

Book of Abstracts

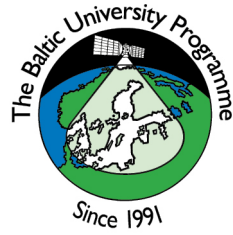
BUP Symposium 2023



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Oral presentations given at the
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This issue of the Book of Abstracts contains 45 abstracts from oral presentations held at the BUP Symposium 2023. In total there are 73 authors of the presented abstracts. The contributors are colleagues at [BUP participating universities](#).

The BUP Symposium in short

A platform where the regional educational and research communities can come together and get to know their colleagues at BUP participating universities. The Symposium is an arena where you can disseminate recent research and where new discussions and collaborations can begin. The Symposium feature oral presentations connected to the 10 BUP themes. This event is an opportunity to establish new contacts in a related field in different countries and universities; internationalisation in practice.

Editor

Adam Söderberg

Useful links

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Content

Session 1 - Closing the loop - Circular Economy in the Baltic Sea Region	6
Enabling Circular Economy Principles through Open Innovation in Companies	7
The valorization of industrial sulfur waste by synthesis of copper sulfide and the application products in waste water treatment	9
Policy actions for the post-war circular recovery of Ukraine	11
Buckwheat groats industry waste: analysis and remade into nature-friendly fertilizers	12
Local production: a path towards circular economy? Potential and barriers	13
ESG transformation of companies and supply chains - survey results	14
BALTIPLAST Project: Baltic Approaches to Handling Plastic Pollution under a Circular Economy Context	16
Circularity of logistics packaging in supply chains	18
Challenges of Household Food Waste Sorting: A Lithuanian Case Study	19
Session 2 - Sustainability literacy - Education for a Sustainable Baltic Sea Region	21
Trends of Soft Skill Integration into STEM Curricula in the Lithuanian Higher Education System	22
Teaching Economics of Climate Change to Master's Students in Journalism, an Experience of Interdisciplinary Dialogue	24
Physical Macroeconomics as a New Educational Course for Sustainable Development and Empirical Analysis	25
Designing the "Farm-to-school" model in Baltic countries: implications from the empiric research and further directions	26
Promoting Sustainability through the Assessment of Ecosystem Services	28
Humanistic education of engineers in the light of sustainable development goals	29
Media Literacy for Manipulative Resistance	30
Development of Green Skills and Eco-Conscious of Students	31
Session 3 - Cities, towns and rural lands - changing urban and rural landscapes in the Baltic Sea Region	33

Mathematical graph theory-based modelling of urban multi-functionality and multi-functionality compass as a tool for analysis, city planning and decision making _____	34
How to manage cities sustainably? Action nets & climate adaptation _____	35
The City of Stockholm and the City of Gdańsk: Two Urban Strategies to Reach the One Goal of Sustainable Development _____	36
Land use/land cover change modelling to address climate change impacts _____	37
Socio-oeconomical determinants of the location of the building of early medieval strongholds in south-eastern Poland _____	39
Housing policy challenges in cities, towns and rural areas. Evidence from Poland _____	40
Towards a sustainable university campus – from bottom-up initiatives to strategic planning and a campus living lab _____	41
Ageing in Cities _____	42

Session 4 - Paths of water, understanding the hydrology and water of the Baltic Sea Region 43

Water resources of the territory above Kakhovka after the explosion of the Kakhovka Hydro Power Plant _____	44
Detection of non-steroid anti-inflammatory drugs in water using dendrimer-coated silica as sorbent _____	46
Sedimentation conditions in Sulejów Reservoir on Pilica River explained by hydrodynamic modelling _____	48

Session 5 - Mitigating emissions in the energy systems - Reducing climate change impacts in the Baltic Sea Region _____ 50

Making wind energy greener _____	51
Water Splitting Using Disordered Multiphase Manganese Oxides for Modern Energy Systems	52

Session 6 - Labour, Human Rights and Accessibility - perspectives on social sustainability in the Baltic Sea Region _____ 53

How sustainable work can improve women’s employment beyond the statutory retirement age under gender inequality in the public pension system? _____	54
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Employee resilience: an emerging field of research in the era of environmental disruptions	56
Session 7 - Flows, transports, and movements - Sustainable mobility from the perspectives of the Baltic Sea Region	58
Evaluation of an intervention model for the promotion of sustainable mobility	59
The problem of delays in the implementation of railway investments in Poland in the context of infrastructure availability – social perspective	61
Modeling of Port Organizational Ecosystem's Resilience in the Conditions of Market Uncertainty	62
European experience in ensuring of Sustainable development of civil aviation	63
Sustainable urban mobility from the students' perspective: how to foster behavioural changes while teaching	64
Use of lightweight materials for vehicles to reduce fuel consumption	66
Session 8 - Climate Change impacts and adaptations - Understanding the present and future climate crises in the Baltic Sea Region	67
Sustainable Development of Society: Formalization, Models and Applications	68
Architecture design process with Life Cycle Assessment and Building Information Modelling	69
Session 9 - Feeding a region in transition - Agricultural lands, sustainable food production and consumption in the Baltic Sea Region	70
“Prophybiotics” for controlling the Salmonella infection in broiler chickens	71
Agricultural Land Abandonment: Case of Estonian Semi-natural Grasslands	73
Different Approaches to CO2 Labeling in Café/Restaurant Menus	74
Carnism as a key factor of an unsustainable and unequal food system	75
Session 10 - Sustainable Tourism	76
Environmental management skills for tourism jobs of tomorrow	77
Affiliations of authors of abstracts presented at the BUP Symposium 2023	78

Session 1 - Closing the loop - Circular Economy in the Baltic Sea Region

Moderator: Natalija Cudecka-Purina, BA School of Business and Finance

Enabling Circular Economy Principles through Open Innovation in Companies

Inga Uvarova & Dzintra Atstaja

Abstract:

Despite the increased environmental pressures, companies have not proactively embraced circular economy principles. Companies are motivated by economic reasons to achieve resource efficiency that in large extent has the positive environmental impact. Yet, companies are less active in innovating new business models adopting such circular economy principles as reuse and use longer that require collaboration. Open innovation offers the potential to stimulate circularity by accelerating the infusion of novel ideas and expertise beyond in-house capacities. There have been limited studies examining the interplay between open innovation and the adoption of the circular economy within companies. This study aims to fill this gap by employing both qualitative methods (interviews, case studies) and quantitative methods (statistical analyses of a survey involving 498 companies of the Eurobarometer FL498 survey). This study investigates the situation of Latvian companies although results can be replicated to other countries. The interpretation of results of the statistical analyses is seen as the methodological novelty that can be transferred for future studies in other countries. There are 2 research questions: Q1) What circulation principles are employed by companies and how their application is interrelated with the open innovation; Q2) Which of the open innovation cooperation partners are the most significant in the application of circular principles in companies? The results reveal that companies rely on own resources and are not intended to use external resources within circular innovations. In adoption of circular economy principles, companies are motivated by the economic resource to achieve resource efficiency. Companies are less active in implementing circular principles such as reuse, use longer or reverse logistics. As regards external expertise, companies are motivated by state support organisations and green suppliers to adopt circular economy principles.

Keywords: circular business, circular economy principles, open innovation, sustainable value

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The valorization of industrial sulfur waste by synthesis of copper sulfide and the application products in waste water treatment

Gabriele Sarapajevaite

Abstract:

A considerable amount of waste is produced in the production of sulfuric acid during the melting and filtration of elemental sulfur (S). Even though 86 % of the latter waste is still S, the by-product is not recycled due to the high amount of impurities and consequently cost-effective treatment procedure, leading to the waste being stored in landfills. Therefore, this research aims to valorize industrial sulfur waste by synthesizing high-value products and to explore the possibilities of produced products in the wastewater purification field. In particular, sulfur waste was used as raw material in the synthesis of copper sulfide under sustainable conditions. Furthermore, the properties of waste-based synthesized samples showed comparative functional properties as the samples produced from commercial sulfurizing agent, consequently demonstrating the industrial waste to be a valid raw material in copper sulfide synthesis. In addition, the produced waste-based CuS was used as a photocatalyst in a biopolymer poly(hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) based composite. The latter samples were tested for degrading model pollutants of waste water such as tetracycline and methylene blue under irradiation of visible light. The results revealed that the waste-based PHBV/CuS composite can degrade organic molecules within 180 min of photodegradation and also be reused at least 5 times with minimal loss of photocatalytic efficiency. Most importantly, the developed waste water remediation method not only suggests a sustainable approach but also proposes a solution to many problems currently occurring in water treatment.

Keywords: sustainable raw materials, eco- friendly synthesis, waste management, polymer composites

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Policy actions for the post-war circular recovery of Ukraine

Olena Maslyukivska

Abstract:

Post-war recovery of Ukraine will generate a massive demand for construction materials. Their extraction and transportation will create significant pressure on the natural environment and generate additional pollution. This demand can be reduced via recycling construction debris. Academic literature recognizes that a comprehensive and effectively implemented set of policy actions is the most impactful catalyst for the transition to a circular economy. The goal of the research is to analyze current key policies, strategies and visions influencing Ukraine's post war circular recovery and identify gaps and priority policy actions. Existing research highlights that the most effective actions and policies to support the transitioning to circular economy are: waste related taxes promoting waste reduction, green public procurement (GPP), emission trading scheme (ETS) (carbon market), eco-design regulations/incentives, material flow accounting, customs tariffs on primary raw material imports, legal guarantees (on products) and VAT. Eco-industrial parks and circular trading platforms create enabling physical and virtual infrastructure. This study presents the analysis of the Ukraine's regulatory framework and its readiness for the post-war recovery using the principles of circular economy. It concluded that the most advanced progress has been made in the area of the ETS and GPP. On 9 July 2023, the Law "On Waste Management" dated 20 June 2022 entered into force. It created a foundation for the waste taxes reform. The study also analyses the pre-conditions and likelihood of implementing other recommended instruments. It also shows that the work eco-industrial parks and circular trading platforms has been accelerated by the local organizations.

Keywords: circular economy, circular public procurement, circular recovery, Ukraine

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Buckwheat groats industry waste: analysis and remade into nature-friendly fertilizers

Odeta Pociene & Rasa Šlinkšiene

Abstract:

Soil degradation due to inappropriate use of concentrated mineral fertilizers is one of the most important problems in the world. Since it is impossible to get abundant, high-quality yield without fertilizers, it is necessary to develop new nature-friendly fertilizers. For the creation of such fertilizers, it is suitable the waste from food industries. Results shows that one of these is the buckwheat groats industry (BGPI), which generates a large different waste containing plant nutrients: buckwheat husks (BH) contain 3.24–3.27% N, uncleaned buckwheat (UBB) – 3.36–5.42% N, and buckwheat husk ash (BHA) – up to 5.84% P₂O₅ and 35.95–38.62% K₂O. Unfortunately, in their original form BH, UBB, BHA are not suitable for fertilization, as they are of inappropriate shape and cannot be used in fertilizer spreaders. Therefore, the aim of this studies is developing a way to produce organic fertilizer granules that would have the suitable chemical composition and spherical shape. The granulation is a complicated process because the mentioned raw materials are difficult to agglomerate, so must be used binders. Results shows that using a drum granulator-dryer and polyvinyl acetate solution as binder it is possible to obtain a granular product from BGPI, in which the commercial fraction (2–5 mm size) is up to 60%, the moisture of the granules is 2–10%, the bulk density 430–480 kgm³, but the granules are not strong enough. Therefore, the influence of other binders (molasses solution, broken eggs) on the strength of the granules is currently being studied.

Keywords: agriculture, buckwheat; organic fertilizers; granulation, sustainability

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Local production: a path towards circular economy? Potential and barriers

Katarzyna Sadowy

Abstract:

Transition towards circular economy requires changes in all elements of the production chain: from design to production and consumption patterns. Small and medium enterprises play a specific role in this transition. The presentation shall provide the insight on the practices of SMEs and NGOs in Warsaw and Berlin, regarding two significant fields of production and consumption: food and clothing. The results show: (1) interdependencies of the producers and clients; (2) interdependencies between various producers (and/or service providers); (3) market shortages which create the impediments in the circular transition. One of the main bottlenecks found was a vicious circle of the insufficient demand (making it difficult for SMEs to operate successfully) and insufficient supply (making it difficult for potential consumers to find goods and services complying to the circular economy principles). Practices introduced by the entities included in the study are often motivated by other rationale than market-driven goals. Therefore market-oriented practices must be especially adapted and tailored according to these (usually responsible and ethic-driven) motivations. The presentation will shed light on the potential role of local government of overcoming the encountered obstacles. The findings presented result from two projects: Local Circular Economy (funded by the Polish Ministry and Warsaw School of Economics) and OpenHeritage (funded by European Commission within Horizon 2020).

Keywords: circular economy, local production, consumption patterns, cooperation, local government

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ESG transformation of companies and supply chains - survey results

Barbara Ocicka, Klaudia Martinek-Jaguszewska & Jolanta Turek

Abstract:

Navigating the company according to the ESG criteria (related to the environment, society, and corporate governance) is becoming of fundamental importance for sustainable development (SD) and the transition to a safe, climate-neutral, climate-resilient, and more resource-efficient circular economy in European countries. The authors present the results of the first stage of the project “Quality of ESG management vs. resilience to crises. Companies - financial institutions - local and regional authorities” carried out among manufacturing and trading companies using the FGI method. The study addresses the research gap - the lack of comprehensive academic research on the management of ESG aspects in business operations, with the goal of identifying the key elements of ESG management maturity model. The presentation aims to discuss the research results by answering the following questions (1) How do entrepreneurs define an 'ESG approach' / ESG management for their own management decisions?; (2) Which areas of organisation's operations are affected by ESG management and to what extent?; (3) How important is the impact of ESG management on businesses and why?; (4) - Which management tasks are relevant for meeting ESG requirements?; (5) How is ESG aspects management treated in the company - as a threat or an opportunity for the organisation and why? The research results allowed us to formulate a proposal for ESG management definition, and to outline the foundations for the ESG management maturity model, especially by indicating the key model dimensions and the business operations growth path.

Keywords: ESG transformation, climate transition, sustainability, supply chain

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BALTIPLAST Project: Baltic Approaches to Handling Plastic Pollution under a Circular Economy Context

Jelena Barbir & Andrea Dobri

Abstract:

The majority of plastic reaching the water bodies originates from single-use plastic. Plastic litter imposes increased health and environmental risk, due to the entailed additives. The project “Baltic Approaches to handling Plastic Pollution under a Circular Economy Context – BALTIPLAST” is tackling this problem within the Baltic Sea region (BSR). The main objective of the project is to identify test and deploy concrete solutions for better management of single-use plastics based on the challenges municipalities in the BSR are facing. The project brings together seven countries of the BSR and focuses on plastic waste reduction and prevention by decreasing the flow of single-use plastics over a period of 3 years. During the first year, solutions have been developed on three different levels: (1) strategic and management, (2) communication and behavior change of consumers, and (3) technical and technological for improvement of collection and treatment systems. These solutions will be implemented and tested in partner municipalities during the second year of the project. The amount of plastic waste will be investigated before and after the implementation of the proposed solutions. Each solution will be tested in a minimum of three countries in different municipalities in order to collect representative results for the transnational level. During the final year of the project, the main outcomes will be the elaboration of an environmental impact assessment of the implemented measures based on the data collected from the six pilots as well as the development of an online platform acting as a solution hub for municipalities based on the lessons learned from testing of the solutions. The impact assessment will focus on the calculation of the reduction of carbon footprint achieved through the application of the proposed solutions, while the online platform aims to equip municipalities with the necessary knowledge for the uptake of the developed solutions.

Keywords: circular economy, plastic waste, single-use plastic, impact assessment

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Circularity of logistics packaging in supply chains

Aneta Pluta-Zaremba

Abstract:

In the contemporary world, an important function in the distribution of products is played by logistics packaging, which protects goods against damage during storage, transport and sale. The basic problem, regardless of the material from which the packaging is made, is its disposable nature. The majority of commercial and logistic packaging immediately after use, i.e. after unpacking or using up the content, goes to the stream of segregated or mixed waste. Only part of it is recycled. Growing and excessive use of packaging, including those that are not recycled, leads to environmental pollution to an extent that deepens the climate crisis. This, in turn, negatively affects nature and increases the risk of biodiversity loss. That is why actions to ensure the circularity of packaging in accordance with the principles of the circular economy are so important. The presentation aims to explain how enterprises can stimulate the circularity of logistics packaging in supply chains. The empirical research was carried out within a project devoted to the circular economy, among logistics and supply chain managers from 166 industrial enterprises in Poland. Only logistic packaging characterized by greater possibilities of development, effective collection and reuse than commercial packaging was subject to the research. The results show that there is still low level of interest of companies in the packaging reusing and ensuring its circularity in accordance with the 5R principles (refuse, reduce, reuse, repurpose, and recycle).

Keywords: circular economy, packaging, supply chains

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Challenges of Household Food Waste Sorting: A Lithuanian Case Study

Rimantas Stašys & Dovile Švažė

Abstract:

Proper management of food waste is essential for reducing the amount of waste that ends up in landfills and for producing valuable resources such as compost. An especially sensitive problem in Lithuania is food waste separation from mixed municipal waste and their collection separately. The main challenging thing of waste treatment is improper food waste sorting, collection, and management. This study aims to review household food waste management in Lithuania, identify the main sorting challenges and suggest how to improve them. Lithuania has implemented several policies and programs to improve biodegradable waste management. One of the key initiatives is the National Waste Management and Prevention Plan for 2021-2027, which aims to increase the separate collection of biowaste and promote the development of the composting industry. Under the plan, municipalities must provide a separate collection of biowaste for households and businesses by 2023. The plan also includes targets for the recycling and recovery of biowaste, to achieve a 55% recycling rate for biowaste by 2025 and 65% by 2030. To support the implementation of the National Waste Management Plan, the Lithuanian government has provided funding for developing composting facilities and purchasing composting equipment. Despite the Lithuanian government's investment in waste management infrastructure and education about the importance of food waste management, regional waste management centres still need to be confronted with people's reluctance to separate this waste from mixed municipal waste. The study carried out a survey and identified the main reasons for the reluctance to separate and suggested how to address these problems.

Keywords: waste management, household food waste, improving food waste sorting

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Session 2 - Sustainability literacy - Education for a Sustainable Baltic Sea Region

Moderator: Cecilia Lundberg, Åbo Akademi University

Trends of Soft Skill Integration into STEM Curricula in the Lithuanian Higher Education System

Joana Ramanauskaite, Paulina Budryte & Jurgita Jurkeviciene

Abstract:

The contemporary events such as pandemics, war, emergence of various AI tools, require employees to possess new sets of skills and be able to reskill in the future. Higher education institutions (HEIs) are adapting to the changing world and are already visualising one of the possible solutions – integration of soft skills education into the curricula. This study concentrates on STEM (Science, Technology, Engineering, and Mathematics) programmes offered by HEIs in Lithuania, as it has been suggested that STEM students may lack the necessary soft skills required to adapt in the working environment post-graduation. The aim of this study is to analyse the trends of soft skill integration into STEM programmes of HEI in Lithuania. The analysis draws on two main sources of information: (1) STEM curricula of HEIs in Lithuania; (2) interviews with experts working in STEM education in HEI in Lithuania. The STEM curricula analysis revealed that approximately 9 courses (ranging from 3 to 6 ECTS) are offered throughout the whole STEM program (180-240 ECTS). However, majority of the programmes allow only up to three alternative courses of soft skill education to be selected throughout the programme. The interviews with the experts reveal that the experts themselves see the necessity to integrate soft skills into STEM curricula. Nevertheless, the higher institutional level commitment in building soft skills education is lacking. Moreover, there is lack of support and clear regulation and/or incentives from the political level of Lithuania. Overall, soft skills development is recognized as essential for success in the evolving job market.

Note: This research was prepared with the support of an international community associated with the Erasmus+ project: “Embedding SOFt skills in sTem academic curricula for the transition to sustainable grEeN economy” (2022-1-PL01-KA220-HED-000085725).

Keywords: STEM, higher education institution, HEI, soft skills

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Teaching Economics of Climate Change to Master's Students in Journalism, an Experience of Interdisciplinary Dialogue

Dmytro Khodyko

Abstract:

Climate change is unique among contemporary challenges for humanity because it demands realization of personal, communal, corporate and governmental responsibility for consequences remote both in time and space. The mission of climate change journalism is not limited to facilitation of climate policy setting, but includes amplification of community leadership. The paper discusses experience of teaching an interdisciplinary course of Economics of Climate Change for Master's students in Journalism. The economic emphasis frames climate change as a broad governance failure in common pool resource management. This generalized economic framework should constitute a resource, along with students' personal and professional experience, as well as inference from exploratory assignments, to create a journalist strategy for shaping the realized common responsibility. The paper summarizes the overall theoretical framework, adopted from the earlier Economics of Climate Change course for Master's in Economics, as well as practice-based discussion topics and literature. The lectures introduce key sustainability concepts and global sustainable development politics, proceed with an overview of common goods and externality theories, and apply them to analysis of climate change impact, mitigation, and adaptation. A separate module is dedicated to transition of Ukraine's national economy towards carbon neutrality, with particular emphasis on energy systems and renewable energy. The workshop discussions investigate the existing strategies of climate change communication, the choice of both scientific and economic sources and expertise, the role of media in policy deliberation, and, last but not least, the methodology of local storytelling on climate impact, adaptation and just transition of local communities.

Keywords: climate change journalism, common pool resources, just transition, local communities

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Physical Macroeconomics as a New Educational Course for Sustainable Development and Empirical Analysis

Lidiia Hryniv

Abstract:

Today solution of new problems of formation of sustainable development economy should be sought at the interaction of various modern sciences and knowledges. An example of this can be new knowledge in physical (spatial) macroeconomics. Thus, Physical Macroeconomics is a system of economic that is based on the natural as well as social sciences and explicitly incorporates the physical laws and laws of the other natural sciences into economic theory and practice. In this context, physical macroeconomic analysis also tends to use a broad interdisciplinarity and systems approach that examines economic issues from a spatial coordinate of Earth's surface, also from a interacting physical and social perspective. Consequently, it is important to incorporate physical macroeconomic analysis into our corporate and governmental decision-making. Therefore, students need this new knowledge. So, the following can be singled principal innovative dominants of the newest physical (spatial) macroeconomics for sustainable development. The new factor has been substantiated of sustainable development - the Earth and the natural fertility of its surface as the physico-economic asset and primary source of enrichment cycles in the economy. Conceptual approaches to the formation of new methodology of the ecosystem economic value. A new function of the landscapes ecosystem has been modelled – the function of ecological proposition (supply) of the Earth as a method of determination of its biogeochemical productivity.

Keywords: sustainable development, circular economy, physical macroeconomics, educational course, new knowledge

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Designing the “Farm-to-school” model in Baltic countries: implications from the empiric research and further directions

Julija Melnikova, Simona Grigaliuniene, Inga Dailidiene & Jennifer Avci

Abstract:

In recent years, there has been increasing emphasis on the possibility of improving school meals by including locally grown products, thus contributing to the development of local economic systems. This model has acquired the name “Farm-to-school” in practice of some countries and, according to its supporters, emphasizes public procurement of locally grown food as a key market opportunity for farmers. The project study carried out in partner countries (namely five partner regions Klaipeda, Kurzeme, Latgale, Tartu and Vorumaa) was specifically sought to make it clearer how to design the “Farm-to-school” program framework in a sustainable direction. To achieve the aim the surveys with project target groups (school administration, students and their parents) have been carried out. The objectives of the study were to gather data on target groups’ perceptions of local school food procurement and to disclose their opinion, needs and expectations related to model development. More specifically, the study aimed at disclosing of the conditions and opportunities for the promotion and use of foods produced by local farmers in general education schools in project partner countries as well as at defining necessary educational efforts to increase healthy nutrition, develop general health habits, and agricultural and food system literacy within general education schools and their communities. The study was also aimed at raising the awareness of all stakeholder groups as well as designed in line with global sustainability goals. The findings of the study could be helpful for designing the further steps of collaboration between schools and local farmers in Baltic countries.

Note: The presentation has been prepared within the BSR Food Coalition project (funded by Interreg Baltic Sea Region Program, contract #S002), which seeks to create the conditions for the development of the “Farm-to-school” model in the Baltic countries. The focus of the project is on school meal programs that are common throughout the world and are used to promote students’ healthy eating habits and bring added value to their learning outcomes.

Keywords: farm-to-school, general education schools, Baltic countries

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Promoting Sustainability through the Assessment of Ecosystem Services

Marharyta Radomska

Abstract:

Ecosystem services represent a set of goods and benefits, provided by nature to humans. It is also a useful concept for explaining the value of nature for well-being of population. Still, there is a need to develop monetary expression of the services provided to stimulate both - rational use of services and conservation of their providers. Contingent assessment is widely used method to valuate services, not present at the real market. But this method also has potential to work as an educational tool, by developing public awareness about the role of nature functioning in their life. Thus, a survey initiated for economic assessment of ecosystems can eventually contribute to their protection. This paper presents the results of the contingent assessment of forest ecosystem services, provided by forestry in Western Ukraine. The focus of the research was on the perception of ecosystem services, level of awareness and their interaction with the willingness to pay for these services. The groups involved were: (1) local population without prior information campaign, (2) local population, provided with introduction to the problem, and (3) visitors to the area. The obtained data demonstrated correlation between the level of awareness and willingness to pay. Values were also compared to the results from similar research works, which showed consistency of assessments and general character of undervaluation of ecosystem services. The paper concludes that it is possible to promote protection of ecosystems and raise commitment to sustainability by involving population into services assessment and informing them about real value of ecosystem services.

Keywords: ecosystem services, environmental awareness, sustainable use of natural resources, economic assessment

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Humanistic education of engineers in the light of sustainable development goals

Joanna Szczepanik

Abstract:

Education is one of the basic tools shaping a person and a citizen. The mission of the university is to shape not only excellent specialists, but also a critically thinking individual who moves freely in the area of social and cultural life, has the courage to ask unconventional questions and to look for new solutions. Humanities and social subjects enable the development of such competencies. However, there is often a lack of understanding of the role of the humanities in the process of educating future engineers. This is related to the attitude of technical faculties, which, following the needs of the market, focus only on the graduate's professional skills, which is reflected in the curriculum. Meanwhile, the fourth Sustainable Development Goal points to the need to provide education to appreciate cultural diversity and the contribution of culture to sustainable development. Article 13 of the UNESCO Convention on the Diversity of Cultural Expressions also obliges signatories to introduce policies that take into account the inclusion of culture in educational programs. So what is the status of the humanities in the area of technical higher education? Is the need to shape an engineer who moves freely in the socio-cultural reality noticed and implemented? How is it implemented at the level of faculties, universities, and of the ministry's guidelines? The author points to the actions already taken, but still individual, which are a good model for understanding the importance of the humanities in educating conscious and critically thinking graduates of technical faculties.

Keywords: humanities, higher technical education, the mission of university

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Media Literacy for Manipulative Resistance

Oksana Yarema

Abstract:

Living in the digitalized society which became rather developed during the last 3-4 years, and with the replenishment of social media and the Internet in general, students become the so-called global digital citizens with developed fluency in solution, creativity, collaboration, media and information. However, the internet serves not only as an instrument for educational and personal development. You should be aware of the manipulation existing in various forms, as well as know how to keep yourself safe. The main idea of implementing a Media Literacy course into the core curriculum is to teach students to be aware of the fraud, manipulation, advertising effects, fakes and dangers existing in the digital community and to be resistant to its influence. While working on the topic of manipulation students learn the meaning of the terms such as bot, bot herder, botnet, citizen journalism, doctoring a video, lead, mobile journalism (mojo), multimedia journalism, splicing in video, troll, etc. The main content of the topic Manipulation covers the aspects of (1) understanding the concept of media manipulation, (2) identifying the flaws in media messages and casting the doubts, (3) distinguishing and applying types and techniques of media manipulation. The language skills are enhanced by (1) learning the related terms and language functions to discuss the issues of manipulation in the media, (2) improving reading, listening, writing and speaking skills. Critical thinking is formed via (1) analyzing manipulated media messages and (2) evaluating the impact of manipulation.

Keywords: media literacy, manipulation, bot, citizen journalism, mobile journalism

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Development of Green Skills and Eco-Conscious of Students

Olena Babenko & Yuliya Kharchenko

Abstract:

The Green Deal is one of the priorities of the European Commission, and ensuring sustainable development and overcoming the consequences of climate change and environmental degradation is possible only through the common actions of countries on changes in legislation, industry, energy, transport, agriculture, etc. Awareness of the powerful influence of environmental conditions on the quality of life, the internal need to implement international standards in the field of environment should be formed in every person, starting from childhood. Therefore, such an important role in the formation of green skills and Eco-conscious is given to education. Participation in various activities related to international mobility is an important way and one of the forms of development of Eco-conscious of students. During the work of the First International "Natural Science Research School" (Ukraine-Slovakia), students of the Faculty of Natural Sciences and Geography of the Sumy Makarenko Pedagogical University got acquainted with some examples of the demonstration of Eco-consciousness of the population and the formation of green skills. International mobility created the necessary conditions for students to understand the need for: (1) preservation of the environment; (2) studying the consequences of exposure to the environment of harmful substances and possible ways to reduce this negative impact; (3) analysis of various objects for the content of harmful and/or dangerous factors; (4) mastering the basics of energy efficiency and energy saving; (5) conscious consumption and disposal of household waste; (6) analysis and assessment of risks for the environment and human health; (7) health-care competence formation.

Keywords: Green Deal, sustainable development, green skills, Eco-conscious, international mobility

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Session 3 - Cities, towns and rural lands - changing urban and rural landscapes in the Baltic Sea Region

Moderator: Joakim Ekman, Södertörn University

Mathematical graph theory-based modelling of urban multi-functionality and multi-functionality compass as a tool for analysis, city planning and decision making

Kestutis Zaleckis

Abstract:

The multi-functionality (MF) of urban structure was formally introduced as a concept of city planning around 1990 with the emergence of New Urbanism. It could be seen as one of the essential aspects of Smart Growth, Compact city, Walkability, 15-minute cities and other similar ideas. Despite the acknowledgement of MF as an important concept in city planning, various data and indicators could be used for its analysis, thus making its comparison results dependent on the selected models. This paper focuses on modelling the multi-functionality of urban structures based on widely available open data (e.g., OSM) while comparing four cities: Vilnius, Kaunas, Thessaloniki as an example of organic Mediterranean urbanism, and Detroit as a car-oriented structure. MF analysis is based on mathematical graph theory, which allows to simulate both movement and concentration of people while travelling to various destinations. The modelling is conducted in three steps: (1) analysis of spatial structure, which supports MF through street network configuration and building density; (2) analysis of gravity fields created by travel destinations; and (3) simulation of concentration of people at various travel destinations by evaluating competition between destinations and the number of inhabitants available. Statistical analysis of correlations between various mathematical graph centralities is used to form a "compass of multi-functionality," which, in a similar easy-to-understand way as various compasses of sustainable urban form, represents the modelling results and could be used as both analysis and a decision-support tool in urban planning.

Keywords: urban multi-functionality, mathematical graph theory, urban simulation, decision support system

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How to manage cities sustainably? Action nets & climate adaptation

Jakub Wydra

Abstract:

It is not a novelty to identify cities (and the urbanization process) as key research areas for climate adaptation. Cities are both a cause and a place to seek solutions to the climate change threat; city inhabitants are extremely vulnerable to the consequences of climate change, which makes a problem even more important as urban areas become home to the majority (ca. 75%) of Europe's population. The aim of the following research is to identify the key action nets' actors/stakeholders influencing the process of urban climate adaptation. The research is based on the method of action net analysis; it comprises three stages which are conducted by a mix-mode methodology (desk study, in-depth interviews, development of model of networks). The usage of this approach makes it possible to confront qualitative research with the adapted theory and urban/ national/ European policies, economic proposals, legal solutions, and operational strategies. Thereby the following project will become applicable in the sense of the resource material for decision-makers or be utilized at the strategic-level in other cities. The presentation reports the preliminary results of the first stage of research – desk study and preliminary urban action-net mapping – conducted within European cities (two of them located in the Baltic Sea Region: Tallinn, Krakow). It is also an opportunity to highlight the identified barriers of research on climate adaptation in the general field of management.

Keywords: action nets, climate adaptation, city governance, urban management, urban resilience

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The City of Stockholm and the City of Gdansk: Two Urban Strategies to Reach the One Goal of Sustainable Development

Liliia Hrytsai

Abstract:

The author analyzes the development strategies of two cities – the City of Stockholm and the City of Gdansk – to compare the key features of both strategies and to identify good practices, which could be applied in other sustainable urban development strategies. In the elaboration she addresses the following four research questions: (1) What specific approach does the City of Stockholm apply to advance sustainable development? (2) What unique measures does the City of Gdansk take to promote sustainability? (3) What are the similarities and differences of two sustainable urbanization strategies? (4) What good practices could we adopt from each of the strategies? The main findings demonstrate that both City Councils have formulated a clearly defined strategies, goals and indicators for reaching sustainability; also, these cities have both long-term strategies and operational programmes that concentrate on the nearest future. This is distinguished by the author as a first good practice; the following good practice is the integration of smart city elements into the urban system and becoming ‘sustainable smart city’, which helps local governments to meet urban challenges of the 21st century. The last, but not the least are the rigorous and quite ambitious climate goals, which allow the cities to compete in prestigious international contests and gain awards for their environmental performance. Methodology of this study is based on the review of scientific elaborations, materials from official web pages, as well as interviews and public speeches of Mayor of Stockholm Mrs. Karin Wångård and Mayor of Gdansk Mrs. Aleksandra Dulkiewicz.

Keywords: sustainable urbanization, smart city, Stockholm, Gdansk

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Land use/land cover change modelling to address climate change impacts

Maris Klavins, Karina Stankevica & Maris Nartiss

Abstract:

Climate change do have in in future will have more expressed impact on land use and landcover (LU/LC). Thus, it is important to go beyond the state-of-the-art and fill in specific gaps associated with integrated indicators for monitoring land use and land cover change, the effects of awareness and behavioural patterns on pathways to more sustainable land use across Europe. The aim of the study is to identify dynamic spatial simulation models of LU/LC that can serve as informative platforms for policy setting and decision-making processes on the use and management of land resources. By mimicking the causal mechanisms and feedback loops of LU/LC, the models can be developed into learning tools for understanding the dynamics and driving forces of the land-use system and show how landowners' choices might affect future trajectories. To successfully achieve these ambitions, environmental models and software has been analysed to be scientifically and technically sound, reliable, usable and cost effective. The critical analysis will enable to the stakeholders/scientists/decision-makers to select the appropriate tool according to the modelling requirements based on parameters that reflect the trends of changes.

Note: Part of the Horizon 2020 project Europe-LAND.

Keywords: Land use/land cover, modelling, climate change, biological diversity

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Socio-oeconomical determinants of the location of the building of early medieval strongholds in south-eastern Poland

Cyryl Konstantinowski Puntos

Abstract:

Southern Poland abounds in various types of gords, which were the core of the development of the region of broadly understood Lesser Poland and Western Ruthenia in the early Middle Ages. Poland was then ruled by Mieszko I and Bolesław I the Brave. Hillforts were created over the years through a certain transformation, starting from the hillfort itself (in the strict sense) to the changed morphology of the ramparts themselves. They were the core of the functioning of the region. The main communication routes were rivers (in the catchment area of the Baltic Sea) or roads (often in depressions). They were the basis for connecting open settlements with the main (state-forming) centers. The research focused on (1) what social points are the most important (2) oeconomic conditions (3) the application of various types of socio-oeconomic theories. The main goal is to show the conditions that were at that time. The basic function of this type of analysis is research based on literature analyses, data queries and geoinformatics (GIS) analyses. An interdisciplinary connection, it combines history, archeology (including geoarchaeology) and the broadly understood geoarchaeological aspect. Showing the network of dependencies is extremely difficult in this type of analysis. The analyses are based on vector data (individual locations of strongholds on the map) and raster data (Digital Elevation Model). It is extremely important to know how given communities functioned in a supra-regional context. Certainly, contact with other countries was also important. An extremely interesting aspect is trade and socio-oeconomic conditions with northern countries through the use of natural communication routes.

Keywords: carpathians-baltic trade, socio-oeconomical network, early-medieval, hillforts, Medieval SE Poland and SW Ruthenia

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Housing policy challenges in cities, towns and rural areas. Evidence from Poland

Anna Piętka

Abstract:

Housing is a crucial element of urban and rural development due to its socioeconomic implications and the role of the residential buildings in achieving carbon neutrality goals. The aim of the study is to present different challenges that cities, towns and rural areas face in this respect and how those are addressed at a local level in Poland. Analysis performed by applying desk research and statistical description conclude that (1) cities and tourist areas struggle with the affordability issue, (2) towns and rural areas are faced with projected depopulation, (3) improving energy efficiency of residential buildings presents a challenge both in urban and rural areas. To verify how local authorities respond to these issues, a case study was performed - strategic and housing policy documentation of selected cities, towns and rural areas was reviewed. The results show that housing issues are not always reflected in the official documentation, meaning are not given proper attention. In view of that, action from central government is required, namely setting proper regulatory environment, providing stable funding for projects that are impossible to be financed at a local level and increasing awareness about the role of housing for sustainable development.

Keywords: housing, housing policy, regional development, housing needs

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Towards a sustainable university campus – from bottom-up initiatives to strategic planning and a campus living lab

Jarosław Działek

Abstract:

The starting point for the paper lies in the concept of a learning landscape, which refers to the recent shift in learning and research tasks at universities, combining individual and collaborative efforts, formal and informal knowledge exchange, as well as self-education, co-learning, and co-creation. This shift impacts how university campuses and their relations with their surroundings are planned, designed, and managed, aligning with their role in socio-ecological transitions to address contemporary and future challenges. The concept of a learning landscape is applied to the new campus of the Jagiellonian University, built between 1998 and 2017 at the edge of the city, between dense and developing urban fabric and protected natural areas. During its construction, there was a focus on creating buildings with modern teaching and research facilities, while less attention was paid to designing open spaces that would promote interdisciplinary interactions and foster relations with neighbouring communities and institutions. Additionally, the decision to build the campus on a greenfield site resulted in the destruction of the local biodiversity. The design, with large paved surfaces, a car-centric approach, and traditional landscaping, led to weak resilience to climate-change-related events such as heatwaves and local. This paper aims to document the development of bottom-up initiatives, focusing on the Kampus+ initiative, at the Jagiellonian University campus. Initially, they started a debate about the (un)sustainability of the campus, later co-created several test solutions there, and finally gathered a larger coalition of change that prepared a strategic proposal for campus open spaces and established a campus living lab. The paper's objective is to identify the stages of the socio-ecological transition of the campus space, the key stakeholders in this process, and the points of tension that emerged along the way.

Keywords: university campuses, learning landscape, socio-ecological transition, bottom-up initiatives, living lab

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Ageing in Cities

Nikola Koktavá

Abstract:

This paper focuses on the challenges posed by the global ageing of populations in urbanized areas and on improving accessibility to basic services. Geoinformatics can help urban planners to transform the urban environment to make it accessible to all residents, including those who are ageing or less mobile. With the growing number of older residents in cities, it is necessary to address barriers such as stairs, high curbs or lack of resting places that may limit their mobility. Adapting the urban environment to the ageing population and creating inclusive spaces is essential to improve the quality of life of older people. Urban redevelopment should address demographic change and promote active and independent living for older people, involving cooperation between stakeholders. The study illustrates the main problems related to the mobility of older people and provides examples of good practices by taking selected Czech medium-sized cities as examples. The aim of the study was to identify the problem areas related to the mobility of older people and, conversely, to show possible solutions to these problems. The study also highlights the problem of data; often there is no data on mobility in medium-sized cities. The study shows that the selected cities are making efforts to make the city barrier-free and to reduce barriers within the city, but there are still a large number of deficiencies in these cities - lack of benches, stairs leading to public transport, high curbs or narrow sidewalks, etc. Of the cities surveyed, Brno has the largest number of data, providing a relatively wide range of data, but for examining the mobility of seniors, the data is insufficient for all cities surveyed.

Keywords: micro-mobility, seniors, ageing population, open-data

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Session 4 - Paths of water, understanding the hydrology and water of the Baltic Sea Region

Moderator: Agneta Andersson, Umeå University

Water resources of the territory above Kakhovka after the explosion of the Kakhovka Hydro Power Plant

Viktor Karamushka

Abstract:

On June 6, 2023, the dam of the Kakhovka Hydro Power Plant (HPP) was blown up. This man-made disaster had colossal humanitarian, social, economic and environmental consequences. The environmental consequences and risks caused by the destruction of the HPP for the territories located above and below the dam are multidimensional and complex. The purpose of this study is to analyse the situation with water resources of the territories above Kakhovka after the disaster. With the use of satellite monitoring data, field surveys and insider information, the dynamics of the dehydration of the Kakhovka Reservoir and the formation of a significant number of static (lake-type reservoirs) and dynamic (bed of the Dnipro River, rivers, streams) water bodies are shown. Around June 17-18, 2023, the Kakhovka Reservoir ceased to exist as unique water object. Its rich biodiversity has largely perished and its intact aquatic ecosystem has been physically lost. The dewatering of the Reservoir became critical in providing water to human settlements in the region. As of June 8, the water level in the reservoir was 12.5 m, while the minimum level for water intake ("dead point") is 12.7 m, therefore, water intake for settlements and industrial enterprises became impossible. Such a situation has become critical for maintaining the safe technological condition of the Zaporizhzhya Nuclear Power Plant. Irrigated agriculture in the territories under the influence of the Reservoir will cease to be an important sector of the economy and a source of well-being for the local population. Drainage of the Reservoir was accompanied by a decrease in the level of underground water, as a result of which water disappeared in wells in coastal villages. A decrease in the groundwater level can cause soil subsidence in some areas, which may pose a threat to the stability of residential buildings and the construction of industrial and communal facilities. In fact, a new wetland ecosystem is developing in the region of the Kakhovka Reservoir, on the basis of which a new socio-economic model of nature management is being formed. Completion of this process should be expected after the liberation of the occupied left-bank territories of Ukraine.

Keywords: Kakhovka HPP disaster, water resources, Dnipro River, water ecosystem, dewatering

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Detection of non-steroid anti-inflammatory drugs in water using dendrimer-coated silica as sorbent

Piotr Scigalski & Przemysław Kosobucki

Abstract:

Constant increase in production and consumption of pharmaceuticals has led to their higher concentrations found in sewage. Employed water treatment techniques are often inadequate to remove or process these compounds in quantities reaching many wastewater treatment plants, resulting in releasing these contaminants directly into the environment. Non-steroid anti-inflammatory drugs (NSAIDs) are a type of pharmaceuticals applied to combat fever and other inflammation, but have also found use as effective painkillers and to prevent blood clotting. Combined with their low price and high availability, often without prescription, NSAIDs have become some of the most popular drugs, resulting in communal and hospital sewage carrying especially high concentrations. This research focuses on developing a new porous material with the intent of using it to isolate NSAIDs from water in order to determine their concentration levels. For this purpose a dendrimeric copolymer of methylamine and 1,4-butanediol diglycidyl ether was bound on the surface of silica beads. This sorbent, named MA-BDDE was used in dispersive solid-phase extraction (dSPE) of five select NSAIDs from sewage and surface water samples followed by separation and detection using HPLC-UV/Vis system. Employing such simple yet effective methodology ensures that virtually any analytical laboratory would be capable of conducting this procedure. Validation of HPLC-UV/Vis detection returned LOD values within 57 – 241 ng ml⁻¹ range. Out of tested NSAIDs only traces of ibuprofen and diclofenac were detected in water samples from Polish rivers and effectiveness of MA-BDDE sorbent was confirmed using spiked water samples, showing recovery values between 72 and 98 %.

Keywords: water contamination, pharmaceuticals, liquid chromatography, solid-phase extraction

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Sedimentation conditions in Sulejów Reservoir on Pilica River explained by hydrodynamic modelling

Peshang Hama Karim, Aleksandra Zieminska-Stolarska & Artur Magnuszewski

Abstract:

Sulejow Reservoir is one of the largest reservoirs in Poland exposed to a large flux of nutrients from both point and diffuse sources which leads to an excessive amount of eutrophication and cyanobacteria bloom. This paper's inspiration was to use a 1-D HEC-RAS hydrodynamic model to understand hydraulics of the reservoir and sedimentation conditions. Average in cross sections velocities were calculated by the model and shown in the form of the map. Bottom sediments and sampling was performed of and chemical concentrations were measured in samples of bottom sediments of Total Organic Carbon, Total Phosphorous, and heavy metals. Additionally, data from national water quality monitoring stations were used. Very precise bathymetric map of the reservoir was used with raster resolution of 5 m. The largest depths of the reservoir and the presence of sediment traps coincide with the highest concentrations of organic carbon, nutrients, and heavy metals. Lacustrine part of the reservoir can act as source of nutrients during the low flows and high concentration of phytoplankton. The paper has shown that reservoir hydrodynamic modelling and precise bathymetry map provide a piece of very valuable information which can be used for interpretation of bottom sediments chemistry and nutrients flow in the reservoir.

Keywords: sedimentation, Pilica river, Sulejów reservoir, bottom sediments

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Session 5 - Mitigating emissions in the energy systems - Reducing climate change impacts in the Baltic Sea Region

Moderator: Farid Karimi, University of Jyväskylä

Making wind energy greener

Samy Yousef

Abstract:

Wind energy is one of the most promising renewable energy sources in the European Union in general and the Baltic Sea region in particular, for which demand has recently increased significantly to replace fossil fuels and secure energy sources in light of the current biopolitical crises. Despite its green nature, wind turbine blade waste (WTB) and its disposal is a major challenge in our region, which must be sought to find new technologies capable of recovering its original resources (fibre and resin), which in turn can contribute to achieving sustainability and integrating it into the circular economy. Within this framework, this paper investigated the possibility of treating WTB using pyrolysis and studying their kinetics. The experiments have been conducted with commercial blades on a basic and laboratory scale. The fundamental results showed that WTB can be decomposed in the range of 370-500°C by an activation energy in the range of 172-220 kJ/mol. While the experimental results showed that the resin part can decompose into styrene (49 %)-rich oil (44.5 %) only without any gaseous products at 500°C, the fibres remain without decomposition as solid residue. These results prove that the pyrolysis technique has promising potential in this field.

Keywords: end-of-life wind turbine blades, styrene, kinetics, pyrolysis, short fibres

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Water Splitting Using Disordered Multiphase Manganese Oxides for Modern Energy Systems

Georgii Sokolsky

Abstract:

Cationic additives in electrolyte control the functionality of a nanostructured oxide. Dopant ions can control the size and shape of deposit crystallites and modify the host structure. The manganese dioxide family of polymorphs with ion-molecular sieve properties represents the additional possibilities of "template" effects of dopant ions on the phase composition, heterovalent substitution in the cationic sublattice, changes in morphology and alteration of nanocrystallite size during electrocrystallisation. The electrolyte doping is fruitful in case of functional nanomaterials mainly designated for power sources or (photo, electro) catalysis. The additives of dopant-ions in an electrolyte modify the host structure or they can be the component of electrodeposited nanocomposite material. The cases of low and heavy doping can be distinguished. The low (soft) doping by M^{+} -ions at Mn(II) anode oxidation has the tendency to the hollandite phase stabilisation (template effect), Fe^{2+} , Co^{2+} -ions form ramsdellite matrix, Cr^{3+} stabilises layered birnessite polymorph but heavy doping products in this study are X-ray amorphous (Co^{2+} , Li^{+}). The effects of electrolyte doping in electrodeposited, non-stoichiometric manganese dioxide (NH_4^{+} , Fe^{2+} , and Co^{2+}) were investigated. To sum-up, the correlations between rates of oxygen evolving reaction/oxygen reduction reactions (OER/ORR) and nature of dopant ion, phase, and chemical composition, some surface properties were established by CVA method. $MeOOH$ containing samples demonstrated maximal activity. As shown in literature, coupling of manganese dioxide with $g-C_3N_4$ facilitate both OER and Hydrogen Evolving Reaction rates. Therefore, manganese dioxide could be a prospective bifunctional OER&HER electrocatalyst.

Keywords: water splitting, manganese dioxide, polymorph, electrolyte doping, oxygen evolution reaction

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Session 6 - Labour, Human Rights and Accessibility - perspectives on social sustainability in the Baltic Sea Region

Moderator: Joakim Ekman, Södertörn University

How sustainable work can improve women's employment beyond the statutory retirement age under gender inequality in the public pension system?

Marzena Fryczynska & Wioletta Grzenda

Abstract:

This study identifies the factors of sustainable work quality and organization characteristics which affect the risk of work discontinuation among women beyond the statutory retirement age. If the sustainable work relies on living and working conditions which support employees in engaging and remaining in work throughout an extended working life, sustainable work factors reduce risks of work withdrawal even beyond statutory retirement age. Gender inequality in the public pension and cultural norms make women withdraw from the labor market much earlier than men which leads to having lower pension benefits and becoming more vulnerable to poverty in old age than men. This is particularly important in countries in which the statutory retirement age for women is lower than for men, such as Poland. Using Polish labor market data (Labor Force Survey) and analyzing it by semiparametric Cox modeling, the risk of discontinuing employment beyond the statutory retirement age was evaluated. The risk was lower among women employed in micro-enterprises, whose earnings were higher than the average retirement benefit, who performed work consistent with their education, whose jobs provided opportunities for professional training. Contrary to assumptions that withdrawal from work is reduced by sustainable work factors such as having an agreed developmental plan, working locally, being employed on a permanent work contract, and in the public sector, the research outcomes revealed opposite tendency. The research results can help to create a sustainable solutions addressing the challenges of aging, gender inequity and vulnerability in European societies.

Keywords: employment, pension system, statutory retirement age, sustainable work, gender inequality, semiparametric model

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Employee resilience: an emerging field of research in the era of environmental disruptions

Živile Stankeviciute, Egle Staniškiene, Asta Daunoriene & Joana Ramanauskaite

Abstract:

Challenges facing organisations and their employees are constantly increasing and acquiring new shapes like changing nature of work as a result of the fourth industrial revolution and COVID-19 or political instability and war. Given the turbulent times, organisational survival as well as employee wellbeing at work depend on the ability to withstand and adapt to significant challenges, i.e. their resilience. Resilience is commonly defined as the ability to become strong, healthy, or successful again after something bad happens. However, earlier research lacks conceptual clarity about both employee resilience construct and the factors enhancing resilience. In order to close the gap, a systematic literature review was carried out. Analysis of earlier papers from Web of Science data base allows to underline that: 1) employee resilience can be defined in different ways emphasising even the basic abilities possessed by the employee, or the ability to adapt to adverse events, or the ability to demonstrate positive changes after adversity; 2) some definitions of resilience capture positive growth, while others simply highlight successful adaptation; 3) there is an obvious difference between the capacity for resilience and resilience demonstration; 4) mainly, authors agree that employee resilience is a developable capacity that requires enabling organisational context; and finally 5) human resource management practices serve as highly important factors for enhancing employee resilience. Summing up, the paper concludes that care for employee resilience should be included not only in strategic agenda, but also in daily organisational activities.

Note: This research project has received funding from the Research Council of Lithuania (LMTLT), agreement No [S-MIP-23-55].

Keywords: employee resilience, employee wellbeing, organisational survival, ability to adapt, developable capacity, human resource management practices

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Session 7 - Flows, transports, and movements - Sustainable mobility from the perspectives of the Baltic Sea Region

Moderator: Sven Borén, Blekinge Institute of Technology

Evaluation of an intervention model for the promotion of sustainable mobility

Jone Vitkauskaite-Ramamauskiene & Francesca Cellina

Abstract:

Current trends in car travel have a significant negative impact on the environment. Mobility behavior of individuals is determined not only by external but also internal factors. Therefore, in order to encourage individuals to reduce car usage, it is important to apply not only hard measures affecting external circumstances, but also soft measures aimed at internal barriers that hinder sustainable mobility. During the research, a soft sustainable mobility intervention was developed and evaluated. It consisted of various behavior change techniques - information provision, gamification, comparative feedback, goal setting, progress recording and planning. The intervention was implemented in the form of the "Move Green" initiative. The initiative was aimed at encouraging various workplaces in the city of Kaunas to reduce car commuting trips and choose more environmentally friendly modes of mobility - public, non-motorized transport and walking. Using quantitative and qualitative methods, the impact of the intervention on the mobility behavior and the internal factors influencing it - intentions, attitudes, norms, perceived behavioral control and habits - was evaluated. In addition, the effects of different behavior change techniques on individual socio-psychological factors were evaluated. The results of the study showed that during the intervention there was a statistically significant decrease in car trips. In addition to behavioral changes, significant changes in participants' mindsets were also achieved. Finally, it was observed that the most effective behavior change techniques were directed at social norms. Meanwhile, information provision about the negative effects of car travel was not effective.

Keywords: employee resilience, employee wellbeing, organisational survival, ability to adapt, developable capacity, human resource management practices

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The problem of delays in the implementation of railway investments in Poland in the context of infrastructure availability – social perspective

Jakub Donski-Lesiuk

Abstract:

Poland is a country with a dominant role in road transport. The last several years have been a period of intensive investment in the modernization and expansion of rail transport infrastructure, which is definitely a more environmentally effective branch of transport. Unfortunately, investments carried out on the routes of the national infrastructure management company (PKP PLK) are regularly delayed. These delays affect not only the extension of the period of difficulties in the provision of transport on modernized routes for both, passengers and freight operators, but above all they limit the availability of infrastructure, often causing overloading of alternative routes. The paper presents the problem of delays in social perspective. Selected examples show the change in the market position of rail transport, including the decline in its attractiveness. Importantly, in some cases, modernization aimed at increasing the popularity of railways resulted in passengers leaving this mode of transport as a result of delays. The paper refers to the problem of delays in the implementation of investments on economic and organizational grounds with reference to the issue of sustainable development.

Keywords: logistics infrastructure, rail transport infrastructure, infrastructure investments, congestion

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Modeling of Port Organizational Ecosystem's Resilience in the Conditions of Market Uncertainty

Elena Valioniene & Erika Župerkiene

Abstract:

Ports are integral part of the transportation systems and working under pressures of climate change and under pressures of sustainable development goals. Dependent on the complexity of ports and port service in the newest research ports are analysed as the organizational ecosystems which should be not only sustainable in their activities in relationship with surrounded ecosystems, but also should be resilient for the uncertainties of modern markets and global trade conditions. So, the main object of research is the resilience of port organizational ecosystems working in the highly uncertain market conditions. The goal of the research to construct the theoretical model of port organizational ecosystem's resilience and main objectives are to describe the conception of organizational resilience, to present the port organizational ecosystem's resilience model and to describe its relationship with the responding to the uncertainties of market. The methodology is based on the theoretical analysis and theoretical modelling according to the results of the newest research and guidelines, recommendations, and other legislation on the formation of port resilience.

Keywords: port organizational ecosystem, organizational resilience, uncertain market conditions

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European experience in ensuring of Sustainable development of civil aviation

Larysa Cherniak

Abstract:

At the current stage of human development, climate change is considered by scientists and practitioners of many countries as one of the identified challenges of our century. It is known that the main causes of climate changes include dynamic processes on Earth, external impacts and the result of anthropogenic activity and technogenic impact on the environment. The development of the transport industry makes a significant contribution to the increase of emissions of greenhouse gases into the Atmosphere. Also, the development and growth of the intensity of aviation transport processes is a source of greenhouse gas emissions. Therefore, the ensuring of the Sustainable development of the aviation industry with the development of the scenarios for reducing the greenhouse gas emissions and reducing the negative impact on all components of the environment is the actual task for the aviation community. Such as, atmospheric air, water bodies, grounded waters and soils and causes destroying of the sustainability of natural ecosystems. This article focuses on the analysis of the environmental standards of the European Union to ensure the Sustainable development of civil aviation and the prospects of their implementation in Ukraine. Environmental standards and programs of the EU are analyzed for various components of the environment (atmospheric air, water bodies and grounds). The main results of the analysis showed that the main attention of ecologists in the aviation industry of the EU is focused on the issues of reducing emissions into the atmosphere from stationary and mobile sources at aviation enterprises. But less attention is paid to the issue of reducing the impact on water bodies and grounds. The article concludes that the main vector of the EU's environmental policy to ensure sustainable development of civil aviation is aimed at reducing greenhouse gas emissions and reducing the impact of the aviation industry on climate change.

Keywords: sustainable development, climate changes, greenhouse gases, ecosystems, aviation industry

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Sustainable urban mobility from the students' perspective: how to foster behavioural changes while teaching

Živile Stankeviciute, Egle Staniškiene & Asta Savaneviciene

Abstract:

Urbanisation process causes a huge number of environmental, economic and social issues. Although the number of people living in cities in Lithuania is constantly decreasing, in 2020, 67.4% of all residents lived in cities. Moreover, the students share living in cities in Lithuania is not decreasing making urban mobility even more challenging due to several reasons. First, students are mainly young people who are active in public life, attending various events and willing to move fast from one place to another. Second, the habits of the younger generation are highly important trying to make cities more sustainable, for instance, to reduce the CO₂ emissions or social inequality. The paper focuses on sustainable urban mobility arguing for trade-offs between freedom of movement, economic competitiveness, and environmental protection. Sustainable urban mobility includes walkable and bikeable cities, inclusive transport infrastructure, access to public transport car-sharing systems, and autonomous (electric) vehicles. The core question of the paper is how to encourage the students to change their habits regarding the urban mobility in their study city, in Kaunas (Lithuania)? Trying to answer the question, a pilot study was conducted. Six dimensions, namely walkability, transit safety, safety, attractiveness and environmental quality, infrastructure and technology for drivers, alternative routing were included. Furthermore, questions regarding the incentives leading to behavioural changes were included. The findings revealed that students not so positive evaluate walkability and alternatives routing in the city. Education was mentioned as one of the key factors encouraging to change their behaviour.

Note: This research has been funded by European Union within the project “Lifelong Learning on sustainable urban mobility” (GREENMOBILITY). The project No. 2022-1-LT01-KA220-HED-000085575

Keywords: sustainable urban mobility, behavioural changes, walkability, travel behaviour

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Use of lightweight materials for vehicles to reduce fuel consumption

Yana Smirnova & Iryna Huriia

Abstract:

Nowadays puts forward a wide range of requirements for vehicles, among which sustainability is the most relevant. One of the ways to improve the sustainability of vehicles is by reducing fuel consumption and the weight of their construction. Lightening the weight of the construction without losing strength characteristics can be achieved by using composite materials. This paper presents the technological basics of layered Ti/Al composite materials liquid-phase formation. Three-layer composite materials of the VT1-0/Al system, manufactured according to the presented technology, don't destroy during three-point bending test. As a result of tensile tests the three-layer materials of VT1-0/Al, VT6/Al and Ti-TiV/Al systems don't delaminate after fracture, which indicates a strong bonding between titanium and aluminium layers. It was established that the specific mechanical characteristics of layered Ti/Al composites, obtained by liquid-phase formation exceed known titanium and aluminium alloys, which makes presented materials promising for industrial use.

Keywords: composite material, layered composite, titanium, titanium alloy, aluminium, titanium boride, liquid-phase formation, lightweight material

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Session 8 - Climate Change impacts and adaptations - Understanding the present and future climate crises in the Baltic Sea Region

Moderator: Keith Larson, Umeå University

Sustainable Development of Society: Formalization, Models and Applications

Alexander Makarenko

Abstract:

Concepts and models for sustainable development and transformation of large social systems are considered. Some ways for formalization of scenarios of transformations are proposed. It is proposed the description of a new approach to mentality accounting in operational research (OR), which is based on internal representation of mental images. There are considered: 1) Sustainable development as a mathematical problem, including a formal definition of sustainable development with ethic accounting. 2) New models of large social systems, 3) The influence of the ethical aspects of the transformation of social systems. 4) Risk assessment in scenarios for large socio- economic systems. 5) Transformation of society. 6) Anticipatory aspects of sustainable development. In the case of crisis conditions (for example, in a war situation), the variables change very quickly. Therefore, it is necessary to make a special adaptation of the problem of sustainable development to such conditions. Here we note several areas of setting such problems for crisis conditions. They may look differently depending on the scale and aspects under consideration. An example is migration of students and researchers.

Keywords: sustainable development, formal definition, society models, crisis condition, society transformation

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Architecture design process with Life Cycle Assessment and Building Information Modelling

Piotr Gradzinski

Abstract:

The presentation deals concern the problem of energy optimization of single-family housing in Poland in Western Pomerania and considered because of the changing climate in the region and the consequences. The problem of changes is considered in the category of building materials selection and the architectural form shape. In the analytical part, the following analyzes were carried out: in terms of the structures of the building in minimizing CO₂ emissions and energy consumption of the building materials used and environmental factors (light, shade, wind) influencing energy consumption through the building's shape in the region. It discusses the possibilities to adapt the 'bubble mechanism' into the architectural design process, which is currently used in the business sector and by manufacturing plants and is based on determining the maximum level of pollutant emission. The purpose of the analysis was defined due to ongoing climate change and the possibility of pollutant emission control in a specific area, a so-called 'bubble', with imposing the constraints on architecture. This leads to exploration and changes in the paradigm of architectural design and the implementation of specific material, technical and technological solutions that control and minimize negative environmental impact.

Keywords: architecture, bubbles, DNA, LCA, matter bank, sustainable development

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Session 9 - Feeding a region in transition - Agricultural lands, sustainable food production and consumption in the Baltic Sea Region

Moderator: Nina Moravčíková, Slovak University of Agriculture in Nitra

“Prophybiotics” for controlling the Salmonella infection in broiler chickens

Ramesha N. Wishna-Kadawarage, Rita Hickey & Maria Siwek

Abstract:

Salmonella is the second most prominent zoonotic pathogen within Europe, which is mostly carried by chickens. The synergistic potential of probiotics and phytobiotics against Salmonella has not been investigated sufficiently. This study aimed to test the synergy of probiotics and phytobiotics for which we coined the term “prophybiotics”, in the control of Salmonella, in-vitro. Antimicrobial assays were performed with six lactic acid bacteria (LAB) namely, Lactiplantibacillus plantarum (LP), Lacticaseibacillus casei (LC), Limosilactobacillus reuteri (LR), Lacticaseibacillus rhamnosus (LRh), Leuconostoc mesenteroides (LM) and Pediococcus pentosaceus (PP) to examine their potential anti-Salmonella typhimurium properties. The phytobiotics selected to investigate the synergy included turmeric, green tea and garlic. The results from spot overlays indicated that all six LABs displayed anti-Salmonella effects. However, well diffusion assays showed no inhibition when the LAB culture supernatants were neutralized, indicating that the anti-Salmonella effects observed were most likely due to organic acid production. Co-culture assays with three selected LAB (LRh, LM and PP) revealed bactericidal effects against Salmonella typhimurium, completely eradicating it from the co-culture after 24 hours. As LM displayed the largest zone of inhibition against Salmonella typhimurium, it was selected in combination with phytobiotics in co-cultures with Salmonella. LM in combination with galic displayed the highest bactericidal effects on Salmonella typhimurium after 8 hours incubation when compared to probiotic (pvalue>0.05) and phytobiotics (pvalue<0.05) alone suggesting the combination’s potential as a prophybiotic in controlling Salmonella infection.

Note: This research was funded by the European Union’s Horizon 2020 research and innovation programme under the Marie-Sklodowska-Curie grant agreement No 955374.

Keywords: antimicrobial assays, bactericidal effect, lactic acid bacteria, phytobiotics, salmonella typhimurium

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Agricultural Land Abandonment: Case of Estonian Semi-natural Grasslands

Aki Kadulin

Abstract:

Agricultural abandonment is a prevailing phenomenon in Europe, with decreasing agricultural areas evident in recent decades, particularly in extensive and small-scale systems. Modelling studies predict further abandonment over the next 20-30 years, driven by factors such as soil erosion, unfavourable climate conditions, and economic sustainability. The collapse of the Soviet Union triggered widespread abandonment in Eastern Europe, while agricultural policies and subsidies play a significant role in areas with uncompetitive land productivity. In the 1990s there were no subsidies for farmers anymore and many of them stopped farming. Since Estonia joined the EU in 2004, farmlands have been cleared again due to increased land pressure, because of an increased demand for agricultural products and availability of subsidies. This study is aiming to find out abandonment drivers of semi-natural grassland abandonment drivers in Estonia, Sweden, Switzerland, and Romania. Semi-natural grasslands can be seen as marginal agricultural land. Semi-natural grasslands are economically not competitive with intensely managed agriculture land, but they withhold high ecosystem services potential and so play supporting and mitigatory role in agricultural landscape. The drivers of semi-natural grassland abandonment can be categorized into distinct domains, including technological, political, socioeconomic, and geo-biophysical factors. First the literature review including grey literature was done to bring out every region's peculiarity. Interviews with experts have carried out to systematically evaluate the risk and reasons of abandonment of semi-natural grasslands. Those results can be used to evaluate the current policy and make proposals how to maximize benefit ecosystem services those marginal agriculture provide.

Keywords: agriculture, semi-natural grassland, land use change

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Different Approaches to CO₂ Labeling in Café/Restaurant Menus

Oksana Pokutnia & Håkan Lane

Abstract:

Carbon labeling of meals is used to nudge consumers choose the products that are associated with fewer CO₂ emissions. Despite different types of labeling approaches, it is still not clear which paradigm has the strongest effect in encouraging consumers to make environmentally-friendly purchases. The goal of this online survey is to deploy four different CO₂ labeling approaches with the aim to identify which one is the most effective in comparison with the control group. The Psytoolkit web-based surveying tool was used to simulate a fictitious cafe/restaurant visit. Four different CO₂ labeling approaches and one control group were used: 1) pie chart continuous scale from fully green (least CO₂) to fully red (most CO₂); 2) circular traffic light A-C scale; 3) climate score from 1-9, where a higher number indicates less CO₂; 4) CO₂ equivalent emissions of each in CO₂e/kg; no climate information (control). In total, 180 individuals completed this survey. Individuals are recruited using convenience and snowball sampling. Every enrolled participant is randomly assigned to one of the defined groups. The sample is recruited using SurveyCircle platform and local university students. The survey is now on the stage of statistical analysis. Prior examination of the obtained answers implies that each labeling type displays statistically significant effectiveness in engaging customers to make eco-friendly choices. Among diverse labeling paradigms (visual, numeral, and a combination of both) numeral CO₂ approach seems to have the greatest impact.

Keywords: CO₂ emissions, eco-labeling, climate score, café menu

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Carnism as a key factor of an unsustainable and unequal food system

Anna Buncler

Abstract:

The contemporary ecological crisis is predominantly the effect of human activity on Earth, known in geology, as well as the humanities, as the Anthropocene. One of the main elements of the Human Epoch, though still not widely recognised and acknowledged, is carnism. Carnism, which reached its apogee in the developed countries, contributes to the loss of biodiversity, species extinction, and unsustainable, unequal food systems. It is also morally ambiguous and inconsistent with the values held by the majority of humans around the world. This paper has two aims: 1) to present the definition of carnism, as this notion is new and not widely acknowledged – the term was introduced for the first time in 2001 by social psychologist, Melanie Joy; 2) to suggest the possible solutions to the problems created by carnism. The key is to shift the dominant narrative in food culture (which is a carnist one) to alternative ones, by giving the voice to underrepresented groups – vegans, vegetarians and flexitarians. These groups are often silent, invisible and vulnerable. They rarely express their food choices aloud, since their unpopular choices expose them to prejudice and risk to their social belonging. The paper concludes that supporting and empowering these groups can broaden the perspectives of others, initiate changes in social norms and in consequence lead to more sustainable food systems and more conscious food choices.

Keywords: carnism, sustainability, food choices, ethics

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Session 10 - Sustainable Tourism

Moderator: Anette Oxenswärdh, Uppsala University

Environmental management skills for tourism jobs of tomorrow

Sanna-Mari Renfors

Abstract:

Environmental management skills are crucial for sustainable tourism development and tourism employment as its jobs are greening. These are required as an essential element of the future-proof jobs to reduce the environmental impact of tourism companies and the industry. Therefore, the first step to provide skilful workforce in the tourism industry is to understand the changes caused by the green economy to the skill requirements. This paper contributes to this aim by developing an environmental management skills profile required by the Finnish tourism industry. The profile is developed based on secondary data, a survey and industry interviews (n=10) conducted in spring 2023. Based on the findings, the required environmental management skills by the Finnish tourism industry are strategic management, environmental impact management, resource management, green product and service development, green marketing and communication, green engagement, and value chain collaboration skills. In addition, the findings emphasise that environmental sustainability is a mindset of tourism entrepreneurs and all employees. It can be concluded that the developed profile supports tourism trainers to deliver more specific and industry-oriented education and training, which cover the up-to-date and relevant skills to promote environmentally sustainable development and perform everyday tasks in a sustainable way.

Keywords: sustainable tourism, environmental management, skills development, tourism industry

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