european bioeconomy university

European Bioeconomy Scientific Forum 2025

Boosting regional and international bioeconomy collaboration and skills

11 - 13 June 2025

Joensuu, Finland

THE COLLECTION OF POSTER ABSTRACTS

EBSF 2025

ABSTRACT BOOK INTRODUCTION

The European Bioeconomy Scientific Forum (EBSF) is the official biennial event organised by the European Bioeconomy University (EBU). In 2025, the forum focused on boosting regional and international bioeconomy collaboration and skills. The forum addressed essential matters in advancing the bioeconomy, including regional and international collaboration, knowledge exchange across geographical and domain boundaries, the roles of youth and universities, and the necessary innovation skills. EBSF 2025 took place from June 11 to 13 at the University of Eastern Finland in Joensuu and Koli National Park, Finland.

The poster pitch session offered young researchers the opportunity to present their research findings and innovations in a clear and visual format. It also aimed to foster engagement, curiosity, and discussions among participants.

The poster pitch session was organised into three thematic groups:

Group 1: Biotechnologies and Bio-businesses
Group 2: Bioresource Management and Governance
Group 3: Bioeconomy Policies and Stakeholders

On the following pages, you will find the poster abstracts presented at EBSF 2025, along with author names, affiliations, and contact information. The text of the abstracts is presented as submitted, without editing or proofreading.

EBSF2025 Organising Team

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SHORT AGRI-FOOD SUPPLY CHAIN IN URBAN AREAS: EVIDENCE FROM POLISH GENERATION Z

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Abstract text :

At the WULS, we conduct research in international and regional teams in the field of short supply chains of agri-food products, but the main aim of the poster is to present one of them. Since the outbreak of the COVID-19 pandemic, due to the avoidance of mass gatherings of people and the increased concern for a healthy lifestyle, direct sales of organic agricultural products have developed rapidly in large cities. Various initiatives are being created in urban spaces, such as breakfast markets, community gardens, and bazaars with local agri-food products. City dwellers increasingly use short supply chains of agi-food products, communicating via the Internet (social media, dedicated platforms such as the Polish e-marketplace). Various methods are also being developed to facilitate quick non-cash payments (e.g., blik to the phone), which are preferred especially by young people. Young people are becoming increasingly aware of healthy eating. But do young people make conscious food choices? What are they guided by? How important is the price in their choices and trust in local products? Have they heard of small-scale urban agriculture and urban community gardens, and do they use them? We surveyed people entering adulthood from Generation Z (18-30 years old) living in large Polish cities. The research results indicated purchasing barriers and consumer factors for purchasing from short agri-food supply chains. The use of cluster analysis allowed us to distinguish consumer groups in which socio-demographic differences, interest in buying products from short supply chains and community gardens/bazaars, delivery methods, and issues related to food (e.g., clean label, traceability) were analyzed.

Keywords:

Sustainable city, Poland, urban spaces, agri-food, short supply chain.

MICROBIAL PRODUCTION OF VALUE-ADDED MOLECULES FROM AGRO-INDUSTRIAL BY-PRODUCTS: POTENTIAL APPLICATION FROM BIO-BASED MATERIALS FABRICATION

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Abstract text :

The agro-industry is vital to global food security and produces substantial amounts of waste that contains valuable organic compounds. While some residues are reused, a considerable proportion remains underutilized. Our research project focuses on valorizing agro-industrial by-products like grape pomace, whey, and sugar beet waste through microbial fermentation to produce volatile organic compounds (VOCs) such as 2-phenylethanol (2-PE), 1-butanol, acetic acid, and ethanol. These compounds serve as precursors for valuable bio-based materials with a multitude of applications in food, energy, and pharmaceuticals. By utilizing yeast strains like Saccharomyces cerevisiae, *Kluyveromyces marxianus*, and *Yarrowia lipolytica*, we aim to optimize fermentation conditions such as substrate pretreatment, pH, temperature, and nutrient addition, in line with circular bioeconomy principles. Our research undertaking consists of several stages: (1) identification of suitable agro-industrial residues as substrates, (2) selection of effective yeast strains for VOC production, (3) evaluation of fermentation efficiency at laboratory scale, (4) exploration of VOC polymerisation into bio-based materials, and (5) assessment of scalability for industrial applications. The project's alignment with the European Green Deal and global bioeconomy policies is evident, with a focus on circularity, waste reduction and sustainable material production through the integration of biotechnological valorisation strategies. The project emphasises the environmental and economic benefits of utilising agricultural waste and the potential for bio-economic collaboration, uniting stakeholders from academia and industry to enhance resource efficiency and innovation. It demonstrates the potential of agro-waste VOCs to contribute to a greener, circular bioeconomy, promoting environmental sustainability and economic viability in the agro-industrial sector.

Keywords:

Agro-industrial waste, circular bioeconomy, microbial fermentation, waste valorization.

BIOINSPIRED ANTIVIRAL SURFACES FROM TREE BARK CHEMICALS: A MULTIDISCIPLINARY APPROACH TOWARDS SUSTAINABLE COATING DEVELOPMENT

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Abstract text :

The COVID-19 pandemic highlighted the longstanding need for innovative approaches in both healthcare and materials science to reduce viral transmission in everyday environments where people interact. Materials play a key role in this, yet most existing antiviral coatings rely on synthetic, nanomaterial- or noble metal-based compounds. This study explores how natural bioactive compounds from tree bark can be refined into bioinspired surfaces with antiviral properties. The antiviral properties of bark extractives and phenols from different tree species feature an abundant, chemically versatile byproduct of the forestry industries. By turning an underutilized resource into a high-value functional chemicals, we aim to develop coatings that are both effective and sustainable. As a part of the DESTINY project, this multidisciplinary work brings together three academic institutions and an industrial partner. Initial extraction, characterization, and fractionation of bioactive compounds from bark will be performed at University of Eastern Finland (UEF). Specialized biosafety laboratories at University of Jyväskylä will be used to evaluate the antiviral efficacy of chemical bark fractions and bioinspired materials, while further isolation and purification of the identified compounds will be performed at BOKU university in Vienna. Finally, Stora Enso brings an industry perspective, assessing scalability and potential applications in real-world coatings and materials. Beyond extraction and testing, the project explores how to engineer functional surfaces. Key challenges include stability, adhesion to different materials, and controlling the release of active compounds. By bridging wood chemistry, virology and materials science, this research opens new avenues for the fabrication of innovative bio-based antiviral coatings

Keywords:

Antiviral activity, bark extracts, functional coatings, material science, phenols.

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Group 1. Biotechnologies and bio-businesses

FROM WASTE TO WELLNESS: SCALING BLACK SOLDIER FLY LARVAE FOR SUSTAINABLE PET NUTRITION THROUGH DIVERSE MULTI-STAKEHOLDER COLLABORATIONS – A SOUTHEAST ASIAN CASE STUDY

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Abstract text :

Insects have gained increasing attention as a sustainable, high-quality protein source. While Black Soldier Fly Larvae (BSFL) protein production has been on an industrial scale in Southeast Asia, its applications remain underexplored in regional pet food markets. This case study examines a collaborative initiative involving a career fellowship program that engaged young Southeast Asian professionals passionate about agritech. Conducted in partnership with a leading Malaysian biotechnology startup, then capacity-building program facilitated interdisciplinary collaboration, hands-on learning in bioconversion, and sustainability-driven innovations. The startup utilizes locally sourced pre-consumer agricultural waste to rear BSF, promoting waste reduction while producing high-protein animal feed and organic frass fertilizer. Key insights were drawn on niche identification, benchmarking, market penetration, adaptation strategies, and circular economy business model. The case study also explored the environmental impact of BSFL farming, the nutritional requirements of exotic pets, and consumer insights on insect-based pet food, directly contributing to the design, positioning and launch of the pet food product. Findings highlighted whole dried BSFL's potential to reduce reliance on conventional pelleted pet foods, offering a sustainable, nutritionally rich alternative for different pet feeding occasions. However, market acceptance remained a challenge, requiring consumer education, industry support, and cross-sector collaboration. Local communities—including small-scale farmers, pet shop owners, and veterinarians—are key drivers in scaling circular bioeconomy models, highlighting the need for stronger collective efforts to advance this approach across the region. This study underscores the importance of strategic partnerships, knowledge-sharing, and interdisciplinary collaboration in democratizing BSFL protein within the competitive pet food industry.

Keywords:

Food system, circular bioeconomy, Black Soldier Fly Larvae, insect protein, sustainable pet nutrition.

SYNERGIZING SUSTAINABILITY ASSESSMENTS: INTEGRATING LCA, AUGMENTED REALITY, AND PARTICIPATORY MCDA AND MACROECOLOGY IN BIOECONOMY RESEARCH

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Abstract text :

Sustainable biomass supply is crucial for Europe's bioeconomy transition. Current assessments often lack integration of environmental, economic, social, and technological aspects. This work presents four PhD projects within the DESTINY Doctoral Network's Work Package 5, addressing these gaps with interdisciplinary tools and stakeholder engagement. Project 5.1 uses life-cycle assessment to evaluate environmental impacts of sustainable intensification. Project 5.2 uses augmented reality (AR) to showcase the value of biodiversity in grasslands, helping farmers visualize environmental and economic impacts and explore market-driven solutions for biodiversity-friendly farming. Project 5.3 develops a Multi-Criteria Decision Analysis framework using living labs to holistically assess biomass supply sustainability and communicate results to non-experts. Project 5.4 investigates trade-offs and synergies between biodiversity, biomass production, and ecosystem multifunctionality. Integrating these projects aims to create a comprehensive sustainability assessment framework addressing environmental, economic, and social dimensions, leveraging living labs and augmented reality for better stakeholder engagement. The projects also aim to develop policy recommendations for sustainable intensification and biodiversity conservation. This interdisciplinary collaboration shows how integrating scientific methods and stakeholder insights can drive innovation and advance Europe's bioeconomy transition.

Keywords:

Sustainable biomass supply, sustainability assessment, interdisciplinary research, stakeholder engagement, biodiversity.

BIOREFINING MARINE ALGAE: HARNESSING ULVA ARMORICANA FOR SUSTAINABLE DEVELOPMENT IN BRETAGNE REGION

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Abstract text :

Macroalgal blooms in the Bretagne region of France have a negative environmental and socio-economic impact. A cascading biorefinery model is introduced, it transforms excessive algal biomass into high-value products: ulvan, biogas, and organic fertilizers. Starting with the recollection of fresh Ulva armoricana from coastal blooms, followed by a pretreatment and hydrothermal extraction to isolate the ulvan polymers using water-based, low-toxicity methods. Ulvan could have several applications ranging from pharmaceuticals such as hydrogel to the development of composite materials such as biofilm. The process is designed to minimize chemical waste following green chemistry principles while preserving product quality. Residual biomass is directed to anaerobic digestion alongside local agricultural biomass, the biogas generated supplies the energy requirements of the extraction process and the surplus goes to the grid. The recovery of energy through anaerobic digestion helps to reduce the use of non-renewable energy and to return nutrients to nearby soil. The proposed biorefinery effectively converts problematic algae into a renewable source for stimulating the regional bioeconomy through market opportunities and local job creation. Advanced simulation tools and experimental validation are required to further validate the process parameters and demonstrate scalability. This work provides an alternative to coastal communities for harnessing their available biomass into sustainable, biobased solutions.

Keywords:

Ulva armoricana, Biorefinery, Marine pollution, Cascading use.

SUSTAINABLE BARRIER COATINGS BASED ON NANOCELLULOSE AND NATURAL WAXES

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Abstract text :

Eco-friendly materials derived from natural sources are gaining increasing attention as sustainable alternatives to synthetic polymers in various applications, including films, adhesives, and coatings. Extensive research on bio-based barrier coatings has highlighted the importance of developing innovative coating systems and technologies for the paper industry. These coatings offer advantages of sustainability, a green chemistry perspective, cost competitiveness, abundant natural feedstocks, and strong performance properties. However, achieving effective and scalable solutions remains a challenge for both academia and industry. This study focuses on developing renewable and green waterborne barrier coatings based on nanocelluloses and natural waxes. Paperboard substrates were coated with dispersions of microfibrillated cellulose (MFC), cellulose nanocrystals (CNC), MFC-CNC combinations, and nanocellulose-wax mixtures. Beeswax, carnauba wax, and less studied pine needle wax extracted from Scots pine (Pinus sylvestris) needles were used in this study. The waxes were characterized using Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analyzer (TGA), and Differential Scanning Calorimetry (DSC) to compare their chemical and thermodynamic properties. The coated paperboards were characterized by their barrier properties, including contact angle, water vapor transmission rate, oxygen transmission rate, grease resistance, and mechanical strength. Surface morphology was analyzed by Scanning Electron Microscopy (SEM) to examine the distribution of nanocellulose and wax within the coatings. The main objective of this study is to develop waterborne barrier coatings with high mechanical strength and excellent resistance to water and oil. Additionally, the proposed system is designed for simple preparation and application, requiring minimal or no additional chemicals, and demonstrating strong potential for industrial upscaling.

Keywords:

Barrier coating, beeswax, carnauba wax, nanocellulose, pine needle wax.

HUMAN SKIN CELL MODEL ELUCIDATES THE SAFETY ASPECTS OF HEMP- AND WOOD-BASED DISTILLATES

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Abstract text :

A common goal worldwide is to increase the use of renewable bio-based resources, to which biorefining provides one solution. Novel bio-based coatings and composites are currently being engineered with an increasing rate. Bio-based materials are not necessarily safe even though they originate from nature, rendering comprehensive safety assessment imperative already at the product development stage. To get insight into the skin safety of potential bio-based coating and/or composite components, a human dermal-epidermal co-culture cell model was developed. The model represents the human skin, consisting of human BJ fibroblasts and HaCaT keratinocytes. The model was exposed for 24 hours with increasing doses of wood- and hemp-based distillate samples in air/liquid interface, thus simulating a real-life situation. Cell viability was analyzed as membrane permeability using propidium iodide, metabolic activity with MTT assay, the levels of intracellular reactive oxygen species with 2',7'-dichlorofluorescein assay and the cell cycle profile with flow cytometry. Markers of immune activation were assessed, and IncuCyte® S3 Live-Cell Analysis Instrument elucidated the wound healing properties of the model after sample exposure. The results indicate that the distillate samples neither caused a marked decrease in metabolic activity or cell viability, nor induced oxidative stress. The samples did not lead to pronounced changes in the studied cytokine levels. In conclusion, the developed human dermal-epidermal co-culture model is suitable to assess the safety of such samples. In the future, a human airway co-culture cell model will also be utilized to give insight into the inhalation safety of similar samples.

Keywords:

Bio-based, cell model, distillate, skin safety.

VALORIZATION OF BIOMASS WASTE IN THE LIFE CYCLE OF TOMATO PRODUCTION: A SYSTEMIC PERSPECTIVE

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Abstract text :

Significant losses occur across the food system, from crop residues to food loss and waste in the supply chain, these are missed opportunities to produce food, feed, fuels, fiber, and fertilizers [1,2]. Globally, one-third of food produced is wasted annually, representing US$1 trillion in economic losses and 8–10% of global greenhouse gas emissions [3,4]. Simultaneously, in the EU alone, an estimated 700 million tons of agricultural waste are generated each year. In protected tomato cultivation, crop residues reach approximately 24,000 kg/ha (for every kg of tomato, approximately 0.33 kg of waste is generated). This includes leaves that contain 25-30% protein (rich in Rubisco, a key edible chloroplast protein) [5, 7]. Finding value in the biomass loss in the tomato supply chain requires a systemic and multidisciplinary view. This interdisciplinary study is a collaboration between three projects that aims to integrate supply chain optimization, plant breeding, and life-cycle assessment to address tomato waste valorization. By bringing such projects together, a framework that optimizes logistics, enhances extraction of high value compounds, and identifies end-of-life pathways for tomato waste valorization will be developed. Using optimization models, targeted breeding for residue usability, and comparative end-of-life LCA, we expect the research to reveal how isolated approaches underestimate systemic sustainability gains. We expect coordinated strategies to reveal synergies in reducing tomato waste. The project will also show the strengths and weaknesses of these different methodologies. This work will provide actionable steps for policymakers and industries to adopt circular bioeconomy practices without compromising efficiency and feasibility.

Graphical abstract and references:

https://docs.google.com/document/d/1uezLb0QZBNA_IBZ1LHOlUyBVi_zLmyjrRcVReHidR8A/edit?usp=sharing

Keywords:

Biomass waste valorization, supply chain optimization, plant breeding, and life cycle assessment (LCA).

EXTRACTION OF PHENOLIC COMPOUNDS FROM HEMP AND WOOD BARK: METHODOLOGY AND SUSTAINABILITY ASSESSMENT

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Abstract text :

This study investigates how the role of biorefineries in advancing a sustainable bioeconomy can be explored through the extraction of phenolic compounds from hemp hurd and tree bark residues. It explores two complementary extraction techniques: maceration enables the extraction of phenolic compound while preserving their native structure, whereas pyrolysis thermochemically transforms lignin, yielding novel phenolic derivatives. Although thermal degradation modifies phenolic structures, it expands the range of bioactive compounds, potentially increasing their industrial applicability. The extracted fractions undergo further processing to isolate phenolic compounds suitable for functional (antibacterial/antifungal/antiviral) coatings or treatments, addressing the growing demand for sustainable material alternatives. This research takes a cross-disciplinary approach, integrating chemistry, materials science, and operations research expertise to develop sustainable solutions. To evaluate the economic and environmental feasibility of scaling these processes from laboratory to commercial levels, the study employs ex-ante life cycle assessment (LCA) and technoeconomic analysis (TEA). Insights from these feasibility studies will iteratively refine the sustainability of extraction methods, product applications, and production pathways.

Keywords:

Biomass Valorization, Functional Coatings, Phenols, Sustainability Assessment.

GRAM-SCALE EXTRACTION OF BIOPHENOLS FROM THE COMPLEX WOOD PYROLYSIS TAR MATRIX USING CENTRIFUGAL PARTITION CHROMATOGRAPHY

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Abstract text :

Wood processing industry including forestry are one the cornerstones of Finland's' economy producing steady biobased side streams for the circular economy. Almost 95 % of these side streams are being used as material, raw material or in energy production. One efficient means to process these side streams is the production of versatile biochar. Depending on the manufacturing process and source material various organic byproducts are being produced. Lignin rich source materials, like wood are an abundant source of biophenols that are a diverse group of bioactive compounds having a wide range of applications. However, during thermochemical production of biochar generated phenols are coeluted in tar fractions with hundreds of other constituents. This complicates their purifications for their use as flame retardant, in coatings or composites etc. Here we report an efficient method for the biophenol extraction from the complex tar matrix using scalable, nondestructive and lossless separation technique centrifugal partition chromatography (CPC). Sugars from the industrial birch-based slow pyrolysis distillate were removed by water and heat treatment. Thereafter, CPC method applying Arizona solvent system M/N in descending/ascending mode, respectively, were used to separate phenolic mixtures from the tar. The isolated phenol mixtures typically contained 1 – 2 NMR characterized main phenols in concentrations of 0.54 M – 1.99 M. The total phenolic concentrations were 1.85 – 3.67 M, and the phenolic yield was appr. 30 %wt. The CPC protocols described here allow the production of phenolic mixtures on gram scale and are applicable to similar types of tar fractions originated from thermochemical processing.

Keywords:

Biomass, Phenols, Pyrolysis, biochar, biorefining.

THE ADDED-VALUE OF CITIZEN SCIENCE TO INCREASE AWARENESS AND TO MAKE BETTER DECISIONS FOR PRESERVING SOILS HEALTH

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Abstract text :

The EU Bioeconomy Strategy recognises soils as a fundamental resource for the transition towards a circular economy. Enhancing competences to monitor the pressure on resources like soil and raising awareness on its fragility are in fact among the objectives of the strategy. Scarce resources as time and money, however, frequently make it difficult to pursue these objectives. A contribution to this challenge may come from citizen science (CS). This approach aims at increasing citizens' awareness of specific themes through their direct engagement. Citizens can also be empowered to collect information (citizen-generated data – CGD) to support specific decision-making processes. The aim of this contribution is to analyse the added-value of making decisions holding CGD. Moreover, we also seek to assess the advantages of using CS initiatives to raise awareness on the societal importance of soils. To do so, we will first apply a stochastic cognitive mapping to select different groups of relevant stakeholders. Then, through an analytic hierarchy process, we will identify the principal information gap at the basis of their decision-making objective. Lastly, employing a qualitative value of information approach, we will estimate the added-value of making decisions in possession of CGD. This approach will be also instrumental in assessing the usefulness of CS initiatives to raise awareness on these issues. What we expect from this study is gaining insights able to feed the debate on more cost-effective approaches both for supporting decision-making processes and raising awareness on the central role of healthy soils in the transition towards sustainable bioeconomies.

Keywords:

Citizen-science, qualitative value of information, soil health, citizen-generated data, analytic hierarchy process.

Group 2. Bioresource management and governance

THE POWER OF PLAY: DIGITAL TECHNOLOGIES TRANSFORMING FOREST PLANNING IN THE SUSTAINABLE BIOECONOMY

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Abstract text :

The transition to a sustainable bioeconomy requires innovative approaches to forest resource management that incorporate technological innovation, social inclusivity, and environmental stewardship. The newly established PlayFair Forest Network (PFFN) addresses this challenge by investigating how playful digital participatory technologies can transform forest planning and decision-making. Our interdisciplinary research network explores the potential of interactive digital platforms, such as Public Participation Geographic Information Systems (PPGIS), Volunteered Geographic Information (VGI), and location-based games (LBGs), to enhance stakeholder engagement in the forest bioeconomy. These technologies offer innovative methods for collecting local knowledge, visualising forest management scenarios, and supporting transparent, democratic planning processes. The network bridges forestry, game studies, tourism, and human-computer interaction, directly addressing the EU's objectives of modernising primary production and strengthening the bio-based industrial base. By developing playful digital tools, we aim to:

- Improve data collection and integration of local perspectives
- Enhance public understanding of sustainable forest practices
- Support climate change adaptation and biodiversity conservation
- Create new value-creation channels for rural communities.

Preliminary findings highlight the potential of gamified technologies to motivate participation, share complex information, and bridge communication gaps between researchers, policymakers, and local stakeholders. This approach supports the EU Bioeconomy Strategy's goals of promoting resource efficiency, ecological resilience, and inclusive decision-making. The poster will highlight our network's innovative methodologies, initial research insights, and the transformative potential of playful digital technologies to reshape forest management within a sustainable, inclusive, and circular economic framework.

Keywords:

Digital participation, sustainable bioeconomy, forest planning, gamification, stakeholder engagement.

ENHANCING THE SUSTAINABLE UTILIZATION OF HIGH-MOUNTAIN BYPRODUCTS IN COLOMBIA

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Abstract text :

Colombia’s high-mountain regions host strategic ecosystems with exceptional biodiversity and play a crucial role in providing ecosystem services. However, these areas face multiple challenges, including climate change impacts, decreasing precipitation, illegal economies, and socio-environmental conflicts. Additionally, economic limitations constrain sustainable development opportunities for local communities, many of whom are Indigenous groups or small-scale farmers with limited access to resources and markets. In this context, byproducts from the Ericaceae family present a key opportunity for the bioeconomy, yet their sustainable utilization requires a comprehensive approach that integrates ecological, economic, and social dimensions. This study employs multi-criteria evaluation frameworks to assess their socio-economic and environmental feasibility, identifying strategies to diversify income sources and improve the livelihoods of high-mountain communities. Through surveys and interviews with key stakeholders, such as small-scale producers and environmental authorities, the research explores mechanisms to strengthen knowledge appropriation and integrate these byproducts into sustainable value chains. Additionally, AI-based dissemination strategies will be implemented, leveraging interactive platforms to facilitate knowledge transfer to investors and producers. This approach aims to drive the sustainable valorization of Ericaceae byproducts, foster regional and international collaboration, and contribute to the transition toward resilient and sustainable production models in high-mountain ecosystems.

Keywords:

Ericaceae byproducts, socio-economic feasibility, sustainable valorization, highmountain ecosystems.

BALANCING WOOD PRODUCTION AND CARBON STORAGE IN FOREST LANDSCAPES AND HOLDINGS: USING OPPORTUNITY COSTS FOR FOREST OWNERS IN FINLAND

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Abstract text :

Declining forest carbon sinks require enforced or voluntary mechanisms so that private forest owners adopt management practices yielding climate and other environmental benefits. Effective instruments for conservation-promoting activities, including carbon sequestration, Payments for Ecosystem Services (PES) scheme provide financial compensation for ecological benefits their forests deliver. Existing PES programs such as METSO in Finland align carbon-friendly voluntary practices with biodiversity goals. Integrating carbon conservation into PES and optimizing conserved site selection within a defined budget can help ensure cost-effectiveness while maximizing biodiversity and carbon storage benefits. Another perspective examines how incentives align with forest owners' diverse forest management objectives and preferences. Because forest owners face opportunity costs (OCs) from delaying wood production in forests set aside as carbon storage, incentives should be pro rata with these OCs. These costs may differ depending on preferences and terms; short-term climate horizon refers to carbon neutrality by 2035 and long-term refers to until 2100. We explore synergies and trade-offs between carbon storage and timber production in forest management, focusing on PES schemes. Specifically, we examine compensation fees acceptable for forest owners with different preferences using the "utility loss compensative conservation fees" iteration approach. We study simulated conservation decisions producing the highest utility in terms of the forest owners' holding-level utility model. We evaluate conditions wherein participating in carbon conservation initiatives is rational for forest owners and assess OCs associated with carbon conservation at the holding level. We also examine how, via landscape-level optimization, ecological and economic outcomes of PES schemes can be enhanced.

Keywords:

Payment for Ecosystem Services (PES), Opportunity cost, Carbon conservation, Forest management, Landscape optimization.

STEERING BIOECONOMY THROUGH PEATLAND CONSERVATION: A POLICY REVIEW FROM RAMSAR TO THE NATURE RESTORATION LAW

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Abstract text :

Peatlands are embedded in a complex political and socioeconomic context, particularly when their protection and conservation conflict with traditional economic development. Despite their recognised potential to mitigate climate change, peatland pressures continue to grow, especially in the benefit of agriculture and forestry growth. Hence, a key question emerges: Are policies aligned to effectively prevent peatland degradation and promote restoration across sectors with different interests? In response, this work explores how peatlands are framed in the international political debate and how peatland-related policies at downscaling levels address them. We conducted a chronological review of intergovernmental declarations and treaties together with a policy analysis of European and Swedish regulations. From the adoption of the Ramsar Convention in 1971, international conventions have been urging for more than fifty years the limitation of activities involving peatland drainage, calling for the development of effective legislation to regulate their use and conservation. The European Nature Restoration Law opens a new window of opportunity for the legal adoption of restoration and rewetting measures. As it urges Member States to submit a National Restoration Plan, Sweden has an excellent opportunity to develop a tailored peatland restoration plan. However, more efforts should be put into forest peatlands, as is done for agricultural land, due to the tremendous value of these ecosystems for promoting the bioeconomy. Besides, more investment is required, especially towards technological-based solutions and combined restoration measures, such as rewetting and paludiculture, to reconcile conservation with sustainable use.

Keywords:

Peatland, restoration, climate change, bioeconomy, forestry.

TOWARDS STRONG SUSTAINABILITY FOREST SERVICES – DECISION SUPPORT FOR A MORE SUSTAINABLE FOREST USE

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Abstract text :

Sustainability transformation towards the paradigm of strong sustainability, i.e., operating within the planetary boundaries while being socially just, has proven to be challenging for the current socio-economic systems. A transformation to bioeconomy has been suggested as one solution to tackle these challenges. The following increased utilisation of bio-based resources such as forests can create new problems due to, e.g., degrading biodiversity. There are no decision-support services in the forest sector following the strong sustainability paradigm mainly due to the difficulty of detecting demand for these services and moving away from prevailing value creation logic, and the lack of expertise among forestry experts. This research project focuses on solving the lack of strong sustainability decision-support services which is done by 1) creating an innovative strong sustainability business model for forest services and 2) developing education for forestry experts to respond to the needs of the sustainability transformation. Based on existing literature and interview data, we will develop a strong sustainability forest service business model and analyse its practicality with forest service companies in real-life forest planning service encounters. We will also investigate the competence needs of forestry experts to provide such forest service. We hypothesise that through the strong sustainability business model, various sustainability challenges could be solved while providing new business opportunities for forest service companies. The value creation logic of these forest services should promote the well-being of nature and people beyond economic gains from wood production while considering the forest owners' objectives. Also, we hypothesise that the future expertise of forestry experts is two-fold, thus forest planning and operations should be seen through both ecological and traditional forestry lenses.

Keywords:

Forest service, decision support, business model, strong sustainability.

ENVIRONMENTAL COLLABORATION AND CONFLICT RESOLUTION (ECCR) NETWORK AND COURSE SERIES

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Abstract text :

In an era where environmental and social challenges are increasingly wicked problems, fostering collaboration and inclusive approaches to natural resource governance and circular based bioeconomy is more critical than ever. Since 2016, the ECCR network and course series promotes partnerships in environmental collaboration, conflict resolution, and responsive governance in the fields of natural resource governance, land management and green transition. The ECCR network has united universities, researchers and practitioners e.g. from Finland, Denmark, Indonesia, Tanzania, Uganda, Mexico and the United States to create an interdisciplinary platform for co-creating knowledge and skills. A core activity of the network is the ECCR course series, which gives students and practitioners the opportunity to combine theoretical foundations with realworld cases and engage in interactive exercises on multi-actor discussions, consensus-building, and mediation practices. By fostering collaborative learning, the ECCR contributes to sustainable environmental governance through initiatives such as UNESCO Man & Biosphere programme, Finland's National Action Plan on Youth, Peace, and Security, Finland's Africa Strategy, UniPID network and UEF's Global Development.

Keywords:

Environmental collaboration, conflict resolution, natural resource governance, global partnerships.

OPEN PLANNING FOR A CIRCULAR BIOECONOMY AT LOCAL AND REGIONAL LEVELS

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Abstract text :

In Japan, 57% of forests and nearly 100% of agricultural land are privately owned. This makes it challenging to plan sustainable land use at a regional scale for a circular bioeconomy. This study aims to develop a toolkit that facilitates consensus-building among agriculture, forestry, fisheries, secondary industries, local governments, and citizens as they plan a circular bioeconomy at local and regional levels. The "Ecosystem Service Map" visualizes the sustainable supply of biomass from local forests and farmland. It also incorporates mid- and long-term projections of climate change and its effects on hydrological regimes. The "Industrial Value Chain Map" presents existing biomass-utilizing industries, illustrating the processing and flow of biomass. Additionally, we will enhance the “Database of Bioeconomy Technologies” to showcase resource-cycling technologies that can be tailored to local challenges, increasing circularity and income generation. The actual process of promoting a bioeconomy involves financial and institutional challenges. We will analyze these challenges and collaborate with local stakeholders to develop solutions. This information will be made publicly available as a "Database of Good Governance". We are testing our approach in the Yoneshiro River Basin in Akita Prefecture, Japan. The area was historically known for its large natural cedar forests (*Cryptomeria japonica*), which supported a thriving timber industry. However, due to a prolonged downturn in the forestry sector, it is now struggling with low-quality cedar from planted forests.

Keywords:

Open planning, toolkit, local, Cryptomeria japonica.

MODELLING THE INTERCONNECTION BETWEEN INSTRUMENT DESIGN, ACCEPTANCE, AND EFFECTIVENESS/EFFICIENCY OF INCENTIVES

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Abstract text :

This study addresses the pressing issue of declining biodiversity in farmlands by exploring improved incentive structures for agri-environmental subsidies. Utilizing field data from stone fruit orchards in Spain, we integrate ecological and economic models to assess the effectiveness of targeted versus flat subsidies. Our research utilizes the H2020 SHOWCASE project data, incorporating bioindicators such as wild bees, spiders, and vascular plants' richness and abundance. By employing spatial modeling to upscale biodiversity field data, we identify optimal placements for flower strips and assess their impact on biodiversity. The economic analysis employs a cost-opportunity estimation framework to examine how incentive structures influence farmer acceptance and conservation effectiveness. We compare traditional flat-payment subsidies with targeted incentives that are linked directly to measurable biodiversity outcomes. Preliminary findings suggest that targeted subsidies, supported by robust monitoring, not only enhance biodiversity conservation but also improve the cost efficiency of conservation investments. Our scenario analysis evaluates alternative subsidy designs, offering insights into their potential impact on farmer participation and biodiversity enhancement. The expected results include high-resolution maps that display biodiversity indicators across different conservation scenarios, illustrating the impact of varied subsidy structures. By reducing uncertainty and better aligning payments with conservation outcomes, targeted incentives promise to enhance the effectiveness of conservation efforts, offering policymakers a way to maximize biodiversity within budget constraints and ensure long-term value for conservation investments.

Keywords:

Biodiversity incentives, spatial-economic modelling, conservation policy.

Group 2. Bioresource management and governance

BUILDING THE FOUNDATION FOR A REGIONAL BIOECONOMY: INTEGRATING FOREST BIG DATA AND MACHINE LEARNING TO PREDICT CEDAR FOREST HEIGHT AND GROWTH

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Abstract text :

To utilise forest resources sustainably, it is important to understand forest resources over a wide area and to assess the characteristics of each location. In recent years, the forestry sector has made rapid progress in shifting from paper data such as forest registers to digital data, and in developing high-precision data using airborne laser scanning (ALS), etc. The use of such digital data is essential for sustainable forestry and ecosystem management. On the other hand, there is still a gap between such big data and forestry sites. This study introduces the development of a technology for high-resolution prediction of tree height growth in Japanese cedar plantations using forest big data. A machine learning was used to quantitatively assess tree height data by ALS as a response variable, and forest age, climate and topographic factors as explanatory variables. Although there were errors in target regions due to data characteristics and unaccounted factors, tree height was estimated with high accuracy after bias correction. The importance of climatic and topographic factors differed significantly each regions. The model predicted canopy height for each 25m grid from 20 to 100 years, and then classified each grid into four growth types (high growth, late maturity, early maturity and normal) based on growth patterns. When several regions were studied, not only did growth rates and patterns vary each regions, but also the number of years required for tree height growth and attainment potential varied within the same region. The results of this study will provide the basis for studying location-specific forest planning based on highly accurate forecasts of planted forest growth in the region. In the future, it will be necessary to consider not only productivity, but also the combined consideration of land use and landslide risk, which are expenses related to harvesting and removal of trees.

Keywords:

Sustainable forestry, Site productivity, Machine learning, Airborne laser scanning.

BIOECONOMY IN COUNTRIES OF THE MEKONG REGION (THAILAND, VIETNAM, AND LAOS)

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Abstract text :

This study analyzed the status of the bioeconomy concept in Thailand, Vietnam, and Laos, focusing on government and industry perceptions, development barriers, and its reflection on official strategies. Using document analysis and an online survey, findings revealed that while the bioeconomy is linked to sustainability and the circular economy, a clear vision and dedicated strategies are lacking. Key barriers include limited awareness, insufficient state support, and low technological development. The study emphasizes the forest sector's role and calls for further research on economic valuation and greater policymaker involvement, particularly in Thailand and Vietnam.

- Bieoconomy in countries of the Mekong regions is an emerging concept.
- Official strategies on bioeconomy do not exist, the closest is the Thia Bio-circular green economy
- The first steps in development of the bioeconomy must be directed towards the sustainable use of natural resources.
- Forest bioeconomy is an essential and inseparable component of the bioeconomy.

Keywords:

South East Asia, Sustainable development goals, Forest strategies.

TRANSATLANTIC INNOVATION NETWORKS IN FOREST-BASED BIOECONOMY: NAVIGATING POLYCRISIS WITH THE QUINTUPLE HELIX MODEL

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Abstract text :

The "polycrisis" concept introduced by Morin & Kern (1999) highlights the complexity of overlapping global crises such as biodiversity loss, climate change, and social inequalities. Addressing these challenges requires systemic, multidisciplinary approaches and robust innovation networks that unite diverse stakeholders—governments, businesses, academia, civil society, and the environmental sphere. This research explores transatlantic innovation networks in the forest-based bioeconomy (FBE), focusing on the Finnish-American Research & Innovation Accelerator (FARIA) network. Finland's advanced forest management and sustainability initiatives complement the U.S.'s technological expertise and industrial scale, offering a unique opportunity for knowledge exchange and co-creation of innovative solutions. This study employs the Quintuple Helix Model and Network Innovation Theory (NIT) to explore how multi-sectoral partnerships—academia, industry, government, civil society, and the environmental sphere—drive sustainable innovation and facilitate the transition to a bio-based economy. The research adopts a mixed-methods approach, combining Social Network Analysis (SNA) to map knowledge flow and collaboration, participatory foresight methods like solution scanning, and the Implications Wheel® to assess the long-term cascading effects of collaboration strategies. Additionally, a systematic framework is developed to evaluate network strategies and their potential impact on societal transformation and sustainability. By examining stakeholder roles and interactions, this research enhances understanding of how transatlantic collaborations can drive transformative innovation in the FBE. The findings will provide insights into the institutional and ecological contexts shaping sustainable innovation processes, contributing to scalable solutions for global sustainability challenges.

Keywords:

Transatlantic collaboration, Forest-based bioeconomy, Quintuple Helix Model, Innovation networks, Sustainability transitions

SOCIAL INNOVATION AS CATALYST FOR A SUSTAINABLE BIOECONOMY - MAPPING THE BIOECONOMY ECOSYSTEM ACROSS TEN EUROPEAN REGIONS

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Abstract text :

The transition to a circular bioeconomy (CBE) is a key driver of sustainable economic development, reducing reliance on fossil-based resources while enhancing regional resilience. Beyond technological advancements, social innovation plays a crucial role in fostering systemic change by engaging local communities, promoting sustainable business models, and enabling knowledge co-creation (Ayob et al., 2016; see also Friedrich et al., 2022; Gallie, 1956; Marques et al., 2018; Slee et al., 2021). This study presents the development of a comprehensive CBE ecosystem map covering ten European regions: Plovdiv (Bulgaria), Pannonian (Croatia), North Aegean (Greece), Campania (Italy), Podkarpackie (Poland), Centru (Romania), Vojvodina (Serbia), Nitra (Slovakia), the Western Balkans, and the Carpathian region (Ukraine). The regions differ significantly in terms of ecosystems, economic structures, and circular bioecon-omy best practices. The regions represent a variety of geographic and climatic conditions, from Mediterra-nean coastal areas to continental and mountainous landscapes, leading to diverse bio-based value chains. To identify and investigate the link between bioeconomy and so-cial innovation, we use data from the CORDIS database as well as expert-driven in-puts gathered through a structured survey conducted in each of the ten regions to identify key stakeholders, sectoral synergies, innovation hotspots, policy frameworks, core functions and best practices within the ten regions.

Our findings serve as a support tool for regional stakeholders, including businesses, research institutions, policymakers, and civil society, to optimize bioeconomic value chains and leverage circular economy principles effectively.

Keywords:

Bioeconomy, social innovation, ecosystems, networks.

GIVE A CLEAR AND CONCISE TITLE TRANSFORMATIVE EXPERIENCES: ROLE OF FINNISH COMPANIES AND SERVICE PROVIDERS

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Abstract text :

This study enriches the understanding of how transformative experiences are explored from a company and service provider perspective and focuses especially on how their development can be designed and facilitated for consumers. The purpose of this study is to increase understanding of transformative experiences from a service provider perspective and evaluate the status of transformative experiences research and its focus areas within the tourism context. The study contributes to bioecological scientific research by emphasizing key areas for future studies to further explore the role of Finnish companies and service providers in providing sustainable experiences that leads to consumers' positive transformative outcomes.

The study employed an online survey collected from Finnish and German consumers based on their motivations and interest in experiences offered by Finnish companies and service providers This study is directly aligned with Sustainable Development Goal (SDG) 12: Sustainable and Responsible Consumption (from a consumer perspective). It is also aligned with Finland Tourism Strategy 2019-2028 regarding sustainability and business development of the tourism sector and contributes to the Sustainable Travel Finland (STF) program launched by Visit Finland which addresses sustainable consumption.

The societal relevance of this study is the potential pro-environmental and pro-social benefits of mindful consumption in Finland (resulting from transformative tourism experiences) for the Finnish society, environment, and economy.

Keywords:

Transformative Experiences; Finnish Companies; Service Providers; Consumers' Positive Transformation.

BRIDGING THE GAP: TRANSITION INTERMEDIARIES AS CATALYSTS OF THE ITALIAN SUSTAINABLE TRANSFORMATION

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Abstract text :

The sustainable transition is progressing steadily, but given the consequences of the climate crisis, there is an urgent need to speed up the process. The transition is not just about using nature-based and circular methods in production. Rather, it also requires the implementation of regulatory policies, stakeholder collaboration, and shifts in certain social behaviors. Transition intermediaries (TIs) are key players, as they are equipped with a diverse set of tools for overcoming bioeconomy barriers. As a reference for the TIs' services, we chose a private-public research center based in the Tuscany region of Italy. We contemplate the added value of TIs through a qualitative and quantitative research study performed with national sustainability stakeholders. This research uses a multi-level perspective (MLP) to examine Italy's transition, highlighting the performance of TIs in five crucial areas: Demonstration, Transdisciplinary perspective, "Bottom-up" approaches, Targeted communication, and Brain drain control. Together, these elements create a holistic framework for accelerating the sustainable transformation and building a more resilient, equitable, and environmentally conscious future, where the existing gaps are merged through the increased awareness and involvement of all activity sectors.

Keywords:

Transition intermediary (TI) – Sustainable transition – Technology transfer – Multi-level perspective (MLP) – Italian bioeconomy.

SOBIO: FACILITATING NETWORKING AND SOCIAL SCIENTIFIC RESEARCH EXPERTISE FOR AN INCLUSIVE AND CIRCULAR BASED BIOECONOMY

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Abstract text :

Social Scientific Biosociety Research Network (SOBIO) at UEF is a multidisciplinary research network, bringing together scholars from a variety of disciplines to study the socio-spatial aspects of circular based bioeconomy related processes. The network includes scientific expertise reaching from environmental policy, business studies, law, human geography, forestry, to sociology. SOBIO rests on a rotating coordination structure including departments at both the Faculty of Social Sciences and Business Studies and the Faculty of Science, Forestry and Technology to assure a truly multidisciplinary and evolving focus. A strong focus of the network is to support early researcher training of PhD students and Postdoctoral researchers, to foster their professional networks and to provide feedback that spans across disciplines. This cross-disciplinary approach including scientists and practitioners is seen as a requirement by SOBIO to address and study the complexities of bioeconomy development that unfold in variegated socio-spatial contexts, include a variety of potentially conflicting interests, and involve a myriad of localities and socio-economic processes. While SOBIO is rooted at UEF, it is actively engaging and integrating national and international partners and functions as a one stop contact point at UEF to tab into a myriad of social scientific bioeconomy research expertise. Its activities, such as the annual SOBIO Days, are always a forum to extend collaboration and network reach by welcoming young researchers and accomplished experts in the field from institutions around the globe.

Keywords:

Bioeconomy, social sciences, circularity, network

Group 3. Bioeconomy policies and stakeholders

BRIDGING BIOECONOMY GAPS: EMPOWERING LOCAL STAKEHOLDERS FOR BUILDING PLACEBASED BIOECONOMY STRATEGIES

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Abstract text :

Drawing on findings from 2 Horizon Europe projects, the poster explores challenges and opportunities of the multi-actor approach as an enabler for developing place-based bioeconomy strategies at the regional scale (Dolge et al., 2023). Using a qualitative methodology, including participatory observations and surveys, this study examines main outputs stemming from:

- BIOMODEL4REGIONS, which developed bio-based economy blueprints for 6 Pilot Regions (in the Netherlands, Slovakia, France, Sweden, Italy and Western Macedonia) with the aim of exploiting the different local potentials in terms of feedstocks, infrastructures, production and investment.
- RuralBioUp, which established Action Plans for 9 Regional Bioeconomy Hubs in rural areas (in Italy, France, Ireland, the Czech Republic, Latvia and Romania) with the intention to plan and implement concrete activities contributing to scaling-up local bioeconomy solutions.

Both projects demonstrate how stakeholder participation shapes bioeconomy development by tailoring strategies to local needs, identifying challenges and opportunities across Europe (Bremmers et al. 2013). The study also explores how crossEuropean collaboration can reduce or deepen these gaps (EC, 2020). The poster highlights key dynamics in regional bioeconomy strategies and mechanisms for moving from stakeholder engagement to collective action. The results offer pathways to strengthen co-design and empower local actors, promoting a more effective multi-actor approach. Through the development of policy recommendations, these insights will contribute to the 2025 EU Bioeconomy Strategy.

Bremmers H. J. et al. (2013) Multi-stakeholder responses to the European Union health claims requirements, Journal on Chain and Network Science, 13(2).

Dolge K. et al.(2023) A Comparative Analysis of Bioeconomy Development in European Union Countries. Environmental Management 71(2).

EC (2020) How the bioeconomy contributes to the European Green Deal, Publications Office.

Keywords:

Bioeconomy, multi-actor approach, European collaboration, EU bioeconomy strategy, Horizon Europe.

ENHANCING KNOWLEDGE TRANSFER AND SKILLS DEVELOPMENT FOR CIRCULAR BIOECONOMY GROWTH IN CENTRAL AND EASTERN EUROPE

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Abstract text :

For the health and welfare of people and the planet, there is an urgency to transition from linear and fossil-based systems to a circular bioeconomy. Central and Eastern European (CEE) countries face unique challenges in developing the necessary skills and knowledge transfer mechanisms to fully participate in the bioeconomy transition. In the CEE2ACT project, we created support for ten CEE countries in the development of actionable national bioeconomy implementation roadmaps, specifically for developing embedded 'Knowledge Agenda Chapters.' The approach centralized knowledge transfer and skills development support to bioeconomy hubs (bottom-up networks) via structured collaborations. Key activities included the bottom-up prioritization of country-disaggregated knowledge and capacity challenges, the creation of a knowledge transfer strategy approach, and needs-based matchmaking between stakeholders. The results include general findings and country-specific priorities for further building bioeconomy knowledge and skills development. Crosscutting results include: 1) increasing public and political awareness about bioeconomy opportunities; 2) fostering multi-actor collaborations for innovation; 3) improving access to financing mechanisms; 4) accelerating technical knowledge transfer; 5) streamlining governance to support bioeconomy growth; and 6) strengthening education and training for human capital development. Key priority areas per country vary, and include cross-sectoral and multi-actor collaborations (Bulgaria, Croatia, Poland, Slovakia); increasing policy prioritization and public awareness of bioeconomy benefits (Czechia, Hungary, Romania, Serbia); and investing in innovation, research, and development (Greece, Slovenia). Accessing financing is relevant to all countries. These results support the further development of actionable 'Knowledge Agenda Chapters' in the national implementation roadmaps for bioeconomy growth.

Keywords:

Capacity building, sustainable transition, biobased, multi-actor approach, collaboration.

UNLOCKING BIOECONOMY POTENTIAL: COLLABORATIVE OPPORTUNITIES FOR TÜRKIYE AND THE EU

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Abstract text :

The transition to a sustainable bioeconomy offers a strategic opportunity for Türkiye and the European Union (EU) to enhance economic resilience, reduce environmental impact, and drive green innovation. Türkiye's rich biodiversity, strong agricultural sector, growing biotechnology sector and strategic geographical position provide a strong foundation for bioeconomy development, yet challenges such as regulatory gaps, limited infrastructure, and weak entrepreneurial support persist. Collaboration with the EU can address these barriers while strengthening Europe's bio-based value chains, industrial production, and circular bioeconomy initiatives. Using a qualitative mixed-method approach, our research combines literature and policy analysis, expert consultations, and in-depth interviews with key stakeholders from academia, industry, and policymaking. The research aim is to explore how enhanced collaboration between the EU and Türkiye can support the development of a sustainable bioeconomy, fostering mutual benefits through knowledge exchange, research partnerships, and innovation networks. Findings indicate that while Türkiye has made progress in bioeconomy-related policies, stronger coordination and stakeholder engagement are needed to maximize impact. EU-Türkiye collaboration presents an opportunity to leverage the EU's expertise in bioeconomy governance, sustainable innovation, and circular value chains, while also benefiting from Türkiye's dynamic agricultural and biotechnological sectors. By strengthening research collaboration, policy dialogue, and joint initiatives, both regions can accelerate their bioeconomy transitions in line with global sustainability goals. The establishment of structured cooperation frameworks, such as bilateral innovation projects, capacity-building programs, and knowledge-sharing platforms, will be crucial for fostering a resilient and inclusive bioeconomy.

Keywords:

European Union, Türkiye, bioeconomy strategy, cooperation, sustainable development.

BIOECONOMY AND TRADE: A SYSTEMATIC LITERATURE REVIEW

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Abstract text :

The global spotlight on the bioeconomy, notably seen through platforms like the Global Bioeconomy Summits (GBS), highlights its significance. Yet, the diverse interpretations of 'bioeconomy' across regions create discrepancies, impeding streamlined regulation and oversight. This review aims to address the dearth of research on global bioeconomy trade by examining sustainability, innovation, and the intricate dynamics of geographical and sectoral trade. Safeguarding socioenvironmental sustainability is paramount within the bioeconomy. However, the predominant focus of bioeconomy seems to be on substituting traditional capital with bio-based alternatives (weak sustainability approach) and it raises concerns about potential overexploitation trends, undermining prospects for an equitable sustainable transition. The emergence of new comparative advantages may inadvertently foster resource overexploitation, posing threats to climate mitigation and global food security, particularly impacting vulnerable countries and emerging economies disproportionately. Understanding the nexus between international trade, agriculture, and bio-based products becomes imperative to safeguard food security. Nonetheless, fostering bioeconomy trade could stimulate innovation, facilitating technology sharing to enhance resilience and address climate challenges. However, nurturing innovation ecosystems demands substantial cross-sector investments and collaborations. Furthermore, the inequality in access to technology and innovation between developed and developing countries poses a significant challenge. Through a systematic assessment of existing literature, this review seeks to unravel the complexities of the bioeconomy and explore potential pathways within global trade, with a particular focus on the Mediterranean Region.

Keywords:

Bioeconomy, Trade, Innovation, Comparative Advantage, Systematic Literature Review.

BISC-E AUSTRIA: EMPOWERING STUDENTS IN THE BIO-BASED ECONOMY

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Abstract text :

The Bio-based Innovation Student Challenge Europe (BISC-E) is a Europe-wide student competition coordinated by the Bio-based Industries Consortium (BIC) to foster entrepreneurship, innovation, and excellence in the bio-based economy. The competition challenges students to develop solutions that contribute to a sustainable, climate-neutral Europe, raising awareness of challenges and opportunities within the bioeconomy for students, academia, and industry stakeholders. BISCE also promotes cross-sectoral partnerships, academia-industry interactions, and student-centred innovation. Open to Bachelor, Master, and first-year PhD students (EQF Level 7), BISC-E invites interdisciplinary teams to design biobased products or processes addressing technological, environmental, or societal issues, wholly or partially derived from renewable biological sources. Participants engage in challenge-based learning, gaining hands-on experience in solutionoriented innovation at both national and European levels. In 2025, Austria will join BISC-E for the first time, coordinated by the Centre for Bioeconomy at BOKU University and BIOS Science Austria. Austrian teams will compete at the national finals in May 2025, where their innovations will be evaluated by a jury of industry and academic experts based on sustainability, technical feasibility, and economic viability. The winning team will represent Austria at the European Finals in September 2025. Our poster will showcase Austria’s top innovation aiming to further motivate young researchers and entrepreneurs. BISC-E fosters strong industry collaboration, with BIC members and industry partners providing real-world challenges, expert insights, and financial support. By bridging academia and industry, BISC-E enhances bioeconomy competence, creates career opportunities, and nurtures a thriving innovation ecosystem.

Keywords:

Bio-based economy, Student innovation, Academia-industry collaboration.

STRENGTHENING AGRICULTURAL INNOVATION IN THE BIOECONOMY: INSIGHTS FROM OPERATIONAL GROUPS IN ITALY AND FRANCE.

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Abstract text :

The European bioeconomy relies on sustainable agricultural innovation to enhance resource efficiency, reduce environmental impact, and strengthen rural economies. The EU's Common Agricultural Policy (CAP) and its support for Operational Groups (OGs) under the EIP-AGRI framework play a critical role in facilitating this transition. However, the success of these initiatives depends on the alignment between policy frameworks and the regional agricultural environments where they are implemented. This poster examines how CAP regional policy frameworks, institutional support, and stakeholder engagement shape the adoption of innovations by the Italian and French primary producers. Through a mixed-method approach combining surveys, in-depth interviews, and policy analysis, we investigate the barriers and enablers of innovation uptake among Operational Groups' members with a focus on farmers and project coordinators. Preliminary findings highlight that access to digital infrastructure, targeted financial incentives, and knowledge-sharing networks are critical for successful innovation development and adoption. By gaining a deeper understanding of these regional environments, our research aims to identify opportunities for enhancing policy effectiveness in promoting bioeconomy-driven agricultural innovation. Strengthening the link between CAP measures and regional implementation strategies could support more tailored and impactful policy interventions. Ultimately, this study aims at contributing to the broader discourse on how European policies can drive sustainable innovation, ensuring that the bioeconomy transition is inclusive, effective, and regionally adaptive with a stronger involvement of primary producers.

Keywords:

Bioeconomy, Agricultural Innovation, Common Agricultural Policy, Operational Groups, Regional Policy Adaptation.

YOUTH INVOLVEMENT IN THE EUROPEAN BIOECONOMY UNIVERSITY ALLIANCE

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Abstract text :

The sustainable development of the bioeconomy requires the active participation of Youth, as the young generation will be most exposed to the consequences of today's decisions. Therefore, it is important for Youth to be represented as active stakeholders at all levels of the bioeconomy, from education to decision-making. Through a collaborative partnership of universities, the European Bioeconomy University (EBU) Alliance seeks to promote the transition to a sustainable bioeconomy by bridging disciplines and connecting students, researchers, and professionals through education, research, and innovation, focussing on training a new generation of experts within the bioeconomy. Since participatory approaches in pedagogy lead to higher student engagement and a sense of ownership, these strategies should be employed within the EBU to create a culture of Youth involvement. Institutional initiatives that foster Youth participation, such as funding opportunities, mentoring programs, or the creation of Youth advisory boards, are needed. This work examines the EBU Alliance's strategies to engage Youth in shaping educational, research, and innovation processes. Furthermore, internal governance and decision-making processes are evaluated regarding Youth involvement. We analyse performance indicators and strategy papers and conduct interviews with diverse EBU members. The findings are expected to inform actions for improving Youth engagement strategies, highlighting pioneering initiatives and challenges. Ultimately, fostering Youth involvement within the EBU Alliance and the broader bioeconomy community is essential for designing and implementing a sustainable bioeconomy.

Keywords:

Youth participation, bioeconomy, university partnerships.

BOOSTING CIRCULAR BIOECONOMY TRANSITION WITH AN INTER-REGIONAL OPEN INNOVATION PLATFORM - BIOBOOSTERS HACKATHON

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Abstract text :

BioBoosters – Boosting Circular Transition' project has offered a unique co-operation opportunity for nine regions with smart specialisation strategy on circular transition of bioeconomy sectors. The project connected these regional innovation systems across the Baltic Sea Region to joint open innovation platforms, BioBoosters hackathons, tackling business-driven circular transition challenges. After intense, international, and iterative two-year piloting, the BioBoosters are ready to share our conclusions on the lessons learned on the impact of the inter-regional business-driven BioBoosters hackathon model on the circular bioeconomy transition. Our analysis is based on a dataset including 18 recent circular bioeconomy transition challenges collected from companies of the bioeconomy industries from nine regions in the Baltic Sea Region countries (Finland, Sweden, Germany, Poland, Estonia, Latvia & Lithuania) in 2023-2025. Challenges represent agri-food system, forest-based bioeconomy, and bioenergy fields. As shown by the data, BioBoosters hackathon has potential to speed and strengthen the circular transition of the bioeconomy sectors in the rural areas of the Baltic Sea and beyond. Biobased businesses are well positioned to join, support, or even lead the transition to circular economy business models that are vital to building climate neutral societies. However, especially in the traditional bioeconomy companies in rural regions, there remains several challenges hindering the uptake and full-scale leveraging of the circular economy business models. These include lack of access to talent, expertise, networks, and innovation assets in the rural innovation ecosystems. Co-operation and cross-sectoral expertise are essential for addressing these challenges, and the rural bioeconomy companies are also shown to be open to inter-regional co-operation to respond to these challenges.

Keywords:

Circular economy, bioeconomy, smart specialisation, open innovation, hackathon.

PILOTING AN INTERACTIVE HORIZON SCANNING OF THE FOREST BIOECONOMY IN FINLAND

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Abstract text :

Horizon scanning is a combination of foresight methods to systemically detect, collect, and process futures information such as weak signals of change. In forest bioeconomy organizations, horizon scanning is not widely used, although it can aid decision-making by anticipating future developments. This project piloted interactive horizon scanning to test how futures information can be collected and processed in collaboration with forest bioeconomy stakeholders and academia. The project was divided into three steps: First, an international panel of experts in the forest bioeconomy and in foresight provided their views through a two-stage Real-Time Delphi method on how to identify and interpret weak signals of change affecting the forest bioeconomy. In the second phase, an exploratory, one-time horizon scanning campaign was conducted to collect signals of change with a regional scanning team consisting mainly of Finnish forest bioeconomy experts from outside academia. In the last step, the Implications Wheel® method was used to find possible consequences for the collected signal and to enhance competencies of forest bioeconomy experts to better respond to futures information provided by signals of change. The pilot has shown that there is interest in interactive and open horizon scanning in the Finnish forest bioeconomy. However, the project shows that the futures capacity of forest bioeconomy stakeholders is not yet at a sufficient level, which can, however, be developed by conducting horizon scanning within organizations. Another recommendation is to expand interactive horizon scanning to a wider range of stakeholders across Europe to promote international collaboration and skills.

Keywords:

Forest bioeconomy, Foresight, Futures, Interactive Horizon Scanning, Signals of change.

SHAPINGBIO: ENGAGING STAKEHOLDERS TOWARDS A SUSTAINABLE BIOECONOMY

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Abstract text :

Effective stakeholder engagement is key to achieving sustainability, resource efficiency, and economic inclusivity. In particular, the transition to a sustainable bioeconomy requires active participation from diverse stakeholders. This engagement happens through multi-stakeholder platforms and cross-sectoral collaborations, public-private partnerships, and transparent communication, ensuring all voices are heard in decision-making. In order to achieve that, ShapingBio (EU funded project) dedicated one of its main pillars to the promotion of co-creation processes in the bioeconomy sector. Among others, stakeholders have been included in the testing and validation process to ensure effective and high-quality recommendations to be shared with the European Commission. In particular, two events in the last few months focus on how to ensure that underrepresented voices are raised. The online workshop, "Powering Stakeholder Engagement and Communication for Bioeconomy", explored whether engagement format influences the quality of insights. Experts from EU-funded projects found that engagement goes beyond gathering voices; it involves creating conditions for mutual knowledge exchange: tailored activities and concrete takeaways empower stakeholders, especially underrepresented groups like grassroots organizations, local and/or indigenous communities, and small-scale bioeconomy actors. A few months later, an in-person meeting with environmental NGOs in Brussels confirmed that trust-building and tailored participation are preconditions for actionable insights. Throughout the meeting, activities encouraged open dialogue and peer-to-peer exchange, ensuring a cross-national perspective on bioeconomy governance that helped refine initial findings and co-developed strategies to integrate their voices into EU policy. Implementing a participatory approach since the project's planning phase, allowed NGOs (often seen as peripheral in policy formulation) to emerge as key knowledge brokers.

Keywords:

NGOs, Bioeconomy Governance, Participatory Processes, Underrepresented Stakeholders, Co-Creation Strategies.

REGIONAL BIOECONOMY - OPPORTUNITIES FOR A SUCCESSFUL TRANSFORMATION

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Abstract text :

Strengthening regional and international collaboration is essential for accelerating the bioeconomy transition, fostering cross-sectoral, cross-disciplinary and multi-stakeholder innovation, and building the skills needed for a sustainable future. The regionalization of the bioeconomy provides a structured and scalable framework for transitioning regions into circular bioeconomy model regions. By integrating biological, economic, and social innovation with regional characteristics, this approach empowers stakeholders from academia, education, industry, and policy to co-develop solutions to drive sustainable growth, job creation, and climate protection. Rooted in systemic thinking, this framework links the entire regional bioeconomy system which consists of e.g. natural resources, technologies, and markets with multi-stakeholder innovation processes. Originating from the Bioeconomy Science Center (BioSC) and further developed by BioökonomieREVIER at Forschungszentrum Jülich, it serves as key enabler for transforming e.g. a lignite-dependent region like the Rhenish Mining Area in Germany into a circular bioeconomy. Here, academia-industry collaborations foster new bio-based value chains, such as the cascade utilization of safflower and industry-driven plant-based fiber production. As part of the European BIO2REG project, the regionalization concept has been refined to support regions at different stages of their bioeconomy journey. Through stakeholder engagement, cross-disciplinary collaboration, tailored tools, and co-developed transition pathways, BIO2REG supports regions to translate macro-level strategies into actionable regional solutions. This replicable framework empowers regions to become key drivers of a competitive and sustainable European bioeconomy.

Keywords:

Regionalization, Bioeconomy Transition, Multi-Stakeholder Innovation, Sustainable Growth, Cross-Sectoral Collaboration.