UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN
FACULTY OF GEOENGINEERING
Department of Land Management
Department of Geodesy

BOOK OF ABSTRACTS

International Scientific-Methodical Conference

BALTIC SURVEYING'25

under the auspices of

Voivode of Warmian-Masurian Voivodeship

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7-9 May 2025, Olsztyn, Poland

The conference will be held at the University of Warmia and Mazury in Olsztyn (Department of Land Management and Department of Geodesy) **on 7-9 May 2025**. This conference is organized in collaboration with Latvia University of Life Sciences and Technologies (Latvia) and Vytautas Magnus University Agriculture Academy (Lithuania). The purpose of this conference is to share the experience and knowledge in actual problems of land administration, land management, cadastre, land use, rural development, geodesy, cartography, remote sensing, etc. Problems of improvement of education in land management will be discussed as well.

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

TABLE OF CONTENTS

ORAL SESSION I
– LAND MANAGEMENT SESSION

BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

REVIEW OF RECLAIMED LAND IN LITHUANIA

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Abstract
Land reclamation is the improvement of unfavorable natural conditions of used land for human needs, aiming to enhance agricultural crop growing conditions and increase soil fertility. In this regard, Lithuania is unique, as no other country in the world has such a relatively large proportion of reclaimed land—47% of the country or 87% of agricultural land area—drained by drainage systems. Drainage and other reclamation structures have been serving agriculture for almost 50 years, but today their wear and tear in some areas of Lithuania exceed 70%. For this reason, farmers continuously face various challenges, making investments in the reclamation system essential. To reconstruct and maintain reclamation engineering structures, it is proposed to establish a reclamation fund in Lithuania. However, before assessing the need for reclamation system reconstruction, it is crucial to have accurate information and evaluate the current state of reclamation systems. Therefore, the objective of this article is to analyze the condition of reclaimed land and reclamation structures in Lithuania. The analysis of reclaimed land conditions was conducted using the spatial data set of the reclamation condition and waterlogging of the territory of the Republic of Lithuania at a scale of 1:10,000 (Mel_DR10LT). The obtained results suggest that areas with decommissioned or poor-condition reclaimed land in Lithuania likely exceed 6,000 hectares. However, a fundamental problem is that some municipalities do not account for or report any data on the condition of reclaimed land in their regions, which distorts the real assessment of the state of reclaimed land and reclamation structures. Therefore, to ensure effective accounting and rational use of reclaimed land, solutions must be found to address these accounting issues.

Keywords: reclamation condition of land, drainage systems, spatial data set of reclamation condition and waterlogging (Mel_DR10LT)

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

APPLICATION OF SLAM TECHNOLOGY IN LAND AND CULTURAL HERITAGE PROTECTION: ALGORITHMS, METHODOLOGY, AND TECHNOLOGICAL SOLUTIONS

Taras Ievsiukov, Ivan Kovalchuk, Oleksiy Kutsenko, Dmytro Matviichuk
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Abstract

The destruction and damage of cultural heritage sites due to military conflicts pose a significant threat to historical preservation. As of May 25, 2024, 1080cultural heritage sites in Ukraine have been destroyed or damaged since the beginning of the Russian invasion, highlighting the urgent need for innovative preservation methods. In this paper explores the application of Simultaneous Localization and Mapping (SLAM) technology for scanning and creating 3D models of valuable historical, cultural, and architectural monuments in Ukraine. The research aims to develop a methodology, algorithms, and technological solutions for using SLAM-based scanning to document and preserve cultural heritage. The proposed approach was tested on notable cultural heritage sites, including the historic educational buildings of the National University of Life and Environmental Sciences of Ukraine (designed by Ukrainian architect Dmytro Dyachenko), the Central House of Officers of the Armed Forces of Ukraine, and the Main Building of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute." The study demonstrates the effectiveness of SLAM technology in capturing complex architectural details, facilitating rapid and cost-effective data acquisition for heritage documentation. The developed methodology and algorithms can be adapted for similar applications in other regions of Ukraine, considering the unique characteristics of each site and the available research tools. The findings contribute to advancing digital heritage conservation and integrating modern geospatial technologies into cultural heritage management.

Keywords: SLAM technology, cultural heritage preservation, 3D modeling, land-use planning, especially valuable lands

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

SHAPING NATURE-PROTECTED SPACE IN THE FACE OF PROGRESSIVE URBANISATION PROCESSES ON THE EXAMPLE OF SELECTED SITES IN THE PODLASKIE REGION

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Abstract
Areas covered by forms of nature protection, such as national parks or landscape parks, are extremely valuable elements of space. Their location near urban centres may pose a specific threat to their preservation and protection. In this respect, the appropriate spatial policy of local self-governments and the appropriate park protection policy undertaken by specific park management bodies are significant. The spatial policy of municipalities and the arrangements of protection plans for landscape/national parks are tools for shaping such spaces and their protection in line with sustainable development.
Urban development of cities and demographic development may cause an exodus of people to peripheral areas. The location of protected natural areas in such zones or their vicinity encourages people to settle and enjoy recreational activities. Rational spatial management in such areas can effectively protect natural areas from the negative consequences of urbanisation activities.
Podlaskie voivodeship has many sites covered by forms of nature protection, including national parks, landscape parks, and three main urban centres. The Wigry National Park, the Knyszyn Forest Landscape Park and the Suwalki Landscape Park, among others, were adopted for the analysis. In order to check how the space of these areas and their buffer zones is shaped, the main places of population growth and development were identified. How the spatial policy is implemented and the provisions of the protection plans were verified in the municipalities relevant to these sites. The analyses made it possible to formulate the main directions for the development of buildings and to assess the rationality of spatial management in nature-protected areas.

Keywords: landscape park, national park, spatial policy

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

PUBLIC VALUE CAPTURE AS A MECHANISM FOR AFFORDABLE HOUSING DEVELOPMENT IN BRATISLAVA: OPPORTUNITIES AND CHALLENGES

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Abstract

As Bratislava undergoes rapid urban development, ensuring affordable housing remains a pressing challenge. Public Value Capture (PVC) emerges as a promising mechanism to redistribute the financial gains of urban growth and reinvest them into public goods, particularly housing affordability. This article investigates the potential of PVC as a strategic tool to address Bratislava's growing affordable housing crisis. Amid rising property values and increasing housing costs, PVC provides a framework for municipalities to leverage the financial returns from public investments in infrastructure and urban development. By examining current affordable housing initiatives in Bratislava, this study demonstrates how PVC can effectively channel captured value into social housing projects. Additionally, it evaluates the broader implications of PVC implementation for urban planning, fiscal sustainability, and social equity.

The findings underscore that while PVC holds significant promise for supporting affordable housing, its success hinges on the establishment of robust regulatory frameworks, strong political commitment, and effective public-private collaboration. This paper concludes by offering policy recommendations to enhance PVC strategies, aiming to foster equitable urban development and improve housing affordability in Bratislava. These recommendations provide actionable insights for policymakers seeking to promote inclusive and sustainable urban growth.

Keywords: public value capture, affordable housing, Bratislava, housing crisis, public investments

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

NETWORK ANALYSES IN THE STUDY OF RAILWAY ACCESSIBILITY IN THE MASOVIAN AND WARMIAN-MASURIAN VOIVODESHIPS

Michał Bijata, Agnieszka Dawidowicz
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Abstract

The aim of this study is to analyze railway accessibility in the Masovian and Warmian-Masurian Voivodeships in 2025 and to compare their similarities. Previous research has focused on broadly defined transport accessibility or more narrowly on railway accessibility, but a comprehensive comparative analysis highlighting the differences between these regions is lacking.

The theoretical part reviews definitions of railway accessibility and their practical applications. The case study examines infrastructural accessibility in both voivodeships using spatial data analysis. The evaluation criteria include territorial cohesion, identification of areas with insufficient railway service, the strength and direction of transport connections within the railway system, the functional hierarchy of territorial units, and the distance between railway infrastructure and built-up areas.

Spatial analyses were conducted using GIS technology, enabling a detailed assessment of accessibility and its variation across the studied regions.

Keywords: transport accessibility, rail transport, public transport, region

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POSTER SESSION

BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

SPATIAL ANALYSIS OF RESIDENTIAL RETURN RATES IN THE LARGEST CITIES OF POLAND

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Abstract

Rates of return, which are the relationship between potential rental income and the costs incurred to acquire and maintain real estate, are a key indicator of the effectiveness of real estate investment as a source of income. Rates of return in residential real estate markets are characterized by significant spatial variation, resulting from the multidimensional interaction of local and macroeconomic factors. Taking into account the influence of location in rate-of-return analyses faces significant methodological difficulties due to limitations in traditional calculation methods and analytical models, which, as a rule, do not relate to space. This paper presents the results of a spatial analysis of residential real estate rates of return in Poland's largest cities using, among other things, geographically weighted mixed regression (MGWR) models. The methods used made it possible to determine the spatial heterogeneity of the relationship between income and price, which formed the basis for the development of maps showing the spatial distribution of rates of return for areas of selected local markets. The results indicate significant differences between locations, which underscores the importance of considering spatial factors in assessing the attractiveness of real estate investments, both from the perspective of individual and institutional investors.

Keywords: housing market, rate of return, spatial analysis, geographically weighted regression

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

CURRENT DEVELOPMENTS IN HOUSING PRICES IN SLOVAKIA AND RELATED KEY DETERMINANTS

Miroslav Panik, Julius Golej
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Abstract

Real estate prices have been growing for a long time. Property prices have increased in many countries and this growth is due to various factors such as rising incomes, low interest rates and a growing population. The Economic development and development on the real estate market are interconnected. During an economic expansion, rising incomes cause equilibrium prices in the real estate market to rise, which in turn will affect price expectations and capital gains, causing excessive price increases.

Average prices could increase by almost ten percent this year. Higher inflation, together with the new value-added tax rate and falling mortgage rates, are creating a favorable environment for the growth of prices for new and existing properties. The increase in basic VAT rates quickly translated into an increase in the prices of new buildings and construction materials.

This paper describes the current development of residential property prices, including an estimate of the price trend until the end of 2025. Using statistical methods – correlation analysis, the paper points to important social and economic determinants that influence housing prices in Slovakia.

Keywords: real estate prices, housing determinants, interest rates, correlation analysis

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

STEAM-EDUCATION AS A TOOL FOR FORMING GEO-ENVIRONMENTAL RESEARCH COMPETENCE OF GEOGRAPHY TEACHERS ON THE SUBJECT OF ENVIRONMENTAL POLLUTION

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Abstract

A modern geography teacher should not only master subject concepts, but also form meta-subject skills in students, including research competence and environmental literacy. Analysing the changes in the content of geographical education, it should be noted that it is necessary to transform the process of training geography students in the system of higher pedagogical education in order to form geo-environmental and research competence.

This article considers methodological and practical aspects of geo-environmental and research pre-service geography teachers using STEAM educational technologies in the study of air pollution by city-forming industrial enterprises and transport. The goal of this study is to determine the effectiveness using STEAM to develop students' geo-environmental research skills on the subject of environmental pollution. An analysis of effective methods of STEAM-technology application in the educational process, based on the use of remote sensing data, digital interactive maps, results of empirical research on the ground was carried out.

The research was conducted among students of 3-4 years of educational programmes 6B01509-Geography and 6B01510-Geography-History of Zhetysu University named after Iliyas Zhansugurov (Kazakhstan). The research population consisted of 50 students consisting of 23 students at the control group and 22 students were included in the experimental group. The research applied the methods of observation, analysis, evaluation, design and experimental research. The results of the research confirm the high potential of STEAM-technologies in the formation of geo-environmental research competence of geography teachers, as well as the development of their functional literacy in accordance with the requirements of the information society in modern conditions. The presented practical examples provide successful experience of using STEAM-technologies in the educational process.

Keywords: geo-environmental competence, STEAM technology, enterprises, air pollution, digital map

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

LOCAL SPATIAL DEVELOPMENT PLAN AND VIOLATION OF THE ESSENCE OF PROPERTY RIGHTS

Aleksandra Kudrzycka-Szypiłło
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Abstract

The right to property is one of the fundamental human and civil rights. Property rights are universal rights. In the civil law sense, ownership is the most comprehensive property right, granting the owner the widest range of rights in relation to the thing. Within the limits set by the laws and principles of social coexistence, the owner may, to the exclusion of other persons, use the thing in accordance with the socio-economic purpose of this right, and derive benefits from the thing. Within the same limits, he may dispose of the thing. In accordance with Article 6, paragraph 1 Act of 27 March 2003 on spatial planning and development the provisions of the local development plan, together with other regulations, shape the manner of exercising ownership rights to real estate. The provisions of the plan may limit the owner's rights to the land, including the manner of its development. The question that needs to be answered is when regulations that infringe on property will constitute a violation of the law. Court case law indicates that such infringement of property does not constitute an infringement of the right as long as it is done with respect for the right to property, including the constitutionally protected right to property, and taking into account the principle of proportionality.

Keywords: property rights, ownership, local spatial development plan, the principle of proportionality

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

PROTECTION OF AGRICULTURAL AND FOREST LAND IN THE NEW PLANNING SITUATION

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Abstract

In the face of increasing urbanization pressures and changes in spatial policy, the protection of agricultural and forest land becoming a key challenge for municipalities and public administration. The amended legislation introduces the obligation preparing general plans and designate areas of replenishment, which significantly affects the spatial planning process and land management.

The article analyses the impact of the new regulations on the protection of land of high agricultural and natural value. The introduction of general plans as obligatory element of the spatial policy of municipalities is supposed to organize urbanization processes and reduce chaotic development. One of the key tools in this regard is the designation of replenishment areas, which allows the rational development of already urbanized areas reduces pressure on new agricultural and forest land.

The conclusion notes the need to strengthen control mechanisms and financial support for municipalities to effectively implement new planning tools. Protection of agricultural and forest land in the new planning reality requires a balanced approach that will enable harmonious development of rural and urban areas without excessive interference with valuable natural resources.

Keywords: development replenishment area, municipal general plan, protection of agricultural and forest land

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

NATURE-BASED SOLUTIONS IN LAND MANAGEMENT FOR ACHIEVING LAND DEGRADATION NEUTRALITY IN UKRAINE

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Abstract

In this study, land degradation is defined as the harmful alteration of both the qualitative characteristics and quantitative condition of land within the ecosystem. This degradation results from human activities as well as direct or indirect processes such as climate change and the effects of war. It is manifested by the long-term reduction or loss of biological productivity, ecosystem value, and ecological integrity. Ukraine's environmental policy aims to achieve a land degradation neutrality to preserve land resources and prevent net losses of healthy and productive lands. This goal is pursued by combining measures designed to avoid, reduce, and reverse degradation. To offset anticipated losses, it is crucial to adopt nature-based solutions in land use and management. These solutions involve actions to protect, sustainably manage, and restore both natural and altered ecosystems. This study aims to explore the synergy between mitigating land degradation and the associated benefits of nature-based measures, thereby contributing to the fight against land degradation and supporting sustainable development goals. The focus of this study is the land in Ternopil region, where several measures have been proposed to reduce degradation processes. These measures include the restoration of forest, grassland, and wetland areas; management of natural and semi-natural landscapes; and the implementation of an integrated nature-based approach to agriculture. Key actions include restoring and creating forest belts, returning riverbanks to their natural state, preserving naturally regenerated forests on agricultural land, and forming an ecological network. At the local level, it is recommended to adopt an integrated landscape approach to spatial planning for community development. It is advisable to allocate up to 10% of agricultural land to natural and semi-natural ecosystems, such as meadows, forest belts, hedges, wetlands, grasslands, and steppe areas. Additionally, promoting innovative agroforestry practices that are currently uncommon in Ukraine is encouraged. At the national level, amendments to legislation are necessary to implement and enforce nature-based solutions across all sectors of Ukraine's economy. This aims to ensure rational land use, protection, and regeneration, adherence to environmental protection requirements, and the achievement of Sustainable Development Goals. Furthermore, it is essential to develop financial and credit mechanisms to stimulate the practical implementation of these solutions and enhance the knowledge and awareness of land users regarding the adoption of nature-based approaches and their potential for achieving land degradation neutrality.

Keywords: land, degradation, sustainability, management, protection, regeneration

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BOOK OF ABSTRACTS
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BALTIC SURVEYING'25
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ACQUISITION OF REAL ESTATE BY FOREIGNERS. A STUDY ON THE READINESS TO PURCHASE REAL ESTATE

Maria Hełdak
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The study primarily examined the scale of acquisition of agricultural land by foreigners in Poland (European Union) and the scale of acquisition of residential premises by foreigners. The analyses include the number of permits issued to foreigners to purchase agricultural land in Poland and the area of real estate ultimately acquired by foreigners, the number of acquired residential premises, as well as the distribution of transactions in the country by voivodeships and the largest cities in Poland and the acquisition of land for purposes other than agricultural. The research part concerned preferences and willingness to take out a loan to buy a flat or house in Poland. The authors asked the question: Are foreigners willing to buy a flat/real estate in Poland and are they ready to take out a loan for this purpose, taking into account the country of origin, age and place of residence? It was established, among other things, that 23.2% of respondents intend to take out a loan to buy a flat, and every fifth person surveyed (19.7%) does not have an opinion on this subject yet.

Keywords: real estate

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BOOK OF ABSTRACTS
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SURVEYING DOCUMENTATION PREPARED FOR THE PURPOSE OF COURT PROCEEDINGS – EXPERIENCES OF SELECTED COUNTRIES OF THE WORLD

Agnieszka Cienciała
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Abstract

Judical experts in the field of surveying and cartography are a valuable source of evidence, and conclusions of their opinions concerning important facts of a case are often crucial for the outcome of proceedings. The opinions of the aforementioned experts play an important role, inter alia, in civil cases involving the protection of property and other rights, boundary disputes, etc. They facilitate the court's assessment of the facts and sometimes condition the correct resolution of the case. In practice, there are also orders from courts to produce the above-mentioned documentation in the course of commercial and criminal judicial procedures, although they are not so numerous. The subject matter of surveying documentation prepared for the needs of court proceedings is a difficult issue that requires broad interdisciplinary knowledge, including expertise of the legal conditions of a given country. In practice, even within one country, in different parts of the country, there are different rules and approaches to the execution of the documentation in question. For the purposes of the presentation, the author investigated the issue of surveying documentation prepared in the course of court proceedings in selected countries of the world, including procedures involving the division of real estate, establishment of easements or transmission easements, demarcation and acquisitions. The survey made it possible to discern principles and good practices in the preparation of the above-mentioned documentation, including maps for legal purposes on the international stage. The analyses were aimed at comparing the rules in force in this respect, as well as differences in approach to the above-mentioned subject matter.

Keywords: judical expert, expert opinion, surveying for court proceedings, demarcation, establishment of easement, inheritance, subdivision, maps for legal purposes

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BOOK OF ABSTRACTS
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WATER IN URBAN ENVIRONMENTS: THE INFLUENCE OF BLUE INFRASTRUCTURE ON RESIDENTIAL APPEAL

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Abstract
The study focuses on assessing the quality and functionality of water bodies as components of Blue Infrastructure (BI) in the urban environment, using the city of Olsztyn as a case study. BI, which includes both natural and man-made water features, plays a vital environmental, social, and recreational role in cities. The aim of this study was to carry out a detailed inventory of water reservoirs and assess them in terms of quality and accessibility, considering their various functions (recreational, aesthetic, ecological). All reservoirs within Olsztyn's administrative boundaries were evaluated through cartographic analysis, field surveys, and geo-surveys. The study's findings aim to identify which functional characteristics of water bodies are most relevant to their attractiveness in the context of urban space, providing tools to support the planning of sustainable and environmentally friendly cities.

Keywords: Blue Infrastructure, water bodies, urban environment, sustainability, recreational functions, spatial planning,

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BOOK OF ABSTRACTS
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TERRITORIES PLANNING FOR THE USE OF RENEWABLE ENERGY SOURCES AS AN IMPORTANT AREA OF SUSTAINABLE LAND MANAGEMENT

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[2] University of Warmia and Mazury in Olsztyn

Abstract
Effective land management in the context of renewable energy development is an important area of modern scientific and practical activity. The article discusses topical issues of renewable energy sources (RES) integration into spatial planning and land use, taking into account their impact on ecosystems, socio-economic conditions and possible land conflicts. Particular attention is paid to the challenges associated with the use of land for solar power plants, wind farms and bioenergy complexes. The article emphasizes that the development of renewable energy sources requires significant areas of land, which necessitates strategic planning and minimization of negative environmental impact. The article highlights global and national trends in the introduction of renewable energy, especially in the context of Ukraine's post-war recovery. The expediency of using degraded and contaminated lands for the placement of renewable energy facilities is substantiated, which will optimize spatial development and contribute to the country's energy independence. The methodological basis of the study is the analysis of legal acts, international experience and scientific approaches to land management in the field of renewable energy. The article also discusses potential risks and limitations that may arise during the implementation of renewable energy projects. The possibilities of attracting crowdinvesting in renewable energy projects are discussed separately, which will allow not only to finance the development of energy infrastructure, but also to attract the general population to participate in the energy sector. The results obtained will contribute to the formation of effective land management strategies and their integration into sustainable development policy, both in Ukraine and in Poland.

Keywords: land resources, renewable energy sources, spatial planning, sustainable development, crowdinvesting

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BOOK OF ABSTRACTS
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ASSESSMENT OF SPATIAL CONSISTENCY OF THE BDOT10K ROAD NETWORK FOR THE LOCALIZATION OF RENEWABLE ENERGY INSTALLATIONS

Teresa Front-Dąbrowska
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Abstract

The increase in energy production from renewable energy sources (RES) has remained a key issue for many years, both in Poland and worldwide. The selection of locations for planned renewable energy installations involves the use of various spatial datasets, particularly geodetic databases. The analyses performed in the preliminary design stage use GIS tools that allow the identification of optimal investment areas, the exclusion of inappropriate locations, and the definition of factors that influence the economic feasibility of the investment. One of the crucial factors is direct access to the road network, the presence of a paved access road, and the ability to determine the distance from the road axes. The purpose of this study was to estimate the spatial consistency of the publicly available BDOT10k geodetic database concerning the road network. Analyses carried out in representative test areas allowed the identification of gaps in BDOT10k through comparison with reference data from the BDOT500 database. The research was carried out in a GIS environment, focusing on surface data analysis and the road surface attribute. A correlation was found between the degree of land development and the spatial consistency of BDOT10k with BDOT500. The findings emphasize the need for developing automated tools to update BDOT10k using orthophotomaps, aiming to reduce errors caused by subjective data interpretation.

Keywords: renewable energy sources (RES), spatial data, BDOT10k, road network

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BOOK OF ABSTRACTS
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LAND ACQUISITION BY THE STATE FORESTS IN POLAND AS A TOOL FOR SPATIAL POLICY IMPLEMENTATION – ECONOMIC AND REGIONAL ANALYSIS

Hubert Kryszk, Wiktoria Wiśniewska
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Abstract

The article examines the process of land acquisition by State Forests (SF) in Poland as a key element of active spatial policy in the years 2022–2025. The objective of the analysis is to assess the impact of these activities on land ownership structure and land use in rural and forested areas.

The spatial analysis includes an examination of the distribution of transactions at the regional (voivodeship) and local (county) levels, considering correlations with forest cover and the presence of protected areas such as Natura 2000 and landscape parks. The economic aspect of the study focuses on comparing the acquisition prices of land by SF with market prices of agricultural and forest land, as well as identifying long-term price trends.

Additionally, the study evaluates the environmental functions of the acquired land, analysing its potential contribution to climate policy objectives and biodiversity conservation. The article concludes with policy recommendations regarding the effectiveness of the current land acquisition mechanisms and the potential need for modifications to the right of first refusal regulations, taking into account the perspective of sustainable development in rural and forested areas.

Keywords: land acquisition, spatial policy, environmental functions, economic analysis, sustainable development

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BOOK OF ABSTRACTS
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GIS TOOLS FOR GREEN INFRASTRUCTURE – A CASE STUDY OF THE POJEZIERZE ESTATE IN OLSZTYN

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Abstract
Green infrastructure is becoming an increasingly important element of urban environmental policies. Its significance grows alongside rising public awareness of climate change and the broader societal trend toward undertaking pro-environmental actions. Consequently, municipal authorities, partly under pressure from residents, are engaging in efforts aimed at more effective management of green spaces. However, when addressing the issue at a central level, small spaces located at the points of greatest interaction with users are often overlooked. Therefore, managing green infrastructure at the neighborhood or district level becomes crucial. It enables the effective implementation of green space policies and better alignment with residents' expectations. To efficiently undertake actions related to green infrastructure, it is advisable to use GIS tools, which provide strong support for decision-making, research, analysis, and local-level management activities. Among other capabilities, they facilitate the rapid identification of problems, the mapping of functions, and the monitoring of environmental conditions within a given administrative unit.

Keywords: local governance, spatial decision-making, public spaces, green infrastructure

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BOOK OF ABSTRACTS
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AGRICULTURAL BIOGAS IN POLAND: A STRUCTURAL AND SPATIAL ANALYSIS IN COMPARISON WITH SELECTED EU COUNTRIES

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Abstract

Agricultural biogas is a key element of regional energy transition in the European Union, supporting the development of renewable energy sources and the circular economy. The aim of this article is to conduct a structural and spatial analysis of agricultural biogas development in Poland, compared with selected EU countries: Germany, Denmark, France, and the Czech Republic. The study assesses the effectiveness of national support systems, the spatial distribution of biogas installations, and the institutional conditions for implementing biogas technologies.

The study adopts a territorial approach, integrating methods from socio-economic geography, spatial planning and public policy analysis. The research combines comparative policy analysis, stakeholder analysis and spatial tools (GIS and PCA) to identify key location factors for biogas plants. Three synthetic indicators were developed: WEF (financial efficiency), WGT (territorial density) and WES (substrate efficiency), which allowed for an objective assessment of national biogas support systems. The results indicate that although Poland has a high substrate potential and a dominance of waste-based raw materials, its support mechanisms are financially inefficient and poorly integrated with spatial planning processes.

The paper highlights the need to align energy policy with spatial planning and calls for the implementation of a multi-level governance model that takes into account local institutional and social contexts. Policy recommendations include regionalised support schemes, the development of micro-installations, simplified administrative procedures and a stronger role for local governments and communities. The study contributes to ongoing research on the territorial dimension of energy transition and sustainable planning of the bioenergy sector in the EU.

Keywords: agricultural biogas, energy transition, spatial planning, renewable energy sources (RES), support mechanisms, spatial management

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BOOK OF ABSTRACTS
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THE ROLE OF SMART CITY ELEMENTS IN PUBLIC OPEN SPACE FROM THE PERSPECTIVE OF GEN Z

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Abstract
Generation Z is the group of people born between 1997 and 2012 who are now young adults or are just entering adulthood. These individuals highly prioritize digital technologies of various kinds. They appreciate solutions that are fast, easy to use, convenient to use and, above all, useful. In the public space, smart solutions that serve the general public, including the examined generation, can be specified. A geo-survey was conducted to show which solutions are perceived as most useful by this generation. In addition, this group of people's preference for smart solutions was shown: whether they prefer these or analog solutions more. As it turned out, today's young adults want smart solutions, regardless of whether they live in the city every day or if they commute to university or to work every day.

Keywords: smart city, gen Z

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
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7-9 May 2025, Olsztyn, Poland

CHALLENGES FACING HOUSING MANAGEMENT SYSTEMS IN POST-SOVIET COUNTRIES: THE CASE OF UZBEKISTAN

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Abstract

Uzbekistan, like many other post-Soviet countries, has undergone significant socio-economic and institutional changes since gaining independence. The current housing management system in Uzbekistan is struggling with significant shortcomings in service provision, infrastructure maintenance, and financial stability. Many residential buildings constructed during the Soviet era are in urgent need of renovation and modernization, while the fragmented structure of the housing management system and the lack of effective regulatory mechanisms hinder the implementation of comprehensive management strategies.

This paper focuses on analyzing the transformation of the housing management system in Uzbekistan, with a particular emphasis on key challenges in the management of multi-owned housing stock. The research aimed to provide a comprehensive assessment of the current state of the housing management system and to explore and indicate innovative housing management strategies that increase efficiency, sustainability, and stakeholder engagement.

The study revealed urgent needs for improved regulatory frameworks, increased financial transparency, digitization of management processes, and the promotion of sustainable practices in the management of multi-owned housing. The obtained results provided recommendations for improving the efficiency and quality of housing stock management services, and long-term sustainability in Uzbekistan's housing sector.

Keywords: housing transformation, multi-owned housing, housing management challenges, homeowners associations, Uzbekistan

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ORAL SESSION II
– GEODESY AND SURVEYING SESSION

BOOK OF ABSTRACTS
International Scientific-Methodical Conference
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7-9 May 2025, Olsztyn, Poland

APPLICATION OF THE LBTU METHOD IN THE CONSTRUCTION DEFORMATION MONITORING

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Abstract

Deformation monitoring is one of the most crucial factors in ensuring the safe operation of modern infrastructure. The continuously increasing flow of freight transport results in growing dynamic loads on bridge spans. The increase in loads, combined with changing climatic conditions, affects the service life of structures. Consequently, continuous monitoring of structural health is essential to ensure their safe and efficient utilisation.

With technological advancements, geodetic engineers have gained access to a wide range of tools for measuring deformations. The selection of deformation measurement techniques depends on the specific task requirements, ranging from simple levelling to continuous satellite-based monitoring. However, many of these methods are rarely employed due to their high cost and technical complexity, posing a barrier to widespread implementation. As a result, only a limited number of structures are subject to continuous engineering supervision.

The Laser-Based Tracking Utilisation (LBTU) method offers a significant reduction in cost and complexity for continuous deformation monitoring of various structures, thereby increasing the accessibility of monitoring solutions. This method is based on a programmable laser distance meter capable of adjusting measurement frequency and transmitting data to a computer or cloud storage for further processing and analysis. The method represents a logical evolution of traditional levelling techniques, incorporating modern automation technologies.

The proposed method was tested in Riga, on a critical infrastructure site during maintenance works on the Zemitanu overpass. The experimental study demonstrated that the method is well suited for deformation monitoring and has proven to be sufficiently accurate, cost-effective, and easy to install. These advantages, in turn, open up extensive opportunities for further research and practical applications.

Keywords: deformation monitoring, LBTU, laser distance meter

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BOOK OF ABSTRACTS
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SEGMENTATION OF ALS DATA TO OBTAIN THE MOST RELIABLE PROFILES FROM M_{SPLIT} ESTIMATION

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Abstract

Modern measurement techniques might provide a huge number of measurements (usually known as big data) relatively quickly. One can list here, for example, global navigation satellite systems (GNSS) or light detection and ranging (LiDAR). Regardless of the source or data type, big data is always problematic. Processing a whole data set often requires a computer that is good enough and is very time-consuming. It is often hard to model more complex structures using whole data. Therefore, original data are usually segmented into more convenient parts, which can be processed quickly and provide results that are easier to interpret and more convenient to model engineering structures or terrain. The problems mentioned also concern M_{split} estimation, an advantageous method in LiDAR data processing. The study presents applications of the method in question in processing data from Airborne Laser Scanning (ALS) in profile determination. Three scenarios are considered: processing the whole sets, processing intervals, and processing data using the sliding window method. The computations are performed for two different objects, namely the field and the river. Based on the data from the years 2022 and 2023, the given profiles are determined. The obtained results show that the outcomes of the sliding window method are the most reliable. The profiles obtained using such an approach also seem more informative than those obtained from the whole set processing.

Keywords: M_{split} estimation, ALS, LiDAR, terrain profile

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BOOK OF ABSTRACTS
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7-9 May 2025, Olsztyn, Poland

OVERHEAD ELECTRIC POWER LINE MONITORING WITH REMOTE SENSING METHODS

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Abstract

This paper seeks to determine the most effective remote sensing techniques for monitoring overhead power transmission lines in the context of Latvia. Infrastructure monitoring plays a vital role in managing various sectors of the national economy, and it is especially critical in the field of electric power, where maintaining overhead power lines is essential. With the advancement of digital technologies, remote sensing methods have increasingly been applied for the monitoring of power lines.

The study investigated and compared several remote sensing approaches used for power line monitoring, recognizing that methods such as image acquisition, orthophoto map creation, and laser scanning using unmanned aerial vehicles (UAVs) are the most suitable for Latvian conditions.

A key finding of this research is that, in order to effectively apply remote sensing techniques to monitor overhead power lines, it is crucial to first gather detailed information about the power line itself. For instance, this study looked at Power Line A-24, which consists mainly of I-type wooden supports. Additionally, the study identified areas where deforestation of the protective strip of Power Line A-24 is necessary, recommending the removal of entire trees or bushes in some areas, or just specific branches in other cases. Powerline A-24 is mostly made up of I-type wooden supports that have different vertical offsets.

Keywords: remote sensing, power lines, unmanned aerial vehicles, point clouds

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BOOK OF ABSTRACTS
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IMPLEMENTATION OF OBJECT DETECTION ALGORITHMS IN THE INVENTORY OF TECHNICAL INFRASTRUCTURE, CASE STUDY: INSULATORS DETECTION

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Abstract

One of the key elements of technical infrastructure is utility poles. Their functionality depends on several factors, one of which is the technical condition of insulators. Maintaining them in proper condition is essential to ensuring the correct operation of utility poles. One possible way to conduct an inventory of technical infrastructure is by using remote sensing data for example cameras. However, analyzing the images manually can be time-consuming and prone to errors. Our idea is to use object detection algorithms to identify damaged insulators in images. The plan consists of three steps: pole detection, insulator detection, and damage detection.

In this study, we present object detection algorithms for identifying insulators in images of utility poles. These detections will be used in further research to analyze insulators for potential damage. For the object detection algorithm, we chose the YOLO model (You Only Look Once), which performs detection in real time, making it highly efficient. For training, we used 1,582 original images of utility poles, which were further augmented through rotation and mirroring. Additionally, we incorporated random images into our dataset to reduce the model's tendency for false positive detections.

Our study demonstrates very good results in terms of precision, recall, and mAP (mean Average Precision). The achieved F1-score exceeds 95%. The performance of this model provides a solid foundation for conducting further damage analysis of insulators.

Keywords: inventory of technical infrastructure, object detection, insulators, deep learning

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
7-9 May 2025, Olsztyn, Poland

ASSESSMENT OF PRECISE GEODETIC MEASUREMENTS

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Abstract

Geodetic measurements play a crucial role in various fields such as surveying, cartography and geodesy. These measurements provide precise and accurate information about the Earth's surface and its features. The evaluation of accurate geodetic measurements is of great importance in ensuring the quality and reliability of the data collected.

One of the key aspects of evaluating geodetic measurements understands the instruments and methods used in the data collection process. Instruments such as global positioning receivers, total stations, theodolites and leveling devices are commonly used to collect geodetic data. Understanding the specifications and limitations of these instruments is essential to assess the accuracy of the measurements obtained.

Another important factor in evaluating geodetic measurements is the quality control procedures implemented during the data collection process. Quality control measures, such as redundant observations, calibration checks, and error propagation analysis, are essential to identify and correct errors in the data. These procedures help ensure that the measurements collected are reliable and accurate.

In addition, the analysis and processing of geodetic measurements play a crucial role in assessing their accuracy. Various software tools and algorithms are used to process and analyze the collected data, allowing for the determination of precise coordinates and measurements. The accuracy of the results depends on the correct application of these analysis methods. The aim and objectives of the study are to identify and evaluate the potential errors, accuracy assessment of different types of geodetic measurement methods; to evaluate the causes of geodetic measurement errors.

In general, the evaluation of precise geodetic measurements is essential to ensure the accuracy and reliability of the data collected. By understanding the instruments, implementing quality control measurements, and using appropriate analysis methods, geodetic measurements can provide valuable information for a wide range of applications.

Keywords: geodetic precision, accuracy, geodetic instruments, geodetic methods, geodetic measurements

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BOOK OF ABSTRACTS
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CURRENT TECHNIQUES AND PROGRESS IN LAND SURVEYING

Adam Doskocz
University of Warmia and Mazury in Olsztyn

Abstract

The presentation is referred to geo-data sets or databases which are important for many government departments, business research and the general public (for Global, European and National SDI). The most accurate and up-to-date are data which are produced by geodetic and cartographic procedures.
These include group of methods, among others:
1) field surveys performed by electronic tacheometer (Total Station), RTN/RTK (Real Time) GNSS and other modern technologies (and their hybrid version) or pervious equipment,
2) re-use of previous results of direct measurements,
3) graphical-and-digital processing of analogue maps.
Noting that in a modern digital form, for example in typical large-scale cartographic products are created by compiling collected sets of data or databases. This approach facilitates the collection, maintenance, distribution and use of the SDI (Spatial Data Infrastructure). By reducing duplication, facilitating integration and also respecting user needs – the integration of data can produce savings.

Keywords: land surveying, techniques of measurements, acquisition of geo-data, spatial databases

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BOOK OF ABSTRACTS
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TRANSPORT INFRASTRUCTURE OF THE VISTULA FENS AND SELECTED REGIONAL ARCHITECTURAL OBJECTS

Dariusz Konieczny
University of Warmia and Mazury in Olsztyn

Abstract

The Vistula Fens are a unique region in the Vistula Delta, 1/3 of which is a depression. As a result, these areas are prone to flooding, which is countered by dikes and extensive drainage and flood control systems. The entire area is criss-crossed by rivers, canals and drainage ditches with numerous engineering structures and facilities. The complex nature of the terrain has necessitated appropriate planning of the rail and road transport infrastructure to accommodate inland navigation. The result is the Rybin railway swing bridge and a number of road drawbridges. There is still a ferry crossing on the Vistula in spring and summer along the voivodeship road 501. The seaport of Elbląg is also located in the study area. In 2022, the Vistula Spit will be crossed, opening a new waterway to this and other ports on the Vistula Lagoon. The purpose of this study is to present selected road, rail and water transport infrastructure facilities of the Vistula Fens. It should be noted that Dutch settlers, among others, contributed to the drainage and flood protection of this area, leaving behind not only drainage solutions, but also characteristic wooden buildings with arcades and windmills. The study describes selected buildings located along the transport routes.

Keywords: technical infrastructure, roads, railroad, bridges, waterway, Vistula Spit Canal, architecture, monuments

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ORAL SESSION III – GEOSPATIAL SESSION

BOOK OF ABSTRACTS
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THE DEVELOPMENT OF GEOSPATIAL KNOWLEDGE TODAY – BACK TO THE MAP

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Abstract

Today, the growth influence of geospatial information covers the entire public sector and spheres of functions and activities of each individual. It is a basis for conscious political, social calculations and support for decision-making, which helps to address and develop the sustainability of social, economic, environmental impacts on society. Thanks to such modern technologies as remote sensing, GNNS, high-performance computing, in geographic information systems (GIS) led significant changes in use and perception of geospatial information:

Traditional Cartography has become fully digital, creating digital terrestrial spatial data sets, digital systems allow them to integrate and analyze in combination with other types of data. Infrastructure for geospatial knowledge sustains development by making generated data sets usable, increasingly covering different sectors. State institutions adapted to the development of society and technologies, aware of the need for authorized data, where the main function is to ensure the unity, quality and compatibility of data for state functions and society use. In today's world, understanding "on demand" relates to "time" for humans and machines measured in minutes, seconds, not days and weeks.

Users need effective methods and knowledge to select information from a vast variety of sources, which is valuable for users. Looking at different paradigms of the data space, such as the cognitive pyramid of knowledge management, real-time related data spaces, intelligent data ecosystem, we have found that many questions related to the suitability of using geospatial information for purposes, can be answered using knowledge used "old, good" maps.

Keywords: geospatial knowledge, scale, map base

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BOOK OF ABSTRACTS
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USE OF GIS IN STUDYING CHILDREN'S MAP-READING SKILLS

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Abstract
Using maps, whether displayed on phone screens or in paper form, can be challenging even for adults. Having up-to-date maps on a phone can be useful for navigating unfamiliar places or finding faster routes in familiar cities. However, it is often observed that even adults struggle with map reading, which raises the question: how do children handle it? Can children effectively use maps? If they get lost, will they be able to open a mapping app on their phone and find their way back?
This study presents a tool that can be used to assess children's ability to use maps. The tool utilizes GIS, enabling real-time evaluation of how well children can locate themselves on a map.

Keywords: spatial orientation, spatial skills, map, GIS

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
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MODERN APPROACHES TO LAND RESOURCE MANAGEMENT USING GEOINFORMATION DATABASES

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Abstract

The article is dedicated to modern approaches to land resource management using geoinformation databases. The study emphasizes the relevance of applying geoinformation systems for the analysis, modeling, and visualization of spatial data, which facilitates informed decision-making in land use, agriculture, and ecology.

The main goal of the research is to create a structured geodatabase that includes administrative, hydrographic, agricultural, and transport objects. To achieve this goal, data from open sources such as QGIS and OpenStreetMap (OSM) were used and integrated into vector models for a detailed analysis of land resources.

As a result of the research, a geoinformation database was successfully developed for the East Kazakhstan region. This database enables comprehensive analysis of land resources, contributing to the region's sustainable development and land use optimization.

The authors highlight the importance of using modern geoinformation technologies such as ArcGIS and QGIS to enhance the accuracy and relevance of data, ultimately supporting well-informed decision-making in land resource management. The research results can be applied to further planning and support for the region's sustainable development.

Keywords: geoinformation systems (GIS), land resources, vector database, QGIS, East Kazakhstan region

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BOOK OF ABSTRACTS
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USING A CITY MODEL AS A DIGITAL TWIN FOR PUBLIC CONSULTATIONS

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University of Warmia and Mazury in Olsztyn

Abstract

This presentation discusses the conceptual framework for using a digital city model developed in Unreal Engine as a digital twin to support public consultations in spatial planning processes. The primary aim is to explore how immersive virtual environments can facilitate a better understanding of proposed landscape changes within the context of smart city development. By leveraging the interactive capabilities of Unreal Engine, the digital twin is intended to offer an intuitive and engaging platform for community dialogue.

The presentation outlines the technological foundations of the approach, including the use of C++ and the blueprint system for dynamically modifying the virtual environment. Furthermore, it includes examples of custom-made 3D models and demonstrates how their real-time adjustments may contribute to exploring citizens' perceptions of spatial transformations.

While the model offers significant potential for participatory planning, several challenges must be acknowledged. These include the high entry threshold for users unfamiliar with advanced technology, the need for substantial computing power, and the necessity of interdisciplinary collaboration between planners, software developers, and social scientists. Importantly, this approach raises critical questions about digital accessibility and inclusivity—particularly for communities with limited technological resources or digital literacy.

This conceptual reflection invites further investigation into the social impact of using digital twins in civic processes and encourages debate on their role as tools for transparency, empowerment, and more equitable urban decision-making.

Keywords: Digital twin, Unreal Engine, public consultations, spatial planning, smart city

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
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EVALUATION OF SETTLEMENTS AT RISK OF LANDSLIDES BY USING GIS/RS – CASE STUDY OF KASHAR ADMINSTRATIVE UNIT, ALBANIA

Enkela Begu, Albana Kosovrasti, Aida Huta
University of Tirana

Abstract

Landslide is a complex situation that derives from a variety of connected processes which include both causative and triggering factors. In residential areas this phenomenon cause life loss and infrastructural damages at great amount. Therefore, it is crucial for local and national decision makers to have an up to date, suitable and detailed information based on a complete landslide vulnerability assessment of the target area. In this context, the use of Geographic Information Systems (GIS) and Remote Sensing (RS) plays a key role in identifying and analyzing infrastructure at risk from landslides. Both these technologies offer the opportunity to integrate data on various contributing factors, such as geology, terrain slope, hydrography, land use, to create maps that indicate the level of spatially distributed risk of this process in and to develop prevention strategies. This study focuses spatial distribution patterns on landslide occurring in Kashar administrative unit, Tirana, Albania. This is done using MCDA technique in ArcGIS Desktop 10.8/ArcGIS Pro 3.2 by analysing four main contributing factors: land use, slope, distance from water flows and soil texture. Their relation to area settlements has been examined and hot spots of high risk of landslides have been identified.

Keywords: landslide, GIS, remote sensing, MCDA, satellite images, socioeconomic impact

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BOOK OF ABSTRACTS
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THE ROLE OF THE ROADS INFRASTRUCTURE AND OF THE AGRITOURISMS TRENDS FOR THE NEW DEVELOPMENT OF THE RURAL AREAS IN ALBANIA

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Abstract

Albania suffered the most brutal totalitarian rule of all the so-called communist countries of the East, with the most absurd and total collectivization of agricultural land and livestock, and at the same time the almost complete ban on the rural migration to the urban areas, due to a centralized planning of production and labor. This led to an almost contemptuous and rejecting feeling on the part of the Albanian population of everything that was "rural". This rejection of the countryside, first of all, and the disastrous state of roads in Albania after the fall of the communist regime, for a period of almost 20 years hindered rural development and the integration of rural areas into the flow of economic growth and transformation through successful economic activities related to tourism. Rural transformation was sporadic and very slow, but it started to accelerate after 2010 when a program of development of rural roads infrastructure started to implement. Our research through questionnaires and surveys has proven a direct link between the increase in road accessibility and the growing trend of opening agrotourism activities and their constant success. The experience shows that the development of a road through a rural area almost always brings to the opening of many agrotourisms along it. The rural areas are already being transformed thanks to a raising touristic interest towards them from the Albanian middle class, due also to its growing mobility. The refusal of the rural of the old generations, especially during the communist period, has already changed into a strong attraction among the new generations of Albanians.

Keywords: infrastructure, accessibility, rural, agrotourism, development, tourism

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ORAL SESSION IV – REAL ESTATE AND CADASTRE SESSION

BOOK OF ABSTRACTS
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ANALYSIS OF CADASTRE DATA OF POTENTIAL CONSTRUCTION SITES FOR SOLAR AND WIND POWER PLANTS

Maris Virkavs, Toms Lidumnieks, Vivita Pukite
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Abstract

When reviewing information on solar and wind power plant construction projects in Latvia, no specific data could be found on the areas of the territories required for their implementation and the purpose of real estate use of land units used in the construction process. The aim of the study was to compile open data from the Construction Information System and the Real Estate Cadastre Information System on land units intended for the construction of solar and wind power plants and to conduct an analysis of their cadastral data. The study analyzed 144 land units registered in the information system for the construction of solar and wind power plants on land with a total area of 3072.90 ha. The average area of a land unit for the implementation of the solar power plant construction plan is determined as 10.35 ha. Some regional differences were found, however, on average 49.6% of cases solar parks are built on agricultural land and 26.5% on industrial land. This confirms the trend of using agricultural land and unused land areas in the territories of industrial facilities for the construction of solar power plants. Determining the average area of a land unit for the construction of a wind farm was difficult, because the areas of individual land units selected for construction did not correspond to the number of wind generators to be designed. After correcting the data, the average area of land units intended for construction was determined as 27.32 ha, and the area per wind generator structure – 18.21 ha. Wind power plants are planned to be built on agricultural land in 88% of cases. Construction is planned on forestry lands in 10% of cases. It is expected that the area of land used in forestry for the construction of wind power plants in Latvia will increase, as the construction of wind parks in state-owned forest areas with a capacity of 800 MW is planned. It has been concluded that in some cases wind power plants are planned to be built on lands with a purpose of use - mineral lands, developed peat bog territories, which could be a good reserve for the construction of renewable energy production plants in the future.

Keywords: real estate, renewable energy resources, construction

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BOOK OF ABSTRACTS
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INNOVATIVE APPROACHES TO CADASTRE AND SPATIAL PLANNING IN THE CONTEXT OF MODERN SECURITY CHALLENGES: BALANCING TRANSPARENCY AND CONFIDENTIALITY

Andrii Martyn, Liudmyla Hunko, Liudmyla Kolosa
National University of Life and Environmental Sciences of Ukraine

Abstract

This article addresses contemporary challenges in the cadastral registration of land use restrictions around military and other strategically important facilities under martial law conditions. While public cadastres and open spatial data play a crucial role in land management and urban planning, they can inadvertently disclose sensitive information about military sites and critical infrastructures. Drawing on comparative analyses of international practices—including those of the United States, the United Kingdom, Germany, and Canada—this study proposes novel approaches for ensuring both robust security measures and efficient spatial planning. A flexible zoning framework incorporating "dynamic" buffer zones and "legend-based" masking techniques is explored. These tools allow for the protection of geospatial data regarding strategic and military objects while still providing essential information for civil planning and regulatory purposes. The research highlights specialized GIS algorithms that generate variable restriction parameters, as well as multi-tiered registration mechanisms, offering a viable pathway for effective data concealment and confidentiality. The results suggest that balancing transparency in land administration with state security imperatives is both feasible and urgent, given contemporary security threats. In conclusion, the study puts forth recommendations for legislative amendments, institutional transformations, and the adoption of advanced geoinformation technologies that collectively strengthen national resilience and improve the integrity of land administration systems.

Keywords: land cadastre, urban cadastre, wartime, military facilities, strategic infrastructure, land use restrictions, geographic information systems, data security, buffer zones, registration "legend"

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CHANGES OF REAL PROPERTY TAXATION SYSTEM IN LITHUANIA

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Abstract

There are three main real property taxes in Lithuania and all of them are applied to different persons and are calculated using different methodology. The revenue from real property taxes in different countries varies from 0.1% to 3% of GDP but in Lithuania it is even less than 0.1%. This revenue is allocated to municipal budget. Improvement of real property taxation system, changes in taxable value or introduction of new real property tax can increase revenue from taxation and encourage municipalities to improve living surrounding and infrastructure. Recent discussions in Lithuania about changes in real property taxation system show that new property tax for natural persons and leveling of tax rate can be introduced.

The aim of this research is to analyze real property taxation changes in Lithuania. New property tax legislation amendments can lead that owners would feel unjust because of different tax rate and different calculation of taxable value. Now we are facing paradigm, that Government wants to change real property taxation system, although physical persons already pay property tax. In addition, mediana of municipality taxable value is introduced as minimum untaxable value. Other proposal of amending the law is graduate taxable value and by certain intervals of value different tax rate will be applied. Another problem that we still have two taxes – land and buildings or premises and apartments. There were many discussions about joining these two taxes together but no Government efforts to solve this problem were done.

Keywords: real property, taxation system, tax rate

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BOOK OF ABSTRACTS
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INVESTMENT REALIZATION RISK IN THE LIGHT OF FORMAL-LEGAL AND ADMINISTRATIVE DOCUMENTATION ANALYSIS – THE ROLE OF PROPERTY VALUERS IN IDENTIFYING INVESTMENT THREATS

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Abstract

The realization of real estate investments involves multidimensional risks arising from both market uncertainty and complex formal-legal conditions. A crucial aspect of the investment process is identifying threats related to property valuation and potential administrative barriers that may affect the feasibility of a project. In this context, property valuers play a key role, as their analysis of planning documents, administrative decisions and legal regulations enables an assessment of investment risk and its impact on property value.

This paper focuses on the assessment of investment realization risk in light of the formal-legal and administrative conditions of the investment process. Key factors affecting project feasibility will be discussed, including the importance of local zoning plans, land use decisions, infrastructure agreements, and administrative procedures. The analysis also considers the impact of changing legal regulations on the stability of the investment process and explores strategies for mitigating risk at the planning and valuation stages.

Keywords: property valuation, administrative documentation in the investment process, investment realization risk

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BOOK OF ABSTRACTS
International Scientific-Methodical Conference
BALTIC SURVEYING'25
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REAL ESTATE MARKET TRANSPARENCY FROM THE PERSPECTIVE OF REAL ESTATE PROPERTY REGISTRATION

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Abstract
Accurate transaction prices and property-specific data are crucial for effective property valuation. The completeness and quality of this data directly influence the valuation outcome. However, when market participants have unequal access to information, information asymmetry arises. This study examines the impact of information asymmetry in the property market, focusing on property registration. It investigates how variations in information quality and availability affect market fairness and transparency. Using a mixed-methods approach, the study analyzes transaction data to assess these impacts. Results suggest that improving data transparency can reduce valuation inconsistencies, promoting a fairer real estate market. Recommendations include policy measures to minimize information asymmetry and enhance uniformity in property data collection and appraisal processes.

Keywords: transparency, property valuation, property transactions registration

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BOOK OF ABSTRACTS
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AGRICULTURAL GREENHOUSE GAS EMISSIONS AND MITIGATION STRATEGIES

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Abstract

Agricultural activities play a crucial role in food production; however, excessive use of synthetic fertilizers has raised serious concerns regarding environmental sustainability. The main GHGs from agriculture are methane (CH_4) from animal digestion (enteric fermentation) and rice paddies, nitrogen oxide (N_2O) from synthetic fertilizers, manure management, and tillage, and carbon dioxide (CO_2) from deforestation, soil degradation, and fossil fuel use in machinery. The present study examines GHG emissions from synthetic fertilizers and crops in Turkiye. Data is retrieved from FAO (Food and Agricultural Organization of the United Nations) for the 1961-2022 period. The results from indirect emissions indicated that nitrogen loss through leaching and volatilization was 37.5 kg/ha in 2020. Average losses were 0.127 and 0.37 kg N per ha year^{-1} over the period 1961-2022. N_2O emissions from synthetic nitrogen fertilizers increased by 81% from 2008 to 2020 and had an average increase of 0.59 kt/year over the period 1961–2022. Total N_2O emissions from synthetic nitrogen fertilizers and cereals were 75 kt in 2020. CO_2e emissions from synthetic nitrogen fertilizers were approximately 53 times higher in 2020 compared to 1961, indicating that inefficient use of N fertilizers is directly related to N_2O emissions. Quantity of cereal production explained 93% of the variability in total N_2O emissions. However, N_2O emissions from cereals were not significantly different from CH_4 emissions from rice cultivation in 2022. In the same year, N2O emissions from synthetic nitrogen fertilizers (32.9 kt) were lower than N2O emissions from cereals excluding rice (42 kt). Although N_2O emission intensity had a logaritmic trajectory, variations in intensity were high in the last decade due to increased synthetic N fertilizer surplus and risk of nitrogen deficiency. Reducing agricultural GHG emissions requires a mix of technological innovation, policy support, and farmer education. Emerging innovations such as biochar reduces N_2O emissions. Smart farming such as IoT and AI for precision nutrient/water management reduce emissions. Genetic crop traits (breeding of rice varieties with radiation oxygen loss) reduce CH_4 emissions. Strategies like precision farming (sowing/no-till and rotational wetting and drying) can optimize fertilizer application and significantly reduce CO_2 and CH_4 emissions through sensors and artificial intelligence. By prioritizing environmental sustainability, Turkiye can ensure the long-term viability of its agricultural sector while protecting its natural resources. Subsidies are needed for climate-friendly technology to support sustainable environment.

Keywords: environmental sustainability, greenhouse gas emissions, mitigation, Turkiye

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