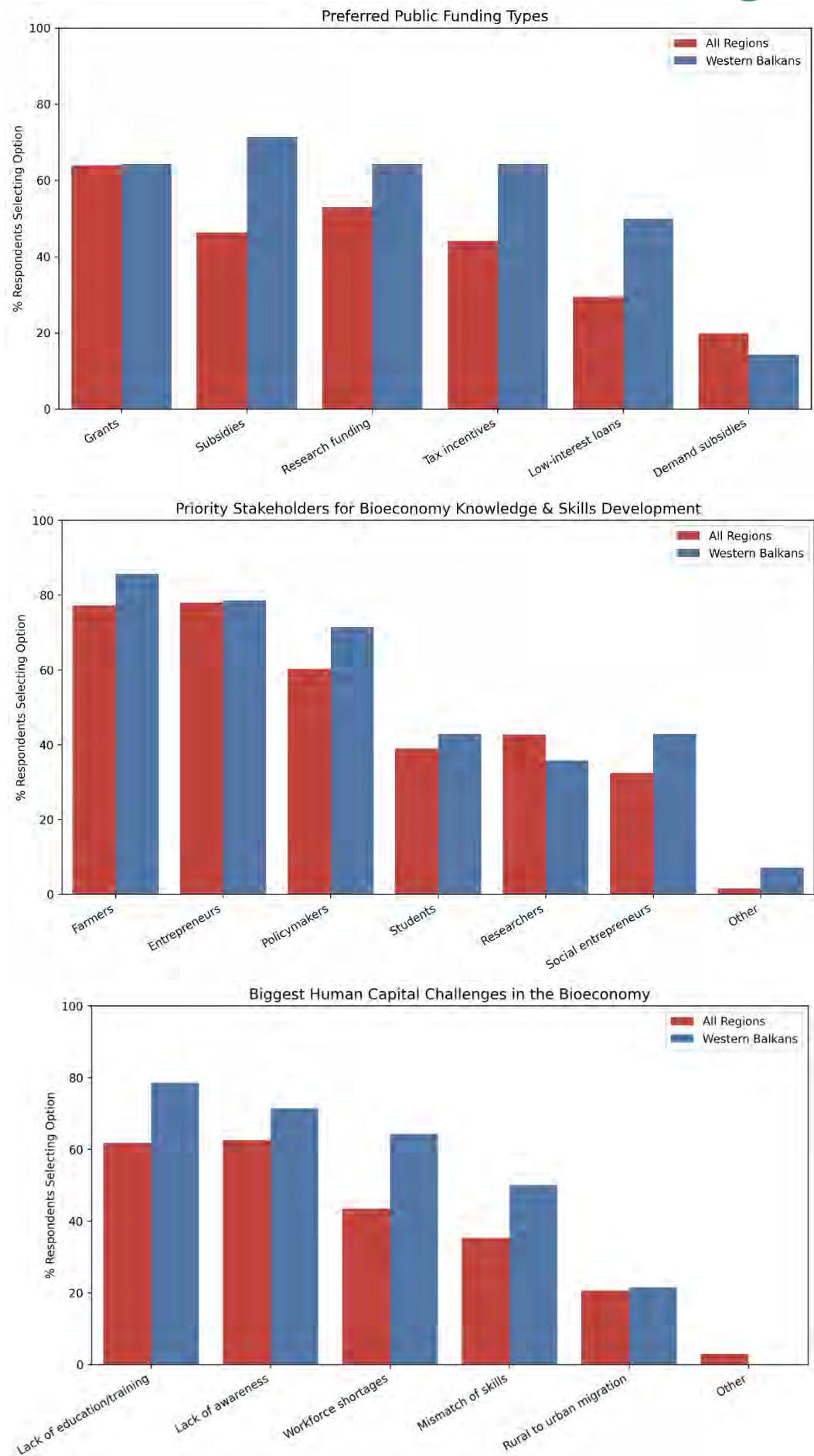
Funding Support: Budget allocations for bioeconomy are missing or inadequate • Funding for research, development, and implementation is limited, and investment incentives are weak or absent.

Infrastructure: Institutional capacity is low, and support systems for knowledge transfer, implementation, and enforcement are underdeveloped.

Regulations: The policy framework is fragmented, with inconsistent or poorly implemented regulations • Law enforcement is weak, and there is no comprehensive legislative support for bioeconomy development.

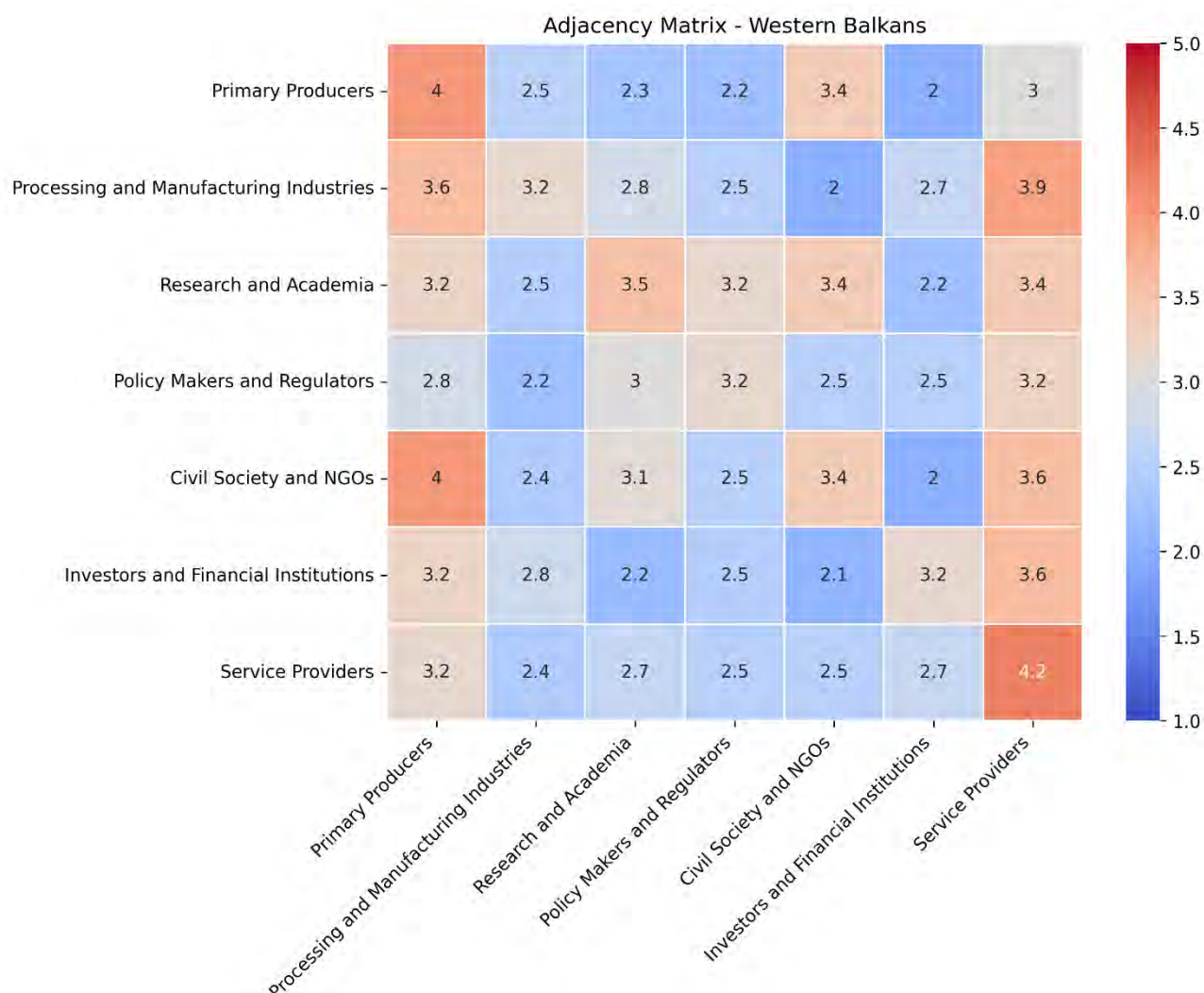
Technological Solutions: R&D investment is insufficient, limiting technological innovation and deployment • A lack of strategic focus on technology in the bioeconomy space further slows progress.

Social Capital: Governance lacks clearly defined socio-environmental goals that align with bioeconomy principles • Broader civic understanding and integration of sustainability into daily life remain underdeveloped.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The dominant bioeconomy concept in the Western Balkans is grounded in the agricultural bioeconomy, supported by biomass production from agricultural residues and forestry by-products. Key activities include: Traditional agriculture • Forestry-based value chains • Biogas and biofuel production • Emerging uses of biodegradable and wood-based materials. The region holds untapped potential in biomass valorization and bioenergy, though current implementation remains fragmented.

B. Social Innovation

Some social innovation practices contributing to the bioeconomy include: Development of biogas plants • Agro-tourism as a means of supporting sustainable agricultural livelihoods and diversifying rural income • Social enterprises engaging marginalized groups • Awareness-raising projects run by CSOs focusing on sustainability, circularity, and environmental protection. Such initiatives often rely on donor or EU-funded support and highlight the grassroots potential for inclusive bioeconomic development.

C. Value Chains

Bio-based products and value chain activities include: Biogas and biofuels (e.g., biodiesel, bioethanol) • Wood pellets and briquettes • Biodegradable packaging materials from agricultural sources. Supply chains involve: Agricultural residues (corn stalks, wheat straw) and forestry by-products • Processing and refining operations • Limited but emerging packaging and distribution practices.

D. Policy and Strategy

No dedicated bioeconomy policy exists at the regional level. Policy support is mostly indirect: Green Agenda for the Western Balkans – climate action, circular economy, biodiversity, pollution, sustainable food systems. RECONOMY Program – supports waste management and circular economy business models. NAGE (Networking and Advocacy for Green Economy) – EU-financed initiative advocating green economic transitions. Renewable energy incentives – indirect support for bioeconomy. At the national level (North Macedonia): OECD Roadmap towards Circular Economy – incorporates circular bioeconomy principles. National Strategy for Sustainable Development (2024–2044) – mainstreams circular economy across sectors. National Plan for Waste Management (2021–2031), National Waste Prevention Plan (2022–2028), Climate Action Strategy (2021–2051) – Ministry of Environment and Physical Planning. National Strategy for Agriculture and Rural Development (2021–2027) + Rural Development Programme – includes biomass and agri-waste management. Smart Specialisation Strategy (2024–2027) – “greening key sectors” action plan with circular bioeconomy potential.

E. Institutional and Project Landscape

A variety of actors across the Western Balkans are involved in projects:

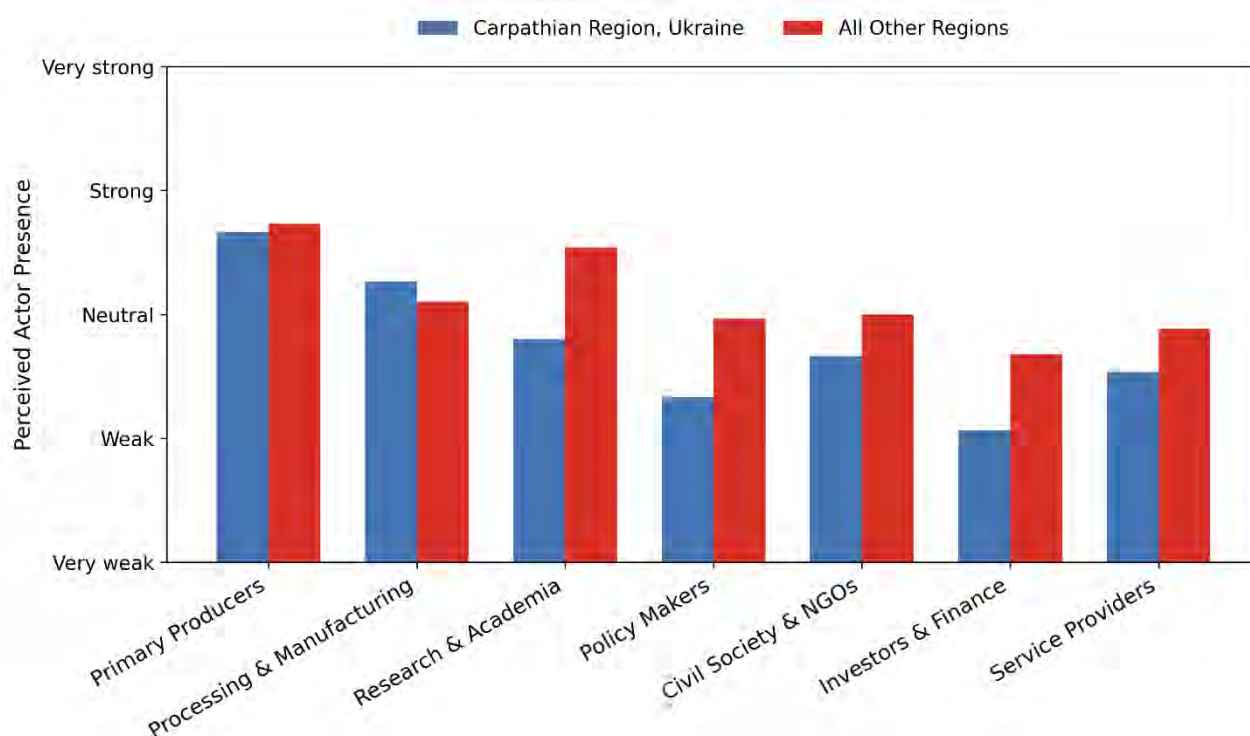
- **Agjencia Kombëtare e Planifikimit të Territorit: ARSINOE**
- **Arete Association for Sustainable Prosperity: FEAST**
- **Association for Help and Support of Patients with Gynecological Diseases Femina M: 4P-CAN**
- **Balkanska Mrezha za Rularen Razvoj Skopje: RIBES**
- **Crnogorsko Udruženje Mediklanih Onkologa: 4P-CAN**
- **Polyhedra Beograd-Zvezdara: DOIT**
- **Ekonomski Fakultet, Univerzitet u Beogradu: WeLaR**
- **Institut za Razvoj i Inovacije (IRI): BEAMING, ESIRA**
- **Institute of Forestry: CEE2ACT**
- **Istraživački Centar za Prostor: TExTOUR**
- **Tehnopapir d.o.o.: IMPACTPapeRec**
- **Institute for Research in Environment, Civil Engineering and Energy: ARSINOE**
- **Regional Rural Development Standing Working Group in SEE: HuMUS**
- **Ss. Cyril and Methodius University in Skopje: BEAMING, DIVAGRI**
- **Tačka Preseka Centar za Nauku Inovacija: EQUALS-EU**
- **Udruženje Plava Zajednica: DigiCirc**

- **Universiteti Bujqësor i Tiranës:** BEAMING, CARE4BIO
- **University of Belgrade – Faculty of Forestry:** DIABOLO
- **Univerzitet u Banjoj Luci:** BEAMING
- **University of Belgrade – Faculty of Mechanical Engineering:** S2BIOM
- **Združenie Platforma za Zelen Razvoj Skopje:** BioRural

4.1.10 Carpathian Region

Fact Sheet –Carpathian Region (n = 14)

Ecosystem Overview



Core Actors:

Research & Higher Education:

Vasyl Stefanyk Precarpathian National University • Ukrainien National Forestry University • Scientists • Bioeconomy training programs • A leading regional university active in biology, ecology, and renewable energy research

Clusters & Business Networks:

Association "Cluster of Bioeconomy" • Cluster Association "Pure Flora" • Zemledar Club • PU Organic Agriculture • The cluster promotes partnerships among businesses, researchers, and government bodies in the bio-based (primarily energy) sector

Private Sector & Cooperatives:

Business entities • Farmer cooperatives • Eco-tourism operators linking sustainability, heritage, and regional development

Civil Society & NGOs:

NGO TAIF • Mama 86 • Promprylad Renovation • Community-based organizations implementing bioeconomy initiatives, NGO FORZA

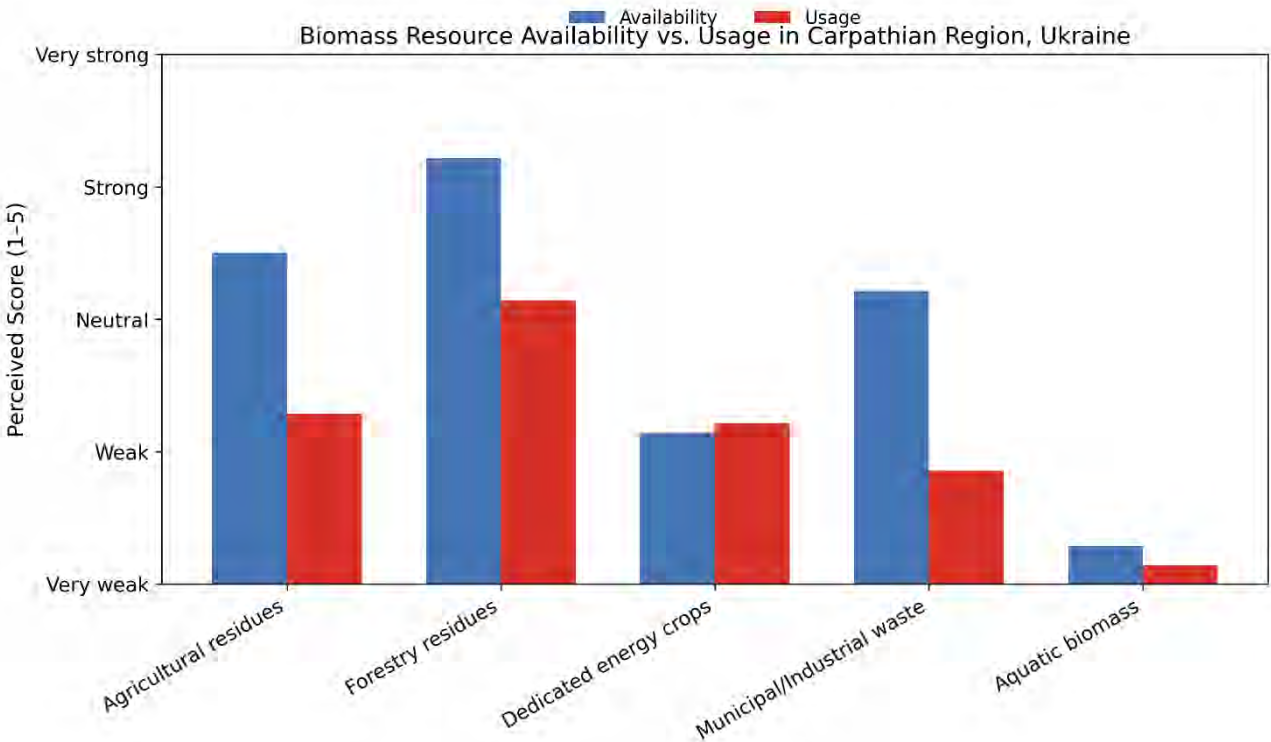
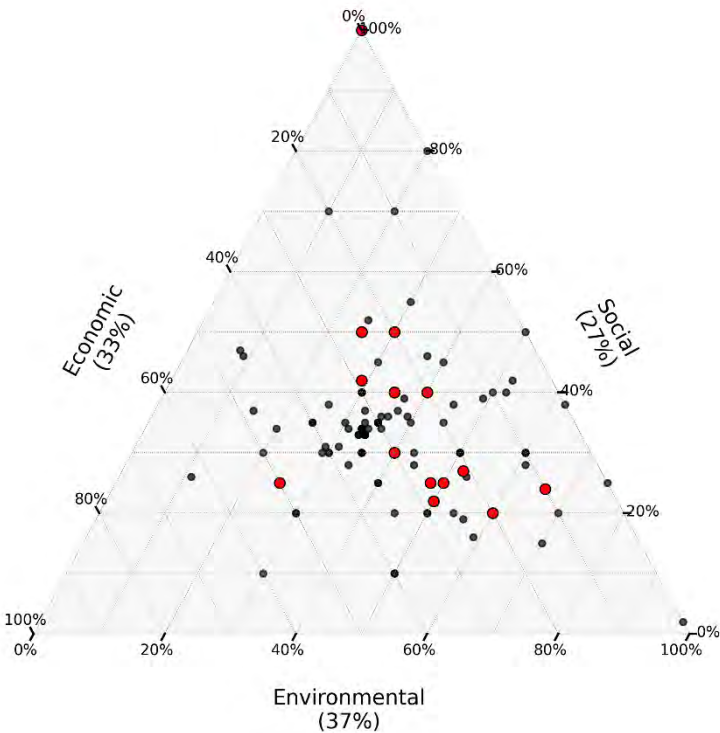
Policy & Advocacy:

Bioenergy Association of Ukraine (UABIO)

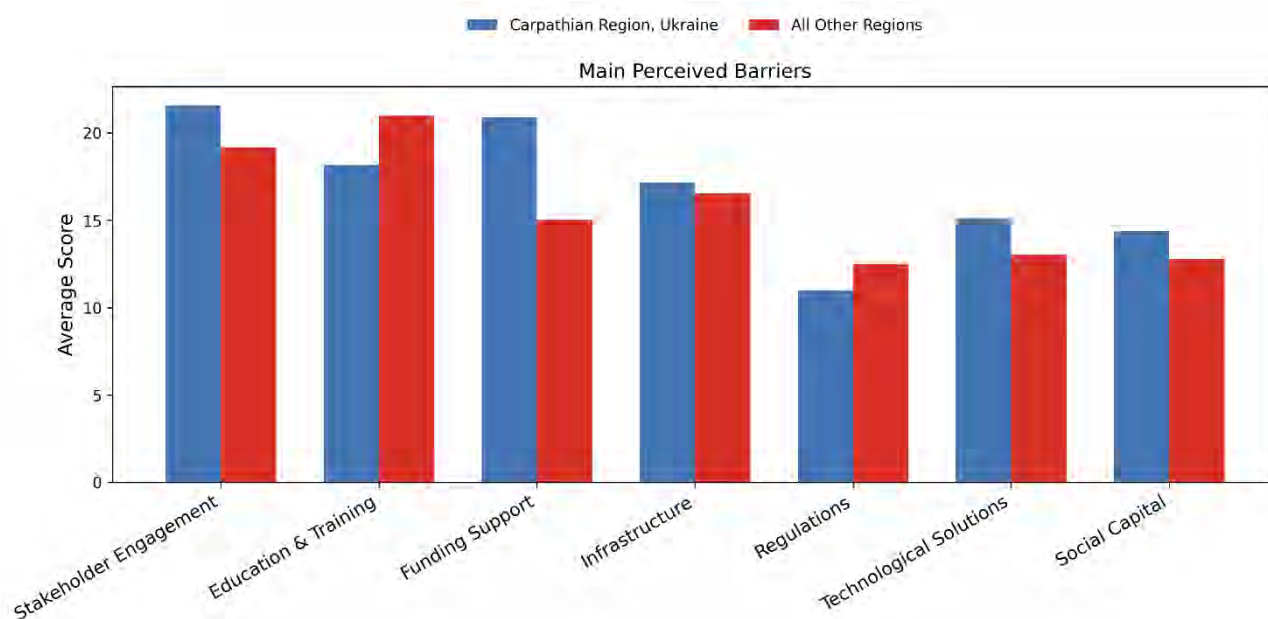
International Support & Development Programs:
EU Development Programs – including Horizon Europe and the European Green Deal,
supporting bioeconomy projects in Ukraine

Agreement with:
Biomass focus: 5.73 (5.95*)
Biotech focus: 4 (5.18*)
Systemic focus: 4.33 (5.13*)

1:strongly disagree -7:strongly agree
* Average All Regions



Perceived Barriers



Stakeholder Engagement: There is a lack of long-term commitment and vision, as decision-making is often influenced by short-term thinking and limited understanding of the bioeconomy's potential • Trust and coordination between biomass suppliers and consumers remain fragile and weak, reflecting a fragmented market and absence of stable relationships.

Education & Training: No direct reference to education structures, though general ignorance and shortsightedness suggest gaps in awareness and capacity-building at multiple governance levels.

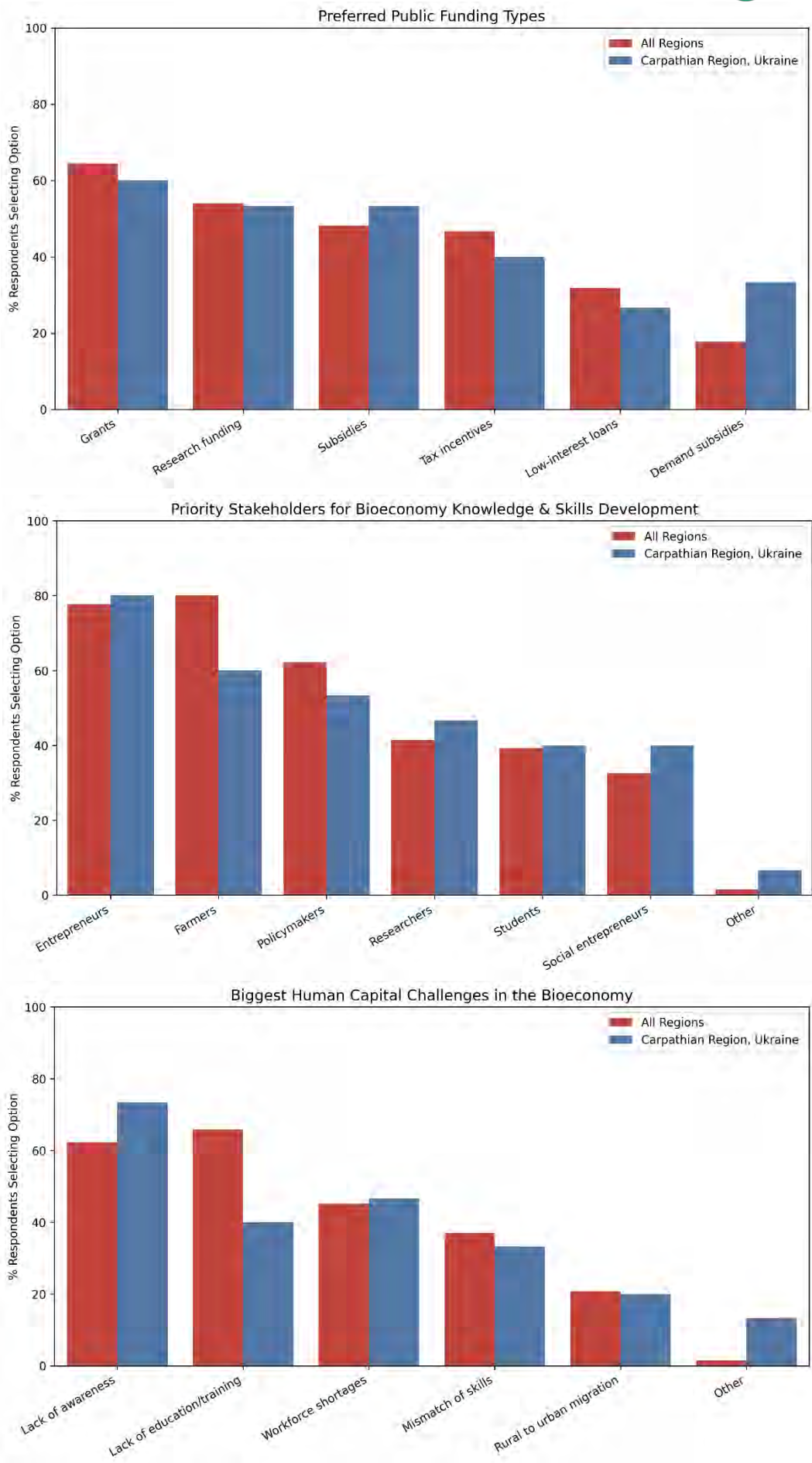
Funding Support: missing policy incentives for biomass supply chains indicate weak financial and strategic support for investment and development.

Infrastructure: Critical gaps exist in regional data on biomass availability, use, and potential • The lack of market structure for biomass-to-fuel conversion systems weakens the operational foundation needed for growth.

Regulations: There is no clear national bioeconomy strategy, and existing references to the bioeconomy in regional strategies lack enforcement mechanisms and action plans • Uncertainty caused by the war and the inability to apply previously effective approaches have disrupted planning and policy implementation.

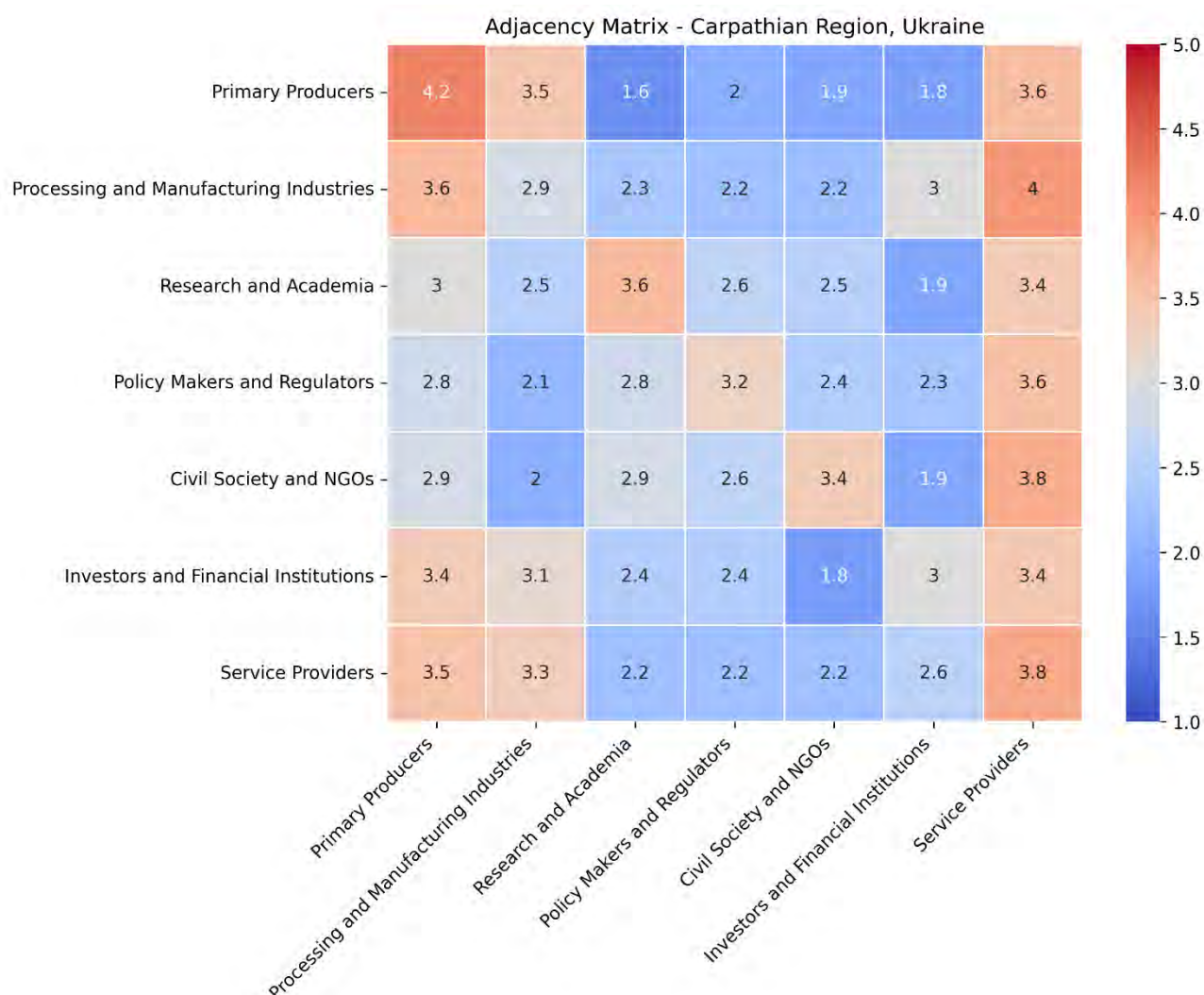
Technological Solutions: fragmented supply chains and data scarcity limit technology deployment and efficiency across the biomass value chain.

Social Capital: Decision-making is affected by a lack of strategic foresight and awareness, preventing cohesive, community-supported action toward bioeconomic goals.



Best Practices

Intra-Regional Collaborations (1: very weak – 5: very strong)



A. Sectoral Focus

The region's bioeconomy is primarily rooted in agricultural and forestry-based activities, with an emphasis on crop production, animal farming, and forest resource use. Despite strong institutional presence, systemic bioeconomy planning remains limited due to the war. Key areas include: Agricultural production • Forestry management • Organic food and small-scale processing • Biogas from livestock waste. Attention is shifting toward green reconstruction, with potential to integrate bioeconomic principles into post-war economic models.

B. Social Innovation

Few structured social innovations have been identified so far, but there are localized initiatives: Some local food initiatives (e.g., healthy sweets from wild Carpathian herbs, small-scale coffee waste reuse) • Geographical indications granted to food products • Civil society and NGO-led initiatives (e.g., FORZA) active in raising awareness, supporting forestry-related

development, and promoting eco-industrial parks. There is growing interest in wood-frame construction and multifunctional forest management, supporting ecological and social goals.

C. Value Chains

Bio-based value chain activities remain scattered, but some examples include: Biogas production (e.g., from a pig farm in Ivano-Frankivsk) • Processing of wild herbs and berries for healthy food products • Forestry-based value chains with focus on wood construction materials • Links between research institutions and local producers are underutilized.

D. Policy and Strategy

There are no dedicated regional bioeconomy policies due to wartime constraints, but relevant directions include: • Focus on green recovery and sustainability in reconstruction efforts • Local governments show readiness to adapt when shown best practices • National institutions have developed strategic research foundations, implementation is limited at local levels.

E. Institutional and Project Landscape (Whole Ukraine)

The Lviv Region Development Strategy (2021–2027) recognizes the bioeconomy as a priority area for smart specialization of this subregion of the Carpathian region. It laid the necessary foundations for further development, including wood processing, organic farming, the food industry, bioenergy, biotechnology, and more. Other 3 subregions of the Carpathian region (Zakarpattia, Ivano-Frankivsk, Chernivtsy) do not have dedicated regional bioeconomy policies due to wartime constraints, but relevant directions include: • Focus on green recovery and sustainability in reconstruction efforts • Local governments show readiness to adapt when shown best practices • National institutions have developed strategic research foundations, implementation is limited at the local levels.

- **Agroderew LLC:** CircHive
- **Culture and Tourism Department of Rivne Regional State Administration:** TEXTOUR
- **Dnipro State Medical University:** 4P-CAN
- **Dept. of Ecology & Natural Resources:** AGRI-BIOCIRCULAR-HUB
- **Fond Rozvytku Innovacij – Innovation Development Fund:** WEnnovate
- **FORZA:** RIBES, ROSEWOOD4.0
- **Institute of Agriculture of the Carpathian Region, NAAS Ukraine:** AGRI-BIOCIRCULAR-HUB
- **Kharkiv National University of Internal Affairs:** EQUALS-EU
- **Kiev International Institute of Sociology LLC:** CARSI
- **Kyiv Academic University:** WEnnovate
- **Civitta Ukraine LLC:** LUKE
- **Lviv Polytechnic National University:** AGRI-BIOCIRCULAR-HUB
- **Lviv Agrarian Chamber:** AGRI-BIOCIRCULAR-HUB
- **Lviv Communal Enterprise Zelene Misto:** AGRI-BIOCIRCULAR-HUB
- **Millwood LLC:** CircHive
- **Ministry of Education and Science of Ukraine:** LUKE
- **National Academy of Sciences of Ukraine:** LUKE
- **NGO All Ukrainian Environmental League:** AGRI-BIOCIRCULAR-HUB

- **Renewable Energy Agency:** S2BIOM
- **Institute for Economics and Forecasting, NAS Ukraine:** BLACK SEA HORIZON, LUKE
- **Ukrainian Institute for Scientific Technical Expertise and Information:** LUKE
- **Ukrainian Makers Association:** make-a-thek
- **Ukrainian National Forestry University:** CircHive, DIABOLO, POWER4BIO
- **V.N. Karazin Kharkiv National University:** SEIZMIC

5. Conclusion

This report set out to explore and map regional bioeconomy ecosystems across ten European regions as part of the RIBES project. The aim was to better understand how territorial configurations of actors, institutions, resources, and practices shape the development of a *socially, economically, and environmentally* sustainable bioeconomy. Using a combination of desk-based research, stakeholder engagement, and an explorative survey, the work focused on capturing regional dynamics, identifying systemic barriers, and surfacing good practices and local interpretations of key bioeconomy concepts.

A key motivation behind this work was the recognition that dominant approaches to bioeconomy development tend to emphasize technological innovation and sector-specific solutions, often at the expense of broader social, institutional, and structural dimensions. In contrast, this report foregrounded the importance of social innovation as a critical but often overlooked driver of transformative change. A second, equally important motivation was the observed conceptual ambiguity surrounding the bioeconomy, its varied meanings and framings across disciplinary, institutional, and regional contexts. This raised the question whether the bioeconomy could function as a shared reference point or *boundary object* referring to a concept flexible enough to accommodate diverse local interpretations, yet coherent enough to support coordinated action. This question matters not only at the level of discourse but also for practical implementation. If the bioeconomy is to serve as a transformative agenda rather than a diffuse policy label, it must enable actors with different priorities be it economic competitiveness, environmental sustainability, or social inclusion to align their efforts without requiring full agreement on definitions or outcomes.

The ten regional ecosystem profiles developed through this work reveal a diverse and uneven landscape. While all regions face transformation pressures, the conditions under which they respond vary considerably. Some ecosystems are marked by relatively dense networks of actors and existing initiatives, while others are more fragmented or nascent. At the same time, nearly all regions already feature successful value chains, innovative projects, and local actions that contribute to bioeconomy-related goals, particularly in areas such as agri-food systems, biomass utilization, and waste valorization. Across the board, the profiles illustrate that bioeconomy-related activity rarely follows a linear or uniform path. Instead, transformation emerges as a situated process, shaped by local histories, governance arrangements, and access to resources. This heterogeneity underscores the need for regionally tailored strategies and highlights the importance of understanding transformation not as the implementation of a predefined model, but as a process of collective negotiation and adaptation.

More generally, the results support the initial claim that social innovation is a critical component of regional bioeconomy transformation. Barriers related to stakeholder engagement, collaboration, and human capital were not peripheral, but consistently surfaced across regions as central challenges. In many cases, the lack of coordination mechanisms, limited trust between actors, or weak participation by civil society proved to be just as limiting, if not more so, than technical or financial constraints. These findings reinforce the idea that without active investment in the social dimensions of innovation, technological solutions alone are unlikely to generate inclusive or lasting change. The results also provide nuanced insights into the second guiding question: whether the bioeconomy can function as a boundary object. The results show, on the one hand, that the term clearly serves as a flexible and

inclusive frame, being one that enables engagement from a wide array of regional actors with differing mandates and priorities. Across regions, stakeholders were able to attach their own meanings to the concept. On the other hand, this conceptual openness also led to confusion, fragmentation, and ambiguity. In several regions, the absence of a shared understanding or operational framework undermined alignment and slowed implementation. In this sense, we must conclude that the bioeconomy has indeed the potential to operate as a productive boundary object, yet only if that potential is actively supported through adequate actions, such as participatory elements of governance, clear communication, and mechanisms for navigating competing priorities. Without such efforts, the concept risks remaining aspirational rather than actionable.

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7. Appendix A Indicators and operationalisation

Domain	Indicator	Operationalisation	Scale
A. Bioeconomy Orientation & Interpretations	Biomass-based vision	Agr. with definition of bioeconomy as biomass use (Q2.1)	1-7 Likert
	Biotech/innovation-driven vision	Agr. with definition of bioeconomy as biotechnology (Q2.2)	1-7 Likert
	Systemic transformation vision	Agr. with "bioeconomy as new way eco. Syst. are organized" (Q3.1)	1-7 Likert
	Sust. emphasis (current)	Allocation of 100 points across environmental/economic/social (Q3.2)	Compos. data
	Sust. emphasis (desired)	Allocation of 100 points across environmental/economic/social (Q3.3)	Compos. data
B. Regional Actor Ecosystem	Actor group presence	Strength ratings of 7 actor types (Q4.1)	1-5 Likert
	Significant ecosystem actors	List of actors & roles (Q4.6)	Open-ended
	Collaboration intensity	7x7 matrix rating actor-to-actor collaboration (Q9.5)	1-5 Likert
C. Biomass Resources & Use	Availability of biomass categories	Ratings for 5 resource types (Q4.2)	1-5 Likert
	Usage of biomass categories	Ratings for same 5 categories (Q4.3)	1-5 Likert
	Usage/application of biotechnologies	Rating biotech use (Q4.4)	1-5 Likert
	Reorg. of eco. system for bioec.	Rating significance of systemic reorganization (Q4.5)	5-point qual.
D. Transf. Needs & Barriers	Stakeholder engagement barrier	Weight allocation in "areas needing improvement" (4.7)	% weight
	Funding barrier	% weight	% weight
	Regulatory barrier	% weight	% weight
	Education barrier	% weight	% weight
	Social capital barrier	% weight	% weight
	Infrastructure barrier	% weight	% weight
	Technological solutions barrier	% weight	% weight
E. Governance Environment	Regional governance supportiveness	1-5 scale (Q5.1)	1-5
	National governance supportiveness	1-5 scale (Q5.2)	1-5
	Governance strengths	Open text (Q5.3)	Qualitative
	Governance challenges	Open text (Q5.4)	Qualitative
	Priority governance areas	Weight allocation across 7 domains (Q5.5)	% weight
F. Fiscal Support & Finance	Public fiscal support sufficiency	1-5 scale (Q6.1)	1-5
	Private fiscal support sufficiency	1-5 scale (Q6.2)	1-5
	Barriers to accessing fiscal support	Open text (Q6.4)	Qualitative
	Preferred public funding types	Checkboxes + explanations (Q6.5)	Qualitative
G. Human Capital & Skills	Availability of skilled professionals	1-5 scale (Q7.1)	1-5
	Education/training adequacy	1-5 scale (Q7.3)	1-5
	Biggest human capital challenge	Checkbox (Q7.2)	Nominal
	Needed training types	Checkbox (Q7.4)	Nominal
	Priority stakeholder groups for skills	Checkbox (Q7.5)	Nominal
H. Regulatory Environment	Regulatory supportiveness	1-5 scale (Q8.1)	1-5
	Regulatory clarity	1-5 scale (Q8.2)	1-5
	Key regulatory barriers	Checkbox (Q8.3)	Nominal
	Urgent regulatory improvements	Checkbox (Q8.4)	Nominal
	Importance of regulatory harmonization	1-5 scale (Q8.5)	1-5
I. Social Capital & Networks	Stakeholder collaboration intensity	1-5 scale (Q9.1)	1-5
	Awareness of bioeconomy	1-5 (Q9.2)	1-5
	Inter-regional collaboration	1-5 (Q9.3)	1-5
	Active network types	Checkboxes (Q9.4)	Nominal
	Collaboration benefits	Checkboxes (Q9.6)	Nominal

8. Appendix B Survey

Section 1. Personal Information

Q1.1 Primary affiliation

Which of the following actor groups do you primarily identify with or represent in the bioeconomy?

- ☐ Primary producers (e.g., farmers, foresters)
- ☐ Processing and manufacturing industries
- ☐ Research and academia
- ☐ Policy makers and regulators
- ☐ Civil society and NGOs (e.g., advocacy groups, community organisations)
- ☐ Investors and financial institutions (e.g., banks, venture capitalists)
- ☐ Service providers (e.g., logistics, consultancy, IT solutions, marketing)
- ☐ Other: _____

Q1.2 Region

Select the region that best represents your location or area of expertise.

- ☐ Plovdiv Region, Bulgaria
- ☐ Pannonian Region, Croatia
- ☐ North Aegean Region, Greece
- ☐ Campania Region, Italy
- ☐ Podkarpackie Region, Poland
- ☐ Centru (Centre) Region, Romania
- ☐ Vojvodina Region, Serbia
- ☐ Nitra Region, Slovakia
- ☐ Western Balkans
- ☐ Carpathian Region, Ukraine
- ☐ Other: _____

Section 2. Bioeconomy Concepts

Q2.1 Agreement with biomass-based definition

A bioeconomy is the use of renewable biological resources, particularly biomass from agriculture, forestry, fisheries, aquaculture, and marine ecosystems as well as waste and residues for producing food, beverages, bio-based products, and renewable energy.

| ☐ Strongly disagree | ☐ Disagree | ☐ Somewhat disagree | ☐ Neutral | ☐ Somewhat agree | ☐ Agree | ☐ Strongly agree |

Q2.2 Agreement with biotechnology-based definition

A bioeconomy is an economy that is based on the application of biotechnologies.

| ☐ Strongly disagree | ☐ Disagree | ☐ Somewhat disagree | ☐ Neutral | ☐ Somewhat agree | ☐ Agree | ☐ Strongly agree |

Section 3. Regional Perspectives

Q3.1 Agreement with systemic definition

A bioeconomy is a new way of how economic systems are organised.

| ☐ Strongly disagree | ☐ Disagree | ☐ Somewhat disagree | ☐ Neutral | ☐ Somewhat agree | ☐ Agree | ☐ Strongly agree |

Q3.2 Current sustainability emphasis

In the context of how the bioeconomy is currently approached in your region, please distribute 100 points across the following three sustainability dimensions. The total must sum to 100.

- Environmental: ____
- Economic: ____
- Social: ____

Q3.3 Desired sustainability emphasis

Thinking about how the bioeconomy should be developed in your region, please distribute 100 points across the dimensions below (must sum to 100).

- Environmental: ____
- Economic: ____
- Social: ____

General comments:

Section 4. Regional Ecosystem Characteristics

Q4.1 Presence of actor groups in your region

Evaluate the presence of the following actor groups in your region.

Actor group	Very weak	Weak	Neutral	Strong	Very strong
Primary producers	☐	☐	☐	☐	☐
Processing & manufacturing industries	☐	☐	☐	☐	☐
Research & academia	☐	☐	☐	☐	☐
Policy makers & regulators	☐	☐	☐	☐	☐
Civil society & NGOs	☐	☐	☐	☐	☐
Investors & financial institutions	☐	☐	☐	☐	☐
Service providers	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐

Q4.2 Availability of biomass resources

Biomass type	Very weak	Weak	Neutral	Strong	Very strong
Agricultural residues	☐	☐	☐	☐	☐
Forestry residues	☐	☐	☐	☐	☐
Dedicated energy crops	☐	☐	☐	☐	☐
Municipal & industrial waste	☐	☐	☐	☐	☐
Aquatic biomass	☐	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐	☐

Q4.3 Usage of biomass resources

(same table structure as above)

Q4.4 Usage/application of biotechnologies

| ☐ Very weak | ☐ Weak | ☐ Neutral | ☐ Strong | ☐ Very strong |

Q4.5 Reorganisation of the economic system for the bioeconomy

Evaluate to what extent the economic system has been reorganised for the bioeconomy (e.g., value chains, clusters, capacity building).

| ☐ Very weak | ☐ Weak | ☐ Neutral | ☐ Strong | ☐ Very strong |

Examples (optional):

Q4.6 Important actors in your region

Please list important bioeconomy actors and describe their roles.

Actor	1:	_____		Role:	_____
Actor	2:	_____		Role:	_____

...

(Up to 20 lines)

Q4.7 Areas needing improvement

Allocate 100 points across the following areas.

- Stakeholder engagement: ____
- Funding support: ____
- Regulations: ____
- Education: ____
- Social capital (networks/collaboration): ____
- Infrastructure: ____
- Technological solutions: ____
- Other: _____ (specify)

Section 5. Governance

Q5.1 Regional governance support

| ☐ Very unsupportive | ☐ Unsupportive | ☐ Neutral | ☐ Supportive | ☐ Very supportive |

Q5.2 National governance support

(Same scale)

Q5.3 Strengths of current governance

Open Question

Q5.4 Governance challenges

Open Question

Q5.5 Governance priorities (100 points)

- Stakeholder engagement: ____
- Funding support: ____
- Regulations: ____
- Education: ____
- Social capital: ____
- Infrastructure: ____
- Technological solutions: ____
- Other: _____

Section 6. Fiscal Support

Q6.1 Public fiscal support sufficiency

| ☐ Very sufficient | ☐ Sufficient | ☐ Neutral | ☐ Insufficient | ☐ Very insufficient |

Q6.2 Private fiscal support sufficiency

(Same scale)

Q6.3 Barriers to accessing fiscal support

Open Question

Q6.4 Effective public funding types

(Check all that apply)

- ☐ Grants
- ☐ Subsidies
- ☐ Demand subsidies
- ☐ Tax incentives
- ☐ Low-interest loans
- ☐ Research funding
- ☐ Other: _____

Explanation:

Section 7. Human Capital

Q7.1 Availability of skilled professionals

| ☐ Very sufficient | ☐ Sufficient | ☐ Neutral | ☐ Insufficient | ☐ Very insufficient |

Q7.2 Biggest challenge

- ☐ Lack of education/training programmes
- ☐ Workforce shortages
- ☐ Skills mismatch
- ☐ Lack of awareness
- ☐ Rural-to-urban migration
- ☐ Other: _____

Q7.3 Adequacy of training programmes

(Same scale as Q7.1)

Q7.4 Types of needed programmes (Check all that apply)

- ☐ Vocational training
- ☐ University programmes
- ☐ On-the-job training
- ☐ Public awareness campaigns
- ☐ Lifelong learning
- ☐ Other: _____

Q7.5 Priority groups for skill development

- ☐ Farmers
- ☐ Entrepreneurs
- ☐ Researchers
- ☐ Policymakers
- ☐ Students
- ☐ Social entrepreneurs
- ☐ Other: _____

Section 8. Regulations

Q8.1 Regulatory environment supportiveness

| ☐ Very supportive | ☐ Supportive | ☐ Neutral | ☐ Unsupportive | ☐ Very unsupportive |

Q8.2 Clarity of regulations

| ☐ Very clear | ☐ Clear | ☐ Neutral | ☐ Unclear | ☐ Very unclear |

Q8.3 Primary regulatory barriers (Check all that apply)

- ☐ Complex approval processes
- ☐ Outdated regulations
- ☐ Lack of enforcement
- ☐ Inconsistent policies
- ☐ Costly application processes
- ☐ Other: _____

Q8.4 Areas for urgent improvement

- ☐ Environmental standards
- ☐ Waste management
- ☐ Land use policies
- ☐ Intellectual property rights
- ☐ Consumer protection
- ☐ Other: _____

Q8.5 Importance of regulatory harmonisation

| ☐ Very important | ☐ Important | ☐ Neutral | ☐ Not very important | ☐ Not important at all |

Section 9. Social Capital & Networks

Q9.1 Stakeholder collaboration level

| ☐ Very high | ☐ High | ☐ Neutral | ☐ Low | ☐ Very low |

Q9.2 Awareness of bioeconomy

(Same scale)

Q9.3 Inter-regional collaboration

(Same scale)

Q9.4 Active networks

- ☐ Research networks
- ☐ Industry clusters
- ☐ Public-private partnerships
- ☐ Community organisations
- ☐ Other: _____

Q9.5 Collaboration matrix

Rate collaboration between the following actor groups (1 = very weak; 5 = very strong).
(Insert your 7×7 matrix as a clean table)

Q9.6 Expected benefits of collaborations (Check all that apply)

- ☐ Greater awareness of bioeconomy opportunities
- ☐ Enhanced knowledge exchange
- ☐ Increased access to funding
- ☐ Stronger innovation
- ☐ Improved market access
- ☐ Better policy alignment
- ☐ Better land use and allocation
- ☐ Other: _____

General comments:

End of Questionnaire

9. Appendix C Project titles

Project Acronym	TITLE
4P-CAN	Personalized CANcer Primary Prevention research through Citizen Participation and digitally enabled social innovation
AGRI-BIOCIRCULAR-HUB	Excellence hub for a smart agriculture and circular bioeconomy towards a sustainable agrifood sector in widening countries (and beyond)
AGROECOLOGY	European partnership on accelerating farming systems transition - agroecology living labs and research infrastructures
AGROinLOG	Demonstration of innovative integrated biomass logistics centres for the Agro-industry sector in Europe
ARGONAUT	ARTificial IntelliGence toOI for enviroNmental impact Assessment of bio-based prodUcTs
ARSINOE	Climate resilient-regions through systemic solutions and innovations
ATRIUM	Alternatives for an effective Transition to sustainable, Reusable and recyclable construction products by the Innovative production of User and eco-friendly bio-based Materials.
BBEC2016	The role of regions in the European Bioeconomy - Bratislava Bioeconomy Conference 2016
BEAMING	Detecting massive-planet/brown-dwarf/low-mass-stellar companions with the beaming effect
BIM-SPEED	Harmonised Building Information Speedway for Energy-Efficient Renovation
BIOCIRCULARCITIES	Exploring the circular bioeconomy potential in cities. Proactive instruments for implementation by policy makers and stakeholders
BIOEASTsUP	Advancing Sustainable Circular Bioeconomy in Central and Eastern European countries: BIOEASTsUP
BIOECO-UP	Circular BioEconomy Market Uptake and Policy Support in Central Europe
BioeconomyVentures	RAISING DISRUPTIVE BIOECONOMY VENTURES, STARTUPS AND SPIN-OFFS TO THE TOP
BioEnergyTrain	BioEnergyTrain

BioFairNet	Bioeconomy and Circular Economy Fair Network Digitally fair and accessible network for reducing GHG activities with circular and bio-economy models
BioGov.net	Mobilizing European Communities of Practice in bio-based systems for better governance and skills development networks in bioeconomy
BioINSouth	Supporting regional environmental sustainability assessment for the BIO-based sectors to improve INnovation, INDUSTries and INclusivity in SOUTH Europe
BIO-INSPIRE	Enhancing bio-based innovation and participation in under-represented regions through cluster mobilization and collaborative governance
BIOLOC	Biobased and social innovation to revitalise European local communities
BIOMODEL4REGIONS	BIOMODEL4REGIONS - Supporting the establishment of the innovative governance models to achieve better-informed decision-making processes, social engagement and innovation in the bio-based economy
BioMonitor	Monitoring the Bioeconomy
BIO-NET	A Network of National Contact Points providing cutting-edge NCP services to the Knowledge Based Bio-Economy research community
BIOntop	Novel packaging films and textiles with tailored end of life and performance based on bio-based copolymers and coatings
BioRural	Accelerating circular bio-based solutions integration in European rural areas
BIOSKOH	BIOSKOH's Innovation Stepping Stones for a novel European Second Generation BioEconomy
BIOVoices	Mobilization of a plurality of voices and mutual learning to accelerate the Bio-based sector
BIOWAYS	Increase public awareness of bio-based products and applications supporting the growth of the European bioeconomy
BLACK SEA HORIZON	Enhanced bi-regional STI cooperation between the EU and the Black Sea Region
BOOST4BIOEAST	BOOSTing the bioeconomy transformation FOR (4) the BIOEAST region
BRILIAN	Cooperative business models for bio-based chains in rural areas
CARE4BIO	Network of National Contact Points for Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment
CARINA	CARinata and CamelINA to boost the sustainable diversification in EU farming systems
CARSI	Caucasus and Central Asia Research on Social Innovation: Development Assistance, Innovation and Societal Transformation

CEE2ACT	Empowering the Central and Eastern European Countries to Develop Circular Bioeconomy Strategies and Action Plans
CELEBio	Central european leaders of bioeconomy network
CHES	Challenges in Extraction and Separation of Sources
CIRCALGAE	CIRCular valorisation of industrial ALGAE waste streams into high-value products to foster future sustainable blue biorefineries in Europe
CircHive	Developing & piloting biodiversity footprinting & natural capital accounting via a 'beehive' of sectoral hubs, for sustainable transition to a circular EU bioeconomy
CLAIM	Customised Laser-assisted Plasma Arc Welding of Light Alloys and Steels
Climate Farm Demo	A european-wide network of pilot farmers implementing and demonstrating climate smart solutions for a carbon neutral europe
COMFORTAGE	Prediction, Monitoring and Personalized Recommendations for Prevention and Relief of Dementia and Frailty
COMPETE	Competition-Induced Novel Quantum States
Consolid8	Consolidating deep & inclusive social innovation ecosystems
COOPID	COOPeration of bioeconomy clusters for bio-based knowledge transfer via Innovative Dissemination techniques in the primary production sector
CREA	Network of summer academies for the improvement of entrepreneurship in innovative sectors
DeCrises	EU Decarbonisation in Times of Crises: Exploring Social Innovations and Enhancing an Equitable Twin Transition
DIABOLO	Distributed, integrated and harmonised forest information for bioeconomy outlooks
DigiCirc	European cluster-led accelerator for digitisation of the circular economy across key emerging sectors
DIVAGRI	Revenue diversification pathways in Africa through bio-based and circular agricultural innovations
DOIT	Entrepreneurial skills for young social innovators in an open digital world. A European Initiative
ECOBREED	Increasing the efficiency and competitiveness of organic crop breeding
EcoDaLLi	ECOsysteem-based governance with DANube lighthouse Living Lab for sustainable Innovation processes

EHUR	EYES HEARTS HANDS Urban Revolution
EJP Soil	Towards climate-smart sustainable management of agricultural soils
ELLIPSE	Efficient and novel waste streams co-processing to obtain bio-based solutions for packaging and agricultural sectors
EMBRIC	European Marine Biological Research Infrastructure Cluster to promote the Blue Bioeconomy
EMPHASIS-GO	Bringing EMPHASIS to operation: European Infrastructure for multi-scale Plant Phenomics and Simulation for food security in a changing climate
ENFASYS	ENCouraging Farmers towards sustainable farming SYstems through policy and business Strategies
EQUALS-EU	Europe's Regional Partnership for Gender Equality in the Digital Age
ESIRA	Enhancing Social Innovation in Rural Areas
EUREMAP	European Research Infrastructure for Marine Bioprospecting
FARMWELL	Improving farmers' wellbeing through social innovation
FEAST	FEAST
FirEurisk	Fireurisk - developing a holistic, risk-wise strategy for european wildfire management
FNS-Cloud	Food Nutrition Security Cloud
FoodCoP	Fuelling startup villages with circular bioeconomy strategies
FOODRUS	An innovative collaborative circular food system to reduce food waste and losses in the agri-food chain
ForestValue2	ForestValue2 - Innovating forest-based bioeconomy
FUNGUSCHAIN	Valorisation of mushroom agrowastes to obtain high value products
GEMINI	GERmanium MId-infrared plasmoNICS for sensing
GenB	Informing and educating young people on more sustainable behaviours and choices to build a future Generation informed and interested in Bioeconomy
GeneBEcon	Capturing the potential of Gene editing for a sustainable BioEconomy
GREEN-LOG	Cooperative and Interconnected Green delivery solutions towards an era of optimized zero emission last-mile Logistics
Greet CE	Green Transition in Central Europe

HoliSoils	Holistic management practices, modelling and monitoring for European forest soils
HUB-IN	Hubs of Innovation and Entrepreneurship for the Transformation of Historic Urban Areas
HuMUS	Healthy Municipal Soils
IDEAL	Integrated DEsign and Analysis of small population group trials
IMPACTPapeRec	Boosting the implementation of participatory strategies on separate paper collection for efficient recycling
IN-HABIT	INclusive Health And wellBeing In small and medium size ciTies
InnCoCells	Innovative high-value cosmetic products from plants and plant cells
INSPIRE	IRCSET International Mobility Fellowships in Science Engineering and Technology: co-funded by Marie Curie Actions
iSQAPER	Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience
LignoSilva	Upgrade of the Centre of Excellence LignoSilva
LIPSE	Learning from Innovation in Public Sector Environements
LUKE	Linking Ukraine to the European Research Area - Joint Funding and Capacity Building Platform for Enhanced Research and Innovation Cooperation
M2EX	Exploiting metal-microbe applications to expand the circular economy
MainstreamBIO	MAINSTREAMing small-scale BIO-based solutions across rural Europe via regional Multi-actor Innovation Platforms and tailored innovation support
make-a-thek	Modular Library Makerspaces for Heritage Crafts Innovation and Digitization
MASTER	Managing Assurance, Security and Trust for sERVICES
MERLIN	Sustainable and intelligent management of energy for smarter railway systems in Europe: an integrated optimisation approach
MountResilience	Accelerating transformative climate adaptation for higher resilience in European mountain regions
MPowerBIO	eM-POWERing SME Clusters to help SMEs to overcome the valley of death
NanoFEED	Nanostructured carriers for improved cattle feed
NCP4Missions	Network of National Contact Points for the five EU Missions

OpenMaker	Harnessing the power of Digital Social Platforms to shake up makers and manufacturing entrepreneurs towards a European Open Manufacturing ecosystem
Phoenix	Synergic combination of high performance flame retardant based on nano-layered hybrid particles as real alternative to halogen based flame retardant additives
Polymers-5B	Synthesis of Bio-based and Biodegradable polymers from monomers from renewable Biowastes via Biocatalysis and Green Chemistry to contribute to European Circular Bioeconomy
POWER4BIO	emPOWERing regional stakeholders for realising the full potential of european BIOeconomy
PRUDENT	Prioritization, incentives and Resource use for sUstainable DENTistry
RefreSCAR	Improved coordination of national and European bioeconomy research and innovation programmes in the ERA through strengthened SCAR Working Groups
RESONATE	Restoring Emotional Stability through Neurofeedback and AI for Transformative Empowerment
RIBES	Radial basis functions at fluid Interface Boundaries to Envelope flow results for advanced Structural analysis
ROBIN	Multi-Gigabit, Scalable & Energy Efficient on-board Digital Processors Employing Multi-core, Vertical, Embedded Opto-electronic Engines
RootLinks	Primary Sector Working Group Support Project
ROSEWOOD	European Network of Regions On Sustainable WOOD mobilisation
ROSEWOOD4.0	Eu network of regions on sustainable wood mobilisation ready for digitalisation
RURACTION	Social Entrepreneurship in Structurally Weak Rural Regions: Analysing Innovative Troubleshooters in Action
Rural BioReFarmeries	Green BioReFarmeries - Small-scale Circular Green Biorefineries for increasing farmer sustainability and competitiveness and building resilient rural areas
S2BIOM	Delivery of sustainable supply of non-food biomass to support a resource-efficient Bioeconomy in Europe
SEISMEC	Supporting European Industry Success Maximization through Empowerment Centred development
SEIZMIC	Scaling Social Entrepreneurship and Innovation: Zooming in on Multidisciplinary Interconnected Challenges

SERIGO	Social Economy for Resilience, Inclusion and Good life in Rural areas
SHui	Soil Hydrology research platform underpinning innovation to manage water scarcity in European and Chinese cropping systems
SIMRA	Social Innovation in Marginalised Rural Areas
SISCODE	Society in Innovation and Science through CODEsign
Small4Good	Small4Good: Sustainable multifunctional management by small forest owners in support of bioeconomy, biodiversity and climate
SUSTRACK	Supporting the identification of policy priorities and recommendations for designing a sustainable track towards circular bio-based systems
SYMBA	Securing local supply chains via the development of new Methods to assess the circularity and symbiosis of the Bio-bAsed industrial ecosystem enhancing the EU competitiveness and resource independence
synBIOcarb	Synthetic biology of carbohydrate-binding proteins: engineering protein-carbohydrate interactions for diagnostics and cell targeting
TETRA	TEst of Tilt-Rotor Air intakes
TExTOUR	Social Innovation and TEchnologies for sustainable growth through participative cultural TOURism
thERBN	THEMATIC EUROPEAN RURAL BIOECONOMY NETWORK (thERBN)
ToBeReal	Empowering bioeconomy projects by deploying Technical, Business, Regulatory and Social assistance services
trans4num	Transformation for sustainable nutrient supply and management
Transition2BIO	Support the TRANSITION towards the BIOeconomy for a more sustainable future through communication, education and public engagement
uP_running	Take-off for sustainable supply of woody biomass from agrarian pruning and plantation removal
URBREATH	Systemic Integration of Transformative Technical and Nature-based Solutions to Improve Climate Neutrality of European Cities and Regions and tackle Climate Change: the URBreath Approach
VALUES	Normative practices in the public sphere. A theoretical modeling of forms of civic engagement
WeLaR	Welfare systems and labour market policies for economic and social resilience in Europe
WEnnovate	Co-creating more connected ecosystems to transition European innovation

XTREAM	Sustainable exploration and biodiscovery of novel products and processes from extreme aquatic microbiomes to expedite the circular bioeconomy
YOUCOUNT	YOUCOUNT - EMPOWERING YOUTH AND COCREATING SOCIAL INNOVATIONS AND POLICYMAKING THROUGH YOUTH-FOCUSED CITIZEN SOCIAL SCIENCE

The project

The **RIBES** project **aims** to enhance the uptake of bio-based innovations in ten (10) European regions by developing new governance and business models that combine social entrepreneurship with rural development, thus advancing the transition to a circular economy.

Coordinator: **CENTRAL EUROPEAN INITIATIVE (CEI)**

PARTNER		SHORT NAME
	Central European Initiative	INCE
	Maastricht University	UM
	Centre for Research and Technology Hellas	CERTH
	BIOCOM	BIOCOM
	White Research	WR
	University of Hohenheim	UHOH
	CIRCE - Centro Tecnológico	CIRCE
	Q-PLAN International	QPL
	ARX.net	ARX.NET
	European Rural Development Network	ERDN

	Agricultural University Plovdiv	AUP
	MedINA	MedINA
	Energy Institute Hrvoje Požar	EIHP
	SPRING	SPRING
	Lucian Blaga University of Sibiu	LBUS
	Rzeszowska Agencja Rozwoju Regionalnego S.A.	RARR
	Balkan Rural Development Network	ULBS
	Faculty of Technical Sciences University of Novi Sad	FTN
	Bioeconomy Cluster	BEC
	FORZA Agency for Sustainable Development of the Carpathian Region	FORZA

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