

**” Alexandru Ioan Cuza” University of Iași
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BOOK OF ABSTRACTS

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THE PROFESSOR EMERITUS DR. LIVIU APOSTOL - THE MAN, THE GEOGRAPHER, THE FRIEND

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Professor Liviu Apostol's academic development radiography embodies an almost 70 degrees overturned hourglass, with its directional peaks that join the cities of his professional development: Iași-București-Piatra Neamț-Suceava-Iași-Cluj Napoca...

His geographical activity included key fields of utmost scientific interest, starting his career as a secondary school teacher in a commune of Neamț county, then moving on to research in the field of climatology and environmental quality, continuing with specialized tourism (both internal and external) and, finally, after receiving his doctorate, becoming a university professor in Suceava and Iași.

A man's life, as he spent it with selflessness and devotion to science as a distinguished promoter of national and international meteorology and climatology. For most of those who knew and appreciated him for all his professional and human merits, Liviu Apostol will remain a worthy successor of the university school's spirit of environmental protection, in general, and of research in the field of meteorology and climatology.

Liviu Apostol, the man and the friend, drew a progressive line for Iași geographical scientific research, which his successors in the aforementioned fields have the duty to multiply at a higher level.

CONTRIBUȚIA PROF. UNIV. DR. EM. LIVIU APOSTOL LA DEZVOLTAREA CLIMATOLOGIEI ÎN ROMÂNIA

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Prezentarea va sintetiza contribuția Prof. univ. dr. em. Liviu Apostol la dezvoltarea climatologiei în România realizată în cei peste 30 de ani de activitate în domeniu prin proiecte de cercetare, cărți, articole științifice și îndrumarea lucrărilor de doctorat.

ARE SCIENCE METRICS BENEFICIAL TO SUSTAINABILITY? A STANDPOINT OF DISCIPLINES WITH A SOCIETAL IMPACT

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Both sustainability and planning require interdisciplinary approaches. Moreover, an interdisciplinary approach is required to the sciences contributing to planning for sustainable local communities. Nevertheless, current criteria governing science, particularly career promotion and research funding, overemphasize the contribution of research to scientific progress and economic growth, disregarding its societal impact. The new European framework research program and Romanian strategy for research promise a change. In order to meet this need, the current study aims to respond to this challenge by analyzing two examples of disciplines contributing to sustainable local development, yet disadvantaged by the previous strategies. We analyzed urban/landscape ecology and humanistic geography based on data from the Romanian Classification of Occupations, criteria used in academic and research career advancement, and funding programs, and phrased some recommendations for helping the development of similar research areas in the future.

EXPLORING THE SEA FISH RESOURCES ALONG THE SCYTHIA MINORS COASTLINE USING GIS: A PRELIMINARY INVENTORY THROUGH ANCIENT LITERARY SOURCES

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This approach presents a GIS-based preliminary inventory of sea fish resources in Scythia Minors, using the ancient literary sources. Scythia Minors, also known as Dobruja, was a Roman province located in the southeastern part of modern-day Romania and Bulgaria, along the western coast of the Black Sea. To conduct this work, a variety of ancient

literary sources, including Greek and Roman texts of 35 ancient authors such as Ovid, Pliny the Elder, Oppian, Athenaeus, and Aelianus, were consulted. The inventory identified 40 species of sea fish that were present in the Black Sea during ancient times, including sturgeon, anchovy, mackerel, sea bass, and gray mullet, among others. In addition to identifying fish species, the study also uncovered information on fishing techniques and equipment used by the ancient inhabitants (e.g., nets, harpoons, hooks). While the outcomes of this study are just a part of those proposed in the grant project FinDaRT (PN-III-P1-1.1-TE-2021-0544), it offers a starting point for a comprehensive understanding of the sea fish resources and their importance in the ancient world. Furthermore, the findings could also serve as a GIS database for future studies that investigate the socio-economic significance of seafood in Scythia Minors and its impact on the local economy and culture.

DECIPHERING GREEN INFRASTRUCTURE PATTERNS IN EASTERN EUROPE: FOCUS ON BUCHAREST, ROMANIA AND CHISINAU, REPUBLIC OF MOLDOVA

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This comparative study aims to test the hypothesis according to which environmental awareness of planners is crucial to sustainable cities with a healthy and well connected green infrastructure able to provide ecosystem services. To test the hypothesis, we compared two cities, Bucharest (Romania) and Chisinau (Moldova), based on quantitative analyses using CORINE land cover and use data to analyze the land structure and its dynamic, and qualitative analyses focused on the planning process. Our findings suggest that both cities share a decreasing interest for planning for their green infrastructure, which was lost and fragmented. The process

was aggravated in Bucharest by post-communist property restitution. Based on the results, we recommend planners in post-communist countries to give more attention to the green infrastructure, in order to produce plans fitted to the welfare and sustainability needs of people.

ANTHROPOCENE: FUTURE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

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Appearing in 2000, the term Anthropocene has known a public success that clearly exceeded the academic success. Supported by journals edited by Elsevier, Sage and Springer, the concept is at the centre of amorphous scientific debates, unclear from an epistemological point of view and even more unclear regarding its framing in a certain scientific field. In Romania, for example, the Anthropocene was integrated into the research reports of the Geonomic Sciences section of the Romanian Academy, it has generated geomorphological investigations (research), it has initiated study subjects at the geography faculties, it has led to doctoral theses at the Physics Faculties, it allowed the organization of international conferences at Technical and Philosophy Universities or the appearance of articles in sociology journals... Our communication aims to explore the possibility of the Anthropocene, as a concept and a scientific object, to be constituted as a solid platform that leads to the internal unification of geography as a science and to the meaningful replenishment of the profession of geographer. The central idea is that defining the new planetary reality through the concept of the Anthropocene can dissolve the classic paradigm of the antagonistic nature-culture couple in a new, integrated paradigm, which would allow the harmonization of geographical views on the evolution of the environment in the context of promoting sustainable development. The chance of harmonizing the vision of physical geography and human geography is enhanced by the public success of the Anthropocene, a fact that would facilitate the resizing and recalibration of the image regarding the social utility of geography. The process becomes possible through a simultaneous top-down and especially bottom-up dynamic, starting from pre-university education, because geography is the only school subject capable of integrating environmental education, sustainability education, spatial

education, geo-media education and education oriented towards the development of the spirit of global citizenship.

IT SOLUTION FOR EVALUATING THE BLUE-GREEN INFRASTRUCTURE OF BUCHAREST METROPOLITAN AREA

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Blue-green infrastructure is essential to life quality. It provides places for recreation and relaxation, attractive views, connection to nature and a sense of place, and practical benefits, such as flood protection, shading and cooling, improved air and water quality, carbon storage and habitat for pollinators and other wildlife. Unfortunately, in Bucharest, the capital of Romania, the degradation of landscapes in the Metropolitan Area can lead to their abandonment or irreversible alteration. This study aims to develop an innovative method of creating a blue-green infrastructure plan as an essential part of the urban development plan. The IT component represents a methodologically innovative and original model in the European Union. Proposed land use in the studied area is valued in several categories (zero, low, moderate, high, very high). To evaluate the landscape characteristics of in the studied area, we used the values of biodiversity, socio-economy, connectivity, and type of ecosystem services offered. For a more accurate assessment of the landscape, CORINE 2018 and Urban Atlas data were used in conjunction with elevation. In order to define the connections between areas with high landscape characteristics (core areas), an IT solution was developed for evaluating the connections of different landscape elements with the ARCGIS - Linkage Mapper tool. By overlaying the obtained raster with the property raster from the National Agency for Cadastre and Real Estate Advertising and high-resolution satellite images, a realistic connectivity analysis was carried out in the studied area. The connectivity analysis was used to develop a blue-green infrastructure design scenario for Bucharest metropolitan area.

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**EFFECTIVE EQUIVALENT TEMPERATURE INDEX SPECIFIC
TO THE EASTERN ROMANIAN PLAIN. CASE STUDY:
SPATIAL DISTRIBUTION AND IDENTIFICATION OF
BIOCLIMATIC RISK AREAS**

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The present study proposes an assessment of the regime and spatial distribution of the bioclimatic effective equivalent temperature index (TEE) specific to the Eastern Romanian Plain, for the period between 1990 and 2020. The bioclimatic effective equivalent temperature index indicates the effective / equivalent temperature felt by the human body in the hot season. In this study, monthly average values of the climatic parameters of air temperature, air's relative humidity and atmospheric pressure were used. Parameters measured for 30 years come from the nearest meteorological stations. The mathematical calculations were based on the dates meteorological obtained from 12 meteorological stations located in the analyzed territory. This data was used to calculate the values of the above-mentioned index for the summer season (June-August) and the months that mark the end of spring (May) and beginning of autumn (September). In this manner, it completes the reader's perspective upon the level of bioclimatic risk in the concerned territory. Detailed assessment of bioclimatic indices is interesting and useful in studying variation in space and time. The diagnostic analysis is useful in the adoption efficient of mitigation and adaptation strategies to bioclimatic conditions variable. Currently, it is necessary to describe the conditions of comfort or the bioclimatic risk related to the climate with the presentation of the weather.

**SOCIAL VULNERABILITY TO NATURAL HAZARDS IN
NORTH-EAST REGION OF ROMANIA**

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Natural hazards have generated unpredictable situations that have affected human communities over large geographical areas. In Eastern Europe, climate change is cumulatively and gradually leading to an increasing trend in extreme temperatures and precipitation, with their concentration in short periods, increased frequency of catastrophic floods, and reactivation of landslides. All these processes will be increasingly reflected in areas where natural vulnerability overlaps with economic and social vulnerability. The present study analyses the assessment of social vulnerability of human communities to natural hazards. This type of holistic approach is based on combining social factors. The methodological framework can be captured in three main steps: i) selection of variables and derivation of principal components; ii) estimation and distribution of SoVI; iii) identification of areas with a high degree of vulnerability. In order to assess socio-economic vulnerability to natural hazards, the Social Vulnerability Index (SoVI) was proposed and calculated using Principal Component Analysis (PCA) to reduce the dataset and cluster them. PCA is a multivariate technique that can analyse several dependent variables in a dataset and extract relevant information in the form of a (reduced) set of new variables. According to the results, 10.86% of North-East Region localities are located in high vulnerability classes and 27.35% in medium-high classes. The distribution of these classes is predominantly in the eastern part

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MAPPING THE DAMS BUILT ON THE RIVERS OF THE NORTH DEVELOPMENT REGION OF THE REPUBLIC OF MOLDOVA

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Interruption of longitudinal and lateral connectivity is hydromorphological condition taken into account when establishing if a water body is heavily modified or not. Dams as well as reservoirs created in the upstream represent one of the reasons of attribution to river and stream the status of heavily modified water body. Present research represents a first attempt to develop a spatial database of dams on the rivers of the North Development region of the Republic of Moldova using satellite images and geoinformational techniques. The results showed that from identified 2523 dams only 14% are partially demolished, the others

are generally in satisfactory condition. In case of the dams' upstream part, only for 49% of them reservoirs and ponds are present in good condition, those in eutrophic condition and semi-dry accumulations are of 13%, the upstream of other 30% is characterized by dry territory and 8% by wetland. Dams' density is considered very high in case of streams, the average being 0,57 dams/ river km or about 1 dam on every 1,77 km of river, and much lower on medium rivers, being only 0,15 dams/river km or one dam is constructed on almost every 7 km of river.

SOCIAL AND ECONOMIC INDICATORS ANALYSIS IN ROMANIAN PROTECTED AREAS

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Protected areas have become increasingly important for the conservation of biodiversity, as well as for the socioeconomic development of local communities. However, the impact of protected areas on local economies and communities is complex and often debated. This study aims to analyze the social and economic indicators in Romanian protected areas to better understand the relationship between conservation and development. We collected data on socioeconomic indicators, such as population density, income, education, and employment, in and around 1574 protected areas in Romania, distributed in 3228 administrative units. We also analyzed the management plans of these areas to assess the extent to which they incorporate socioeconomic considerations. Our results show that the socioeconomic indicators in protected areas vary significantly, with some areas experiencing economic growth and others facing economic decline. We found that areas with high levels of tourism tend to have better socioeconomic indicators, such as higher incomes and employment rates. However, areas with a high level of protected status and low levels of tourism tend to have lower socioeconomic indicators. We also found that while most management plans include some socioeconomic considerations, there is a lack of integration between conservation and development goals. This lack of integration can lead to conflicts between conservation and development objectives, and hinder

the sustainable management of protected areas. Our study highlights the need for a more holistic approach to protected areas management that considers both conservation and development goals. We recommend the incorporation of socioeconomic indicators into monitoring and evaluation frameworks and the development of strategies that promote sustainable tourism and local economic development in and around protected areas.

RISK AND SUSTAINABLE TOURISM RESILIENCE IN THE POST CRISIS AND COVID-19 PANDEMIC PERIOD

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Tourism is one of the most affected sectors of economic services by the 21st century pandemic of the new epidemiological virus SARS-CoV-2 (Covid-19); small tourism companies/firms have been seriously affected, requiring business recovery through the implementation of digital technologies (intense promotion on websites, improvement of their own web pages, creation of new tourist packages that take into account the new standards imposed (social distancing). Crises with immediate effects on tourism sector actually represent the notion of "risk", also called "shock", and a new concept called "resilience" was approached in order to combat them. The shock can be of an economic nature (financial crisis, recession), military (armed conflict, civil war), social (protests, street movements), environmental (floods, tsunamis, drought), medical (pandemic), or even touristic (tourist overcrowding, conflicts between residents and tourists).

EVALUATION OF HEAT ISLAND EFFECT THROUGH REMOTE SENSING METHODS

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Climate change is leading to more summer and tropical days across the globe. This has become abundantly clear in recent summers and, as a result, the heat island effects are becoming more intense and frequent. Urban heat island effect is one of the typical features of the urban climate

and a phenomenon which lead to extreme weather and air pollution. This directly threatens the health of humans and has many consequences on living environment, including infrastructure, drinking water and surface water the quality. Therefore, is necessary to identify the specific locations of urban heat islands. The purpose of this paper is to evaluate the heat island effect and to quantify the situation of the new development areas in Iasi, north-east of Romania. Remote sensing and GIS methods were used for this analysis, together with 4 high resolution aerial images. GIS software was used for the study and to develop the heat islands map. Heat locations were satisfactorily determined by the model. Thus, understanding the studies on this subject will support decision makers and conservation planners manage effectively land and climate.

THE ROLE OF HYDROLOGICAL FACTORS IN THE MOBILIZATION AND ACCUMULATION OF PLASTIC WASTE

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Plastic waste frequently accumulates in rivers, lakes, seas and oceans, therefore, given the resilient nature of plastic and its persistence in the environment, the consequences for biodiversity, ecosystems and human health can be significant.

Therefore, it is necessary to research the role of the hydrological factor in their mobilization and accumulation. In this respect, it is not unimportant to analyze how the morphological and hydrological characteristics of the watersheds can influence the transport, accumulation and dispersion of plastic waste.

By analyzing the case studies focused on the Bistrița hydrographic basin, which is one of the well anthropized basins in Romania, developed both in the mountain area of the Eastern Carpathians and in the Subcarpathian, this paper aims to deepen the understanding of how the hydrological factor contributes to the distribution of plastic waste, thus joining efforts to search for effective strategies to remedy and prevent this type of pollution.

Following the data analysis (bibliographical sources, statistical data, field observations), in a first step, the identification of retention areas, such as lakes and dams, riparian areas, confluence areas, critical areas, where

plastic waste tends to accumulate temporarily or permanently, as well as the factors that determine this accumulation.

Next, the aim is to highlight the mechanisms that determine the transport, dispersion and accumulation of plastic waste, imposed by the climatic characteristics (in particular, the variability of the amounts of precipitation) and the hydrological ones (the value of the flows and, above all, their fluctuations). Furthermore, the analysis of the data regarding the shape of the basin, the distance of the river from the localities, the presence of infrastructure elements and some objectives and economic activities, etc. leads to the identification and characterization of the major sources of plastic pollution, as well as to the assessment of the vulnerability of different ecosystems to this type of risk.

Finally, based on the analysis and data obtained, proposals can be formulated and plastic pollution management measures established, taking into account the role of the hydrological factor. These measures could include pollution prevention strategies, more effective monitoring of waste collection and disposal, and assess the degree of pollution and its impact. Last but not least, the importance of collaboration between institutions and the population, at national and local level, of engaging all interested parties in the issue of plastic pollution in a concerted effort to protect ecosystems and ensure a sustainable future, must be emphasized.

UNDERSTANDING THE EVOLUTION OF EU ENVIRONMENTAL POLICY USING THE INSTITUTIONAL GRAMMAR TOOL

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The environmental policy of the European Union (EU) began to make its mark with the establishment of this political union. Over time, this environmental policy has continued to evolve and numerous community normative documents have been implemented. Among the most important documents developed and adopted are the Environmental Action Programs (EAPs). Thus, since 1972 (the year in which the first EAP was adopted), a total of 8 EAPs have been adopted to date. In order to be able to determine the development of these programs from the point of view of the priority objectives and the domains addressed, the Institutional

Grammar Tool was used. This tool made it possible to identify the main types of statements (strategies, norms, rules) in the last two EAPs (7th EAP and 8th EAP), the main types of actions (allowed, mandatory and prohibited) implemented by the actors to achieve the priority objectives, and the areas of interest. The analysis of the two documents showed that the instructions in the 8th EAP are much clearer than in the 7th EAP, which is much more complex in terms of language. In summary, with the help of the IGT, we will be able to present the evolution over time of the last two EAPs, both in terms of priorities and domains.

THREE NEW SPECIES OF BEETLES (INSECTA: COLEOPTERA) ASSOCIATED WITH DEAD WOOD FROM THE REPUBLIC OF MOLDOVA¹

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The paper includes three deadwood-associated coleopterans species - *Dirrhagofarsus attenuatus* (Mäklin, 1845), *Enicmus rugosus* (Herbst, 1793) and *Rhopalocerus rondanii* (Villa & Villa, 1833) new for the fauna of the Republic of Moldova collected from the Padurea Domneasca Reserve. The species were collected with the entomological aspirator, flotation method and the trunk trap for flight interception. The number of identified species from the families Latridiidae have reached to 9, Eucnemidae to 3 and Zopheridae to 6 in the Republic of Moldova.

GLOBAL ASSESSMENT OF SOIL ORGANIC CARBON CHANGES DURING 2001-2015

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Soils are the largest global terrestrial reservoir of carbon, containing twice the amount of atmospheric carbon and almost three times the amount of carbon stored in live terrestrial vegetation. Also, this natural carbon pool is essential for climate stability and soil fertility around the globe.

However, despite the multidimensional importance of this environmental indicator, there is a lack of knowledge on soil organic carbon (SOC) changes throughout the Earth's terrestrial surface. This paper explores recent global trends (2001-2015) of SOC, based on appropriate geostatistical tools (the Mann-Kendall test and Sen's slope estimator) that were applied (at pixel level) using multi-temporal SOC raster data freely available in international databases. The entire geostatistical analysis of SOC trends was carried out for 193 UN member states, and the complex global results can be crucial for understanding the dynamics of this major carbon pool and controlling climate change and land degradation.

ANALYSIS OF SHOREBIRDS OF NORTH INDIA

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Shorebirds are a group of birds that inhabit water bodies. Their presence in good number ensures ecological integrity. Thus, they are used as indicator of ecosystem health. India has variety of shorebirds that are winter visitors while some are resident birds. Citizen science program has been initiated since 2017 to monitor birds of North India. Students, volunteers and field staff participated and visited nearby waterbodies (Lake, River, Pond etc). They were asked to identify and record their number. The study showed, protected areas and rivers provide refuge to variety of shorebirds. However, high level of pollution load in waterbodies of Delhi NCR, is a concern and thus low abundance of waders were reported. Upland rivers and lakes have lesser pollution but fluctuation in river flow likely to affect the waders. In other parts shorebirds are likely to be affected by sand mining which is widespread in North India.

NEW SAPROXYLIC BEETLE SPECIES (COLEOPTERA: STAPHYLINIDAE) FROM REPUBLIC OF MOLDOVA REVEALED BY DNA BARCODING AND MORFOLOGICAL ANALYSIS

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The work includes nine species of coleoptera: *Batrisodes unisexualis* Besuchet, 1988, *Trichonyx sulcicollis* (Redtenbacher, 1816), *Sepedophilus bipunctatus* (Gravenhorst, 1802), *S. constans* (Fowler, 1888), *S. pedicularius* (Gravenhorst, 1802), *Gyrophaena manca* Erichson, 1839, *Scaphisoma agaricinum* (Linnaeus, 1758), *Medon rufiventris* (Nordmann, 1837) and *Hypnogyra angularis* (Ganglbauer, 1895) newly identified for the fauna of the Republic of Moldova. Out of these nine species, six were detected using the DNA barcoding technique, while the other three species were identified by morphological methods. Thus, the number of saproxylic beetle species, from the family Staphylinidae (subfamilies: Aleocharinae, Paederinae, Piestinae, Pselaphinae, Scaphidiinae, Staphylininae and Tachyporinae) found so far in the Republic of Moldova reached 30 species.

**THE ECONOMIC CAPITALIZATION OF THE IMPACT OF
MINIMUM AIR-TEMPERATURES ON ENERGY
CONSUMPTION. CASE STUDY: BUCHAREST-BĂNEASA**

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In the context of the ongoing climate changes, the energy consumption has become a topic of utmost concern, especially for population, in choosing the most cost-effective way and resources for indoor-heating. Therefore, this experimental study tried to estimate both the energy amounts needed to heat up the residential indoor spaces, by means of a specialized quantitative tool named the Cooling Energy Consumption - CEC, and the average resulting costs that people living in Bucharest Metropolitan Area might have to pay during the three consecutive winter months (D, J, F), in order to increase and maintain their indoor temperature at the internationally-agreed on standard of optimal comfort (+18.33°C). In this respect, the daily minimum air-temperatures, incoming solar radiation and wind-speed values provided by the Bucharest-Băneasa weather station were used to calculate the corresponding mean monthly values for December, January and February over the entire 1980-2015 period. Then, the CEC index has been calculated through a formula taking into consideration both the monthly and seasonal mean values of the three above-mentioned weather elements and the Heating Degree Days (HDDs) totals, representing the monthly/seasonal sum of all differences between

daily minimum air-temperatures and the base temperature of +18.33°C, as recommended by ISO 7730 thermal standards. The CEC value for December is 528.7 kWh/m², for January is 547.6 kWh/m², for February is 491 kWh/m², and for all winter months altogether, its average value is 739,9 kWh/m². Then, two different types of individual heating systems (CT) were taken into consideration: a conventional CT produced by Ariston, with a net efficiency of 93%, and a gaseous condensation CT produce by Wiessmann, with a net efficiency of 108%, to calculate the corresponding actual energy consumptions for each of the heating systems of reference. Finally, the results being obtained were multiplied by the actual unit cost of energy - 1.3 lei/kWh, provided that the total monthly consumption keeps less than 300 kWh/month, according to OUG 27/2022, thus obtaining the final costs of energy being consumed for heating either for each month, or for the entire cold season (D, J, F). In January, for instance, the total price for heating is 765.48 lei for the more classical Ariston type CTs and 659.17 lei for the more performant Wiessmann-type ones, with a difference higher than 100 lei between the two constructive types. To conclude, it is important to say that this experimental study showed how easy, fast and precise the energy used for indoor heating may be calculated and how the improved energetic performance of CTs may literally help people to save up more money. Moreover, this study also proves how climatic factors of influence may be used both to forecast, plan and manage energy consumptions over any period of time and to estimate their respective economic impact on each household, depending on the climatic region they are located in.

THE DESIGN AND IMPLEMENTATION OF ECO-SUSTAINABLE TECHNICAL SOLUTIONS BY RECOVERY ON INDUSTRIAL BY-PRODUCTS IN GEOTECHNICAL ENGINEERING APPLICATIONS

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The article proposes the creation of optimized synergistic structures between additive materials, from the category of industrial by-products, through experimental modeling, which will ensure the increase in the

performance level of the final products, in accordance with the needs and capacities of the materials market in the field of constructions and climate change. The experimental applications based on the integration of industrial by-products, allowed the definition of multi-criteria requirements necessary to improve the technical and environmental performance characteristics of materials and methods of engineering works. The improvement of the technical and environmental performance characteristics of the newly designed structures will allow the approach and implementation of alternative solutions for the valorization of industrial by-products, with the extension of the life span and reproduction in the economic circuit, as well as the reduction of the negative effects associated with the massive production of materials used in the field the constructions.

OPEN SOURCE DATA-BASED SOLUTIONS FOR IDENTIFYING PATTERNS OF URBAN EARTHQUAKE SYSTEMIC VULNERABILITY IN HIGH-SEISMICITY AREAS^{bp}

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High-seismicity areas should be thoroughly studied in terms of urban vulnerability, since such knowledge represents the backbone of effective vulnerability modelling actions. Alas, this requirement represents a far-reaching goal in many developing countries, due to a lack of interest from authorities on one side and a shortage of exposure and vulnerability data on the other side. The above-mentioned shortcoming has powerful implications for all phases of disaster management (i.e., preparedness, response, recovery), and its resolution should be prioritised by both disaster risk scientific community and decision-makers. This paper aims to identify primary time-independent spatial patterns of earthquake systemic vulnerability based on the accessibility of key emergency management facilities (e.g., medical units, fire stations), focusing on the urban settlements located in the high-seismicity area nearby the Vrancea Seismogenic Zone in Romania. To this end, we put forward a transparent, highly-replicable, GIS-based methodological framework that integrates open source data extracted from OpenStreetMap to compute the service areas of emergency management centres, and to map earthquake systemic vulnerability levels. The resulting maps enlighten the identification and

understanding of accessibility and systemic vulnerability patterns. These are influenced by a dynamic convergence of factors embedded in the urban spatial layout. The overall accessibility was estimated at medium-high levels, and the overall systemic vulnerability at low-medium levels. However, certain cities (e.g., Bacău, Onești, Tecuci, Urziceni) present higher levels of systemic vulnerability that raise concerns. These findings can be used to streamline the allocation of resources required to manage earthquake-induced seismicity at regional scale, and to develop locally tailored seismic vulnerability reduction strategies. Beside its multi-scalar utility, the study presents a roadmap to a first-hand, time and cost effective assessment of earthquake systemic vulnerability. This moves the needle towards positive change in addressing the challenges of high-level seismic risk, which are frequently neglected in Romania.

THE EFFECT OF INCLUDING BARLEY GRASS JUICE IN THE DIET OF COMMON CARP CULTIVATED IN RECIRCULATING AQUACULTURE SYSTEM

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Recirculating Aquaculture System (RAS) are sustainable systems that contribute to the reduction of water consumption and allow obtaining higher productions than traditional aquaculture in ponds. At the same time, due to the high population densities in the RAS, there is a need for efficient control of water parameters and efficient waste management. Furthermore, the diets used in the RAS must ensure both the nutrient requirements for the cultivated species as well as a low conversion factor and low nitrogen and phosphorus in the water. The aim of this study was to test the effect of including barley grass juice in the diet of common carp cultivated in RAS on some parameters of production, flesh quality, oxidative status and water quality.

CLUJ-NAPOCA METROPOLITAN AREA - REGIONAL ATTRACTIVENESS AND ENVIRONMENTAL CONSTRAINTS

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The Cluj Metropolitan Area is located in Cluj County, the north-western development region of Romania. The strategic option of polycentric territorial development was adopted on the basis of the principles outlined in the NDP (National Development Plan)- on spatial development at regional level. This involves supporting development processes within urban growth pole. The associative structure at the Cluj Metropolitan Area (CMA) was formed at the end of 2008, continuing the efforts to establish a metropolitan area with economic specificity, initiated by Cluj County Council in 2006. Communes included in Cluj Metropolitan Area are also part of different micro-regional associations with relatively homogeneous characteristics. These associations were formed at the initiative of city halls and they have legal personality.

Cluj-Napoca Metropolitan Area (CMA – Zona Metropolitană Cluj-Napoca) is a voluntary association of 18 communes around a polarization urban center. It was created in 2008 and developed as a socio-economic space of mutual aid. The communes offer physical-geographical space, and Cluj-Napoca attracts investments and a young and dynamic population. The idea of a metropolitan zone in Romania is similar to the European one, where it is called area. CMA and urban structure itself must be an intelligent one, often called smart city, where the development is based on the exploitation of intellectual capital. Education, innovation and economic development together with environmentally friendly activity sectors are main goals of CMA future. More specifically, municipal development should be based on adequate waste management, high-quality drinking water resources, improved air quality, and adequate hazard and risk management to maintain a clean and safe living environment (according to <https://www.cjcluj.ro/proiecte.php>). Thus, new challenges and associated problems emerged: adaptation of transport infrastructure, sewage and water supply, green spaces, sanitation.

CMA has developed from 2008 until today two concentric peri-urban networks. The first metropolitan ring consists of municipalities in the immediate vicinity of the city, which are the most dynamic in terms of investments and attracting the young population. These are the best examples of the so-called bedroom villages of Cluj. The second metropolitan ring includes villages further away from the city center, with a more pronounced agricultural profile (Baciu, N. et al. 2015, 2018). They

are still suffering from demographic decline and agricultural abandonment.

For the studied area, we evaluated the urban importance as regional attractiveness and the challenges given by the urban evolution of the last 20 years. As a methodology, we focused on statistical data, comparison of historical and topographical maps, satellite images and GIS techniques. The statistical data were accessed from INSE and are based on population census data from 2002-2022. For the structure of agricultural and non-agricultural land use, we used data from INSE, as well as the comparison of satellite maps. The GIS techniques used allow us to visualize the effects of demographic changes and land use change in the period 2002-2022.

For the part of challenges and constraints at the metropolitan level, we analyzed data from the Development Strategy of the CMA, the Urban Development Strategy of the Cluj-Napoca municipality. Thus, we evaluated the importance and growth stage of the poles of excellence, on which regional attractiveness and competitiveness are based. They are represented by: the 6 universities, the specialized clinical centers, the IT industry, the sports centers, the international airport – over 3 million passenger's traffic/year, the proximity of Transilvania Motorway, the green city concept, the smart city concept, the Cluj Innovation City concept.

We identified by using statistical data - population, changing of agricultural and non-agricultural land, historical evolution of land use and real estate development – the functional clusters inside the metropolitan area. Thus, each commune has a specific metropolitan function. Also, the proximity or distance from the urban center, as well as the level of attracted investments and labor force commuting reveal the classification of two metropolitan rings: the first ring - ring A, more dynamic and closer to the center and the second ring - ring B, more agri-rural.

INCREASING VULNERABILITIES IN ROMANIAN CITIES: RECENT DYNAMICS IN URBAN SPRAWL AND LANDSLIDES EXPOSURE

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In our complex and highly dynamic risk society, and the context of massive environmental changes, vulnerability emerged as a well-known but still much-debated concept. Some scholars include exposure and sensitivity as definitory elements of vulnerability. In urban studies, assessing exposure to different risk phenomena has a major influence on planning. As in other post-socialist countries, in Romania, cities had a highly divergent recent evolution: first, the shrinkage of cities (the deindustrialization followed by ex-urbanization and de-urbanization, the inner cities losing population), second, the suburban advancement of cities and the urban sprawl (that concentrated population in the nearby rural areas). New residential areas in cities capitalized on the positional advantages of some locations benefiting from proximity but also a cleaner, less disturbed environment. Unfortunately, some of these areas are also exposed to certain natural or human-induced risks. Landslides are one of these risks that are not always properly taken into account in urban planning. Due to unclear local regulations, wrong decisions or even corruption, some new residential areas were built on the unstable ground in areas susceptible to landslides which can lead to disastrous consequences. The current study is an exploratory statistical and territorial approach to the social and economic landslides susceptibility in Romanian cities i.e. the potential human and economic losses that an area might suffer because of its propensity for landslides (population at risks, buildings and infrastructure at risk). Taking into account all Romanian cities and using the official statistics, but also information based on satellite images regarding urban land use changes in the last 20 years, the current paper is a general overview that shows spatial differentiation in susceptibility to landslides requiring differential policies to tackle the emerging risks. The cities will be analyzed concerning their rank and functional profile, also by taking into account the existing strategies and plans in the area of landslide management. The usefulness of our results method lies in framing and grounding proposals for a more coherent territorial management and urban land use planning.

THE IMPACT OF NOISE POLLUTION ON THE ENVIRONMENT AND THE HEALTH OF THE HUMAN POPULATION

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The human body is influenced by a lot of interdependent factors of natural and socioeconomic origin that determine its health. The environment is a factor with a particular impact on the state of health, influencing the occurrence of multiple diseases, such as: chronic respiratory diseases, cardiovascular, allergic, endocrine, metabolic, psychological and neoplastic disorders. In this group of health determinants can be included: the quality of air, water, soil, food, workplace, living area and physical factors such as: noise and radiation. An important factor in the pollution of the environment, currently, has become noise, a real scourge, a form of pollution much more damaging and with much more serious effects than numerous other pollutants. Communal noise assaults people's ears with an intensity close to the level that produces permanent hearing damage. Around the airports, the intense noise of the planes "bombards" people's ears of the area, producing them not only discomfort, but even otic injuries, somatic and mental disturbances. Numerous workers are exposed to noise not only in heavy industry, transport, but even in agriculture. The effects of noise on the body depend on three variable elements: sound intensity, frequency and duration of exposure. The purpose of this paper was to determine the impact of noise pollution on the environment and human health. The researches took place in the city Chisinau with different areas of the intensity of public transport and atmospheric noise pollution. Sonometric determinations were made regarding the evolution in time of the street noise level on the main traffic arteries in the municipality of Chisinau; as well as at the train departure and arrival stations. The most intense sources of noise are those with a sound intensity over 100 dB. One of the regions with major noise pollution is the area of the railway station, which produces negative effects on the health of the population in that area. In such a way, on the road Muncesti in Chisinau, the noise caused by railway transport beats the normative levels, which requires compliance measures on the protection of the population from the influence of railway noise. Also, the sonography results on the streets of Chisinau also determined high noise pollution also in the streets Ion Creangă, Alba-Iulia, Grenoble, Ștefan cel Mare, Dacia and Moscovei. Therefore, it was found that the people who live on these streets more often have dysfunctions of the hearing aid, as well as of the nervous system, influencing most of the homeostatic indices. Clinical and audiometric research on exposed subjects to noise has demonstrated a decreasing of hearing acuity as a result of damage to the cells that transmit sound from the ear to the brain. Based on the given study, it is recommended to amelioration noise pollution by: planting trees along the crowded arteries

of the municipality; redirection of heavy transport to peripheral areas; location of car and railway stations in less crowded areas; as well as the creation of sound-absorbing surfaces that lead to a relative reduction of the noise level both in the case of the noise produced in the respective spaces and the one coming from outside them.

BIOTA FUNCTIONALITY IN PROVIDING ECOSYSTEM SERVICES IN A HIGHLY SENSITIVE MOUNTAIN SOIL ENVIRONMENT

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In the current context of the global climate changes, in the Romanian Carpathians exercises strong pressures on mountain ecosystems due to the massive and uncontrolled deforestation, expansion of the urban areas and land restitution (followed mostly by the land use changing). In these circumstances, the soils mountain sensitivity increased. The paper investigates the biota functionality in providing ecosystem services in a highly sensitive soil environment (with highly acidity and hydromorphic threats) located in Pădurea Craiului Mountains. The studied area is an island of acid rocks located in a massive of limestones. The absolute altitude is 600 - 800 m and the land use is secondary grassland. The analytical results showed a very low (5.14 - 5.76) pH, as a result the vegetation is acidophilus. The organic matter content is low, as well as the N, P, K values. The micromorphological investigation showed textural, depleted, and redoximorphic pedofeatures generated by the strongly influence of the coastal spring water. In such a highly sensitive mountain soil, the biota (less studied in hydromorphic soils) is adapted to the hard environmental conditions, its functionality being limited and specialized. Consequently melioration is required to improve the environment and further biota functionality to provide higher-value ecosystem services.

ANALISYS OF ECOLOGICAL SECURITY BASED ON PSR MODEL IN THE REPUBLIC OF MOLDOVA

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Ecological security presents a complex, multidimensional phenomena. Ecological security analysis is important and useful in decision-making, developing measures in environmental management and maintaining sustainable ecological development. From here it becomes possible to classify it based on different criteria, thus establishing its main types. In this paper, an analysis of ecological security based on the PSR (Pressure-State-Response), model is attempted, for the territory of the Republic of Moldova, in which to highlight the strong influence of human activities that caused strong damage to the original structure of the landscape, leading to ecosystem imbalance. The PSR model is widely used in ecological research and reflects the causal relationship between human activities and the natural environment. Being an adaptable and feasible model, it encompasses all categories of risk, providing a good reference for establishing the ecological security evaluation index system.

BIOMETEOROLOGICAL CONSEQUENCES DERIVING FROM THE SPATIALITY AND TEMPORALITY OF ITU BETWEEN THE THRESHOLDS OF 66-79 UNITS AND OVER 80 UNITS IN MOLDOVA

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The bioclimate is one of the most important life factors for humans, influencing a multitude of states, reactions, attitudes, actions and human activities. In the context of the regional warming of the atmosphere, in the conditions where the warming of the atmosphere of the cities of the region is faster and considering that in the cities of Suceava, Botoșani, Piatra Neamț, Iași, Bacău, Vaslui, Focșani and Galați there are 1,469,929 inhabitants, this study is necessary and fills a gap in scientific research with the information it brings.

Having temperature and humidity data series from 10 stations in the 8 cities for the interval January 1, 2009 - December 31, 2022, we bring to the knowledge plan the temporal and spatial coordinates of the ITU for the Moldova region, with the attention focused on the days of the warm season in which ITU was above the thresholds of 66 (the lower limit of the alert threshold) and 80 units (the lower limit of the bio-meteorological discomfort threshold). The objectives of the study are:

- i) outlining the differences and similarities of the multiannual, annual and daily regime of the ITU, with the identification and determination of the frequency of occurrence of temporal entities in which the value increase exceeded the threshold of 66, respectively 80 units,
- ii) the identification of critical intervals from year and day in which the thermo-hygrometric complex can put man in difficulty, iii) finding some explanations related to the spatiality and temporality of the ITU, focusing on the positional, dimensional-urbanistic and synoptic factors, for the cases where the ITU has passed the threshold of 66/80 units.

From all the processed time series, it emerged that the ITU can exceed the daily threshold of 66 units in the April - October interval. The highest frequency of days with ITU above 66 units is reached at all stations during summer days. ITU went up to over 80 units almost exclusively on summer days, most frequently in big cities (Iași - 9.8%, Galați - 2.9%). In the other cities, the ITU passing over 80 units is almost statistically insignificant at the daily level (in Suceava, Botoșani, Piatra Neamț and Focșani, the share of days with $ITU \geq 80$ was equal to 0). Between 11-13 and 19-21 and only in the months of June-August ITU exceeded 80 units. In Iași, the share of hours with ITU over 80% was 14.6%, in Galati 9.8%, and in Piatra Neamț only 0.23%. Daily cases with ITU values above 66% held 57.5% of the time and were due to anticyclonic billow baric fields.

Through the ITU we demonstrated that in Moldova, on summer days, between 11:00 and 21:00, in a predominantly anticyclonic synoptic context, there is a moderate bio-meteorological risk for the population that goes outside the home during this time.

EXPLORING THE GEOTOURISM-BUILDING MATERIALS NEXUS: A PATH TOWARDS SUSTAINABLE DEVELOPMENT IN IAȘI CITY, ROMANIA

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This study investigates the relationships between geotourism, building materials and emblematic buildings in Iași City, in the context of sustainable development. Geotourism is a form of tourism that explores and promotes the geographical and geological features of a particular area. In this research, we focus on the relationship between geotourism and the use of building materials in landmark buildings. The selection of emblematic buildings and historical monuments was based on criteria related to the geomorphological and geological settings, as well as the local culture, history, tourism, and even literature. The literature review on these topics were complemented by analytical methods, including mineralogical analysis and petrographic analysis. These methods were used to determine the composition and specific textures of the rocks used as building materials in the study area. Additionally, we mapped the geosites in Iași City using the GPS, obtaining the first inventory of this kind that focuses on this particular study area. The integration of these aspects into the tourism development strategies of Iași City, and the Northeastern region of Romania, represents an essential step towards promoting sustainable tourism, preserving cultural and natural heritage, and stimulating a balanced socio-economic development. Furthermore, this investigation can inform and help professionals involved in promoting sustainable urban development and conserving the architectural and cultural heritage of Iași.

PROBLEME ȘI MĂSURI PRIORITARE ÎN DEZVOLTAREA SISTEMELOR PUBLICE DE APROVIZIONARE CU APĂ ȘI CANALIZARE DIN REGIUNEA DE DEZVOLTARE NORD A REPUBLICII MOLDOVA

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În pofida realizărilor semnificative recente în acest domeniu, RD Nord are cel mai redus nivel de acces la sistemele publice de aprovizionare cu apă dintre regiunile de dezvoltare a Republicii Moldova. La apeductele publice are acces doar cca (52%) din populația prezentă a regiunii de studiu, inclusiv 83% în mediul urban și doar 34% în mediul rural. Accesul maxim se atestă în municipiul Bălți (85%) și în raioanele Rîșcani (76%) și

Sîngerei (61%) din partea sudică a regiunii, iar accesul minim în raioanele Ocnița (18%), Briceni (26%) și Dondușeni (33%) din extremitatea nordică, inclusiv în localitățile urbane ale acestora.

La sistemele publice de canalizare are acces doar ~20% din populația regiunii, inclusiv 55% în mediul urban și ~1% în mediul rural. De regulă, lucrările de construcție și extindere a sistemelor publice de aprovizionare cu apă din mediul rural nu sunt însoțite cu cele de construcție și extindere a rețelelor de canalizare. O bună parte din sisteme de evacuare și purificare au un grad avansat de uzură, iar apele reziduale recepționate sunt epurate insuficient, ceea ce majorează semnificativ impactul nociv asupra resurselor de apă și populației locale.

Problemele prioritare, care determină accesul redus al populației la sistemele publice de aprovizionare cu apă și canalizare sunt: situația economică dificilă și caracterul predominant rural al regiunii; capacitatea financiară redusă a primăriilor și populației locale de a cofinanța proiectele în domeniu; alocarea incompletă a mijloacelor financiare aprobate și implementarea parțială a multor proiecte; capacitățile tehnico-economice insuficiente pentru captarea și transportarea apei din râurile Nistru și Prut; rezerve insuficiente de ape subterane în unele raioane; manifestarea mai frecventă a perioadelor secetoase și influența complexelor hidroenergetice construite; lipsa masivă a stațiilor de tartare a apei potabile și de epurare a apelor reziduale în mediul rural. În plus, costurile de construcție a sistemelor de canalizare sunt net superioare (de cca 1,7 ori) față de sistemele de aprovizionare cu apă, iar evacuarea și epurarea centralizată a apelor reziduale nu este o prioritate pentru APL-urile și populația locală. În prezentul studiu, la identificarea măsurilor prioritare în domeniu s-a ținut cont atât de obiectivele specifice și acțiunile stipulate în documentele strategice sectoriale, cât și de necesitatea aplicării principiului bazinier de gestionare a resurselor de apă și principiului regionalizării serviciilor publice de aprovizionare cu apă și sanitație. Au fost selectate 3 aglomerații din bazinul Prutului (bazinele râurilor Ciuhur, Racovăț și Vilia) și 2 aglomerații în bazinul Nistrului - pe axele Soroca Drochia-Dondușeni și Soroca-Florești-Bălți-Sîngerei.

Rezultatele cercetărilor prezentate în acest rezumat fost obținute în cadrul Proiectului aplicativ - Evaluarea stabilității ecosistemelor urbane și rurale în scopul asigurării dezvoltării durabile, cu cifrul 20.80009.7007.11 implementat de Institutul de Ecologie și Geografie în colaborare cu Agenția de Dezvoltare Regională Nord - beneficiarul principal al Proiectului.

USING LIGHT, UNMANNED HELIUM BALLOONS FOR RAIN ENHANCEMENT

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In Romania, any action regarding active atmospheric interventions works by Act No. 173/2008. Under this law has operated the experimental rain enhancement program uses unmanned light helium balloons. Their operation was performed by trained staff within Active Intervention into Atmosphere (S.C. IAA S.A., headquarters in Bucharest, Romania). The French society developed the technology of light unmanned helium balloons - SELERYYS; they were the first in the world that set up this concept. There's necessary automatic coordination like a SOBLI one to operate such balloons. The communication way between a command post and the unit where these balloons are placed is performed by SMS. Only recorded phone numbers are used for this communication to prevent abusive calling. Following French manufacturer (SELERYS), a balloon launching module is composed of: one container, an electric command panel, two batteries of 12 V, solar panels, a weather station, an automatic sliding roof, two helium tank stands, covered guiding panels with foil, six boxing launching, and a switchboard. Besides these previously listed, there're latex balloons, pneumatic connectors, and torch places. On the experimental program's occasion undertaken within Hail Suppression Unit (UCCG) Moldova 1 - Iasi at Cotnari Group (Valea Racului, Hodora, Ruginoasa, Strunga, and Sîrca), considering the velocity too, a surface up to 80000 ha would be covered.

MONITORING OF BIRDS AND BUTTERFLIES IN HIMALAYAS THROUGH CITIZEN SCIENCE

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Himalayas are listed as biodiversity hotspots of the world owing to high endemism and human disturbance. The high level of human disturbance in Himalayas largely due to increasing human population, agricultural activities, development projects and tourism is accelerating the incidences of landslides, flash floods, deforestation, submergence of forest land, land

use change and forest fire etc. Further, in protected areas, poaching and unsustainable harvesting of medicinal plants are threatening the Himalayan biodiversity. Moreover, climate change is affecting the Himalayas which will have cascading impacts on biodiversity, sustenance of Himalayan ecosystem. Keeping in view the above mention facts, it is highly desirable to conserve biodiversity of Himalayas. Though, Government of India has created protected areas network in Himalaya for conservation of Himalayan biodiversity, however such mammoth task can only be achieved through participation of local communities which are an integral part of Himalayan ecosystem. Citizen science is an effective tool which can promote conservation of biodiversity by involving local youth. We therefore, initiated citizen science programs such as online Backyard Bird and Butterfly Counts in Himachal Pradesh (HP), India during COVID-19 pandemic. The local youth of HP participated in these programs and learnt to identify and count the birds and butterflies of their region. Each participant was asked to record the count on a common google form. They identified and recorded 38 bird species and 25 butterfly species in their backyards. The involvement of youth in such programs enhances their rational and scientific thinking and bring them closer to nature. Further the involvement of youth in bird and butterfly count programs can further trained them as field guides. They can be employed in ecotourism and can earn livelihood. Thus, citizen science serves the twin goals of conservation and employment in Himalayas. Hence in near future we are planning to expand it to other areas as well.

REEFS OF GUADELOUPE BETWEEN CLIMATE CHANGE AND OVEREXPLOITATION FOR TOURISM DEVELOPMENT: THE STRUGGLES OF AN ECOSYSTEM

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The reefs of Guadeloupe, a picturesque archipelago located in the Caribbean Sea, have long been recognized as one of the world's most diverse and vibrant marine ecosystems. Jacques Cousteau Underwater Reserve, perhaps the main attraction for underwater related tourism (scuba diving, snorkeling, glass bottom boats), also suffered biodiversity losses under climate change and human activities impact. The delicate balance of this ecosystem is under increasing threat due to the combined

effects of climate change and overexploitation driven by tourism development. This paper based on our on-site observations and other references provides a comprehensive overview of the factors contributing to the potential death of this vital ecosystem and emphasizes the urgent need for better conservation efforts.

The impacts of climate change are already manifesting in Guadeloupe's reefs, with rising sea temperatures leading to coral bleaching events. The excessive heat stress disrupts the symbiotic relationship between corals and their algae, causing the corals to expel the algae and ultimately die. These bleaching events have become more frequent and severe, decimating large stretches of coral reefs that once teemed with life. Additionally, the increased acidity of seawater due to higher carbon dioxide levels poses a significant threat to the calcification process of corals, hindering their ability to build and maintain their skeletal structures.

Simultaneously, the rapid growth of tourism in Guadeloupe has resulted in overexploitation of the reefs. Tourist activities such as snorkeling, scuba diving, and boat anchoring have led to physical damage to the fragile coral colonies. Irresponsible tourism practices, including touching and collecting coral, further exacerbate the problem. Moreover, the construction of resorts and marinas along the coastlines contributes to coastal erosion, sedimentation, and pollution, all of which can degrade the health of the reefs.

The combined effects of climate change and overexploitation create a destructive feedback loop. Weakened and damaged reefs are less resilient to withstand the impacts of climate change, making them more susceptible to bleaching and other stressors. This, in turn, further hampers their ability to support diverse marine life and provide crucial ecosystem services such as fisheries, coastal protection, and tourism appeal.

To address these issues and prevent the death of the reef ecosystem in Guadeloupe, a multi-faceted approach is needed. Firstly, immediate measures must be taken to mitigate climate change and reduce greenhouse gas emissions. This involves transitioning to cleaner energy sources, promoting sustainable practices, and implementing international agreements to limit global warming. Additionally, local conservation initiatives should focus on raising awareness among tourists, promoting responsible tourism practices, and enforcing regulations to minimize physical damage to the reefs.

Furthermore, the implementation of marine protected areas (MPAs) can provide a sanctuary for the reef ecosystem to recover and rebuild its resilience. These MPAs should include strict regulations on fishing,

tourism activities, and coastal development. The involvement of local communities, scientists, and government authorities is crucial in establishing and effectively managing these protected areas.

THE NATIONAL HAIL SUPPRESSION AND PRECIPITATION ENHANCEMENT SYSTEM IN THE CONTEXT OF CLIMATE CHANGE

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The Authority for the Administration of the National Hail Suppression and Precipitation Enhancement System (AASNACP) authorizes Licensed Operators for weather modification activities on the territory of Romania. In 2010, the first operating license for weather modification activities in Romania was issued, for activities to suppress hail with the help of rockets.

In 2019, the first license was issued for the precipitation enhancement with the help of airplanes and the first small-scale experiment began, in the Dobrogea area, in collaboration with the 3D S.A. company from Greece. During 2021 and 2022, 5 other experiments were carried out, in different areas of Romania, collaborating with Stroyproject LTD from Bulgaria.

The year 2022 also saw the release of a license to enhance rainfall using ground-based generators, rockets and light helium weather balloons. During this year, a series of small-scale experiments were carried out with the help of this three weather modification technologies and satisfactory results were obtained.

At this moment, the National Hail Suppression and Precipitation Enhancement System (SNACP) operates 6 Command Centers for hail suppression and a number of 99 Launch Sites of anti-hail missiles, located throughout the territory of Romania, protecting a total area of 2.8 million ha. Over 1100 specialists trained for weather modification activities, a number of 22 PhD in different scientific fields (Physics, Geography, Meteorology) and 12 PhD students work in this field of activity.

For the development of SNACP, the General Designer - Economic Interest Group is organized and operates, together with the National Meteorological Administration, the National Institute of Pedological Studies, the Technical University of Craiova and other national entities.

CONSIDERATIONS REGARDING THE FLOW OF WATER THROUGH GRANULAR LAYERS

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In riverbeds formed in weakly cohesive rocks, a layered flow phenomenon occurs. The flow of water takes place in the bed, but also through the foundation of the bed consisting of granular layers. At the same time, the movement of water also extends into the granular layers in the riparian area of the bed. This aspect influences the parameters of the phenomenon of erosion and suffusion in the river bed. The movement of water also extends to the riparian zone with implications for the stability of constructions. The determination of water movement parameters (flows, levels, velocities, wall velocities, drive speeds, frictional effort and other) is differentiated in several areas along the vertical of the current. Obtaining research and design data is done through hydraulic modelling and numerical simulation of the flow phenomenon in the bed. The research carried out on a series of granular materials highlighted the formation of transitional and turbulent flow regimes in the granular layers in the foundation of the bed, as well as in the riparian zone. At high Reynolds numbers in the granular medium ($Re = 4 - 340$), the specific inertial forces develop preferentially, and the motion regime is characterized by a wide transition zone from laminar to turbulent. The influence of the granulometry and especially the D50 diameter is predominant in the research model. In the filtration process in the granular layers for the laminar-turbulent and turbulent transition zones, a customized hydraulic conductivity coefficient was used and denoted kt . This coefficient mainly depends on the Reynolds number and the porosity parameters of the granular medium. The turbulent filtration coefficient must be determined experimentally, on Reynolds number ranges and type of granular material. The result of the research is applicable to the study of the morphology of the riverbeds, to the analysis of the erosion phenomena of the bed and its constructions, to the design of water intakes, to the infiltration in the river banks and others.

CONSIDERATIONS REGARDING THE CURRENT MINOR BED CONCEPT IN WATERCOURSES

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The definition and characteristics of the minor bed is a subject of intense scientific debate. The importance of this subject in Romania, but also on an international level, is given by a series of characteristics that the minor bed must respect for a stable operation. At the same time, the minor bed falls into an economic, administrative and social context, a situation in which it must comply with a series of requirements imposed by law. The paper analyzes a series of characteristics of the minor river bed currently researched on a national and international level. Among them can be mentioned: the formation flow, the shape and elements of the section, the right of ownership, the cadastral classification, the method of exploitation of the bed and the immediate riparian area, etc. The analysis of the specialized literature shows a great international differentiation of the treatment of the characteristics of the minor bed. A special problem is imposed by the delimitation of the minor bed based on maps in digital format. The continuous morphological transformation of the minor bed causes the rapid obsolescence of the maps necessary for the design of the constructions located in the bed and in the riparian area. Also, the resolution of some disputes in the area of minor riverbeds is difficult due to the absence of updated maps at time intervals. The creation of the "Numerical Terrain Model" requires a clear delimitation of the minor bed and the areas of use along it. The research was carried out in the hydrographical basins of the Prut and Siret rivers. The obtained results indicate a series of deficiencies in the real estate cadastre of the area occupied by the minor bed and the riparian area. Also, the minor bed and riparian area of the rivers in Romania is heavily polluted, an aspect reinforced by the lack of effective legislation in this field.

**CONSIDERATIONS ON THE DEMOGRAPHIC DECLINE OF
THE POPULATION IN THE NORTH DEVELOPMENT REGION,
REPUBLIC OF MOLDOVA**

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The aim of the paper is to evaluate the demographic decline of the population of the North Development Region, at the level of administrative-territorial units, in the period 1990-2021. The North RD is the territory of the republic where the demographic transition, towards the simple and narrow reproduction system, was registered as early as the late 90s, the region being marked by the greatest demographic decline during the period of state independence. The data obtained as a result of the processing of the information regarding population inflows and outflows allowed us to identify the size of the demographic decline, as well as that of the stabilization of the population, in this sense a typology of geodemographic dynamics was created in the analyzed interval. The socio-demographic indicators analyzed confirmed the hypothesis of the greatest population decline in practically all regional localities, the intensity of the decline being different at the level of urban and rural human habitats, peripheral and polarized around the larger cities of the region. Thus, out of the total number of localities, only 23 human habitats (two cities, district centers, one small town and 20 rural habitats) register an increase in the numerical population, which constitutes 7,3% of the total number of localities in the region, and 92,7% of localities registered a decline in population. RD North remains the most affected development region in the Republic of Moldova, with significant population losses, as a direct effect of the decrease in birth rate, increase in mortality and emigration, both internal, but especially external. The current state of demographic decline in the region represents a sensitive and important subject with real negative effects on socio-economic transformations in the coming period, but the situation in the future perspective may change, taking into account the global pandemic situation from 2019-2020, as well as of the 2022 military conflict in Ukraine.

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INFLUENCE OF VARYING BASE DEMANDS ON WATER AGE IN A WATER DISTRIBUTION SYSTEM

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The paper presents a comparative analysis in the process of modelling water distribution systems (WDS), taking into consideration water age

parameter. The age of the water in WDS is a parameter that determines its freshness. The main goal of the presented research was to analyze changes in water age by linking water age to the demand. A hydraulic model was developed and, using the EPANET program, calculations simulating its parameters was carried out, accounting particularly for water age. A number of simulation cases were analyzed varying the demand in each node of the water distribution system. Simulations lasting 7 days showed a modification in terms of water age. This comparative study has the aim of analyzing the water supply network, showing in which way the efficiency of the system changes due to changes in water age.

PRELIMINARY CONCLUSIONS OVER THE SMALL-SCALE EXPERIMENT FOR RAIN ENHANCEMENT USING UNMANNED LIGHT HELIUM BALLOONS

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Using unmanned helium balloons for rain enhancement is a new approach in the weather modification field. In Romania we performed a small-scale experiment between November 12th to December 11th, 2022, (30 days) in the north-east part of the country, in Cotnari region. The Laico solution was installed in 5 launching sites, and considering the Romania Aeronautical regulation, we use 5 rockets launching sites where we have approval for using the air space for weather modification. Throughout the experimental program's duration, the meteorological conditions were analyzed daily by our specialists, from the forecast stage to the operative situation, using data from the meteorological radar, provided by Romania National Meteorological Administration network. For each day the specialists from the Command Center received the forecast and in depend of it use a balloon trajectory simulation numerical model free source, provided by uwyo.edu, to estimate the seeding zone. For the entire period of the experimental program for rain enhancement, there were seven cases with good meteorological condition for using balloons for weather modification purposes. For validation we use radar estimated amount of rain, and also pluviometers installed on the field, to compare. As a result of weather modification for rain enhancement using this technology, on average, an increase in rainfall amounts was noticed, in some cases from 2.9 l/sq m before cloud seeding to over 7.9 l/sq m after seeding. There

were cases where the increase in rainfall amounts was even more significant, from 9 l/sq m before seeding to over 21 l/sq after seeding. The clouds speed played a very important role for the area where the precipitation was increased, compared with the seeding location.

QUANTITATIVE ASSESSMENT OF SUMMER AIR-TEMPERATURE EXTREMES ON THE MOUNTAIN TOPS OF THE ROMANIAN CARPATHIANS DURING 1990-2020

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Based on the daily summer (J, J, A) air temperature observations available during 1990-2020, this study makes a quantitative analysis of the annual and monthly variations of both daily maximum air temperatures and of some other relevant heat indices of extremes defined in the CLIMPACT project (ETCCDI indices), at eight meteorological stations (Bâlea Lac, Ceahlău Toaca, Iezer, Lăcăuți, Parâng, Vf. Omu and Vlădeasa 1800); all being located on the upper mountain level of the Romanian Carpathians. During the reference period, maximum air-temperatures exceeded 20°C at all meteorological stations, topography and synoptic patterns playing a very important role. Air temperatures in Romania has been slowly but continuously increasing, the warming signal being qualified by various factors. However, the warming signal has also been observed at these mountaineous meteorological stations of reference, with higher air-temperatures at Parâng weather station and lower temperatures at Vf. Omu, mainly because of their different altitudinal distribution.

The results of this study reveal the followings: 1) the warming process is ongoing and intensifying in the mountain area; 2) high air temperature values were recorded at all analysed stations, especially at Parâng station, exceeding 25°C (in 50 days of the reference period), as direct effect of its exposure to most often invasions of hot air-masses from the Mediterranean region.

THE HEALTH OF ARABLE CHERNOZEM SOILS THROUGH THE PRISM OF THE "BIOGEOCENOTIC FUNCTIONS OF THE SOIL" CONCEPT

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Through the prism of the concept "biogeocenotic soil functions", soil health is a pedofunctional category, a complex product of the interdependent and interdetermined interaction of the basic functions (physical, chemical, physico-chemical, informational, integrative) and materializes in the production, environmental-formative and reproductive functions of the soil ecosystem. In this context, soil health involves two basic categories: a) the ecological capacity of the terrestrial ecosystem; b) the ecological stability of the soil ecosystem.

The ecological capacity of the terrestrial ecosystem is a quantitative expression of soil fertility (the productive component of terrestrial ecosystems) and characterizes its ability to ensure the functionality of a certain amount of "aboriginal" pedobionts, the population density of which is determined by the ecological resources of a particular biotope.

In this context, if the biotope is ecologically unstable (it is affected by various forms of degradation) the ecological capacity of the terrestrial ecosystem cannot be fully realized.

The ecological stability of the soil - its ability to resist degradation, i.e. to ensure the production function and to resist the negative impact of biotic and/or abiotic stress factors. This feature is ensured by the local ecological resources, the degree of balance of the structure and mass of pedocoenosis biota and biotope characteristics and materializes in the capacity of self-support, self-organization, self-regulation and self-purification of abiotic and biotic stress agents of the pedobiocenosis.

Soil stability is achieved in quantitative and qualitative soil health manifested in the ability to function for an indefinite period of time as a component of the terrestrial ecosystem and to ensure its bioproductivity, to support the quality of water and air, as well as the health of plants, animals and people.

Non-degraded (healthy) soils are characterized by inter-determined and interacting balanced parameters of biological diversity, efficient self-purification and suppressiveness in relations with phytopathogenic biota. The biotic functions of "healthy soil" are achieved through self-purification processes (biotransformation and/or decomposition with the participation of organotrophic destructuring microorganisms) and the suppression (elimination) of phytopathogenic microbiota that permanently infect the soil.

The suppressiveness of the soil is an indicator parameter of its health manifested in the suppression and or elimination of certain phytopathogenic species and is determined by the combined action of all species of microorganisms responsible for the biological, biochemical, physico-chemical, biophysical processes that take place in the soil and materialize in physical, physico-chemical, chemical, agrochemical, biophysical parameters (structural-aggregate state) of soils.

Through this prism of ideas, the health of the soil is the product of its evolution processes in the previous phases of pedogenesis, which involves 3 levels (abiotic, of non-individual integration of the soil, of individual integration characteristic only of the soil). Contemporary pedogenetic processes are responsible for the environmental modeling of the biotope for future generations of the biotic component of the soil.

THE NECESSARY PARAMETERS FOR THE OPTIMIZATION OF THE ADVANCED PURIFICATION STAGE

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The advanced treatment stage is a crucial step in the wastewater treatment process, aiming to remove residual pollutants from the water that cannot be completely removed in the previous treatment stages. This additional step is mainly applied in municipal and industrial wastewater treatment plants, and uses advanced technologies to ensure a high level of water purification. Sizing the parameters required for the design of the advanced treatment stage is an essential step for ensuring the efficiency and maintaining the performance at high standards of modern wastewater treatment plants. Pollutant concentrations and other characteristics of the wastewater will determine the required capabilities of the advanced treatment stage, so the correct assessment of the characteristics of the wastewater is crucial for determining the appropriate treatment technologies and processes. The main purpose of the advanced treatment stage is to significantly reduce the concentrations of organic and inorganic substances, nutrients, heavy metals, chemicals and other pollutants in the wastewater, so that the water can be discharged into the environment in a state as clean and bacteriologically safe as possible. The advanced treatment stage is a complex and expensive step in the wastewater treatment process, but it is essential for protecting the environment and ensuring the quality of water discharged into natural

water sources. By using advanced technologies, this step helps reduce the impact of pollution on aquatic ecosystems and human health. Among the advanced technologies used in this purification step are: membrane filtration, ozonation, adsorption with activated carbon, advanced oxidation processes. The sizing of the parameters required for the design of the advanced treatment stage is based on several specific criteria and methods, such as: volume and characteristics of wastewater, pollutant removal efficiency, water flow and contact time, equipment sizing, energy consumption. The paper presents a series of steps necessary for the correct sizing of the advanced purification step to obtain the correct results in terms of efficiency.

THE FUNCTIONS OF CYANO-FIXING BACTERIA IN THE CONTEXT OF SOIL HEALTH

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Part of the pedobiocenosis, nitrogen-fixing cyanobacteria in soils can be present: on their surface forming "living" crusts or films, in the soil solution contained in the aggregate capillary pores; on the surface of elementary soil particles and microaggregates and are part of the performance of functions responsible for soil functionality and health.

According to our research, the basic function of nitrogen-fixing cyanobacteria in the functioning of the soil ecosystem is realized in their function as the nucleus of the algal-bacterial pedobiocenosis (Jigău et al., 2019, Jigău et al., 2022).

Through the prism of the priority role of cyanobacteria in the functioning of the soil biome, they have an important direct and indirect role in the sequestration and stabilization of organic carbon in the soil. Their direct role is achieved through direct participation in the aggregation-structuring processes, thus ensuring their permanent presence in the structural aggregates, ensuring the continuous production of algal biomass which is subsequently humified and contributes to the stabilization of the newly formed humic substances in the structural aggregates. In larger quantities, they accumulate in aggregates of 1-0.5 and 5-1 mm. In minimal quantities they are contained in aggregates > 7, especially in those > 10 mm. In the framework of our research, it was established that in arable chernozems there is a positive dependence between the content of cyanobacterial flora and the content of 5-1 mm aggregates, as well as between the content of

cyanobacterial flora and the degree of hydrostability of 5-1 mm aggregates. Increasing the content of 5-1 mm aggregates and their hydrostability contributes to the creation of favorable conditions for the realization of the agrobiocenotic functions determined by the aggregate structure of the soils.

The indirect participation of cyanobacteria in the sequestration of organic carbon in the soil is carried out in their function of producing organic matter rich in carbon and nitrogen. Algae and cyanobacteria are characterized by autotrophic nutrition and, respectively, as a result of the photosynthesis process, part of the carbon accumulates in their biomass, which contains up to 70% carbohydrates, 50% proteins, 10% lipids and other substances that in the process of decomposition accumulates in the soil and contributes to the accumulation of carbon.

Thanks to the increased nitrogen content, the decomposed cyanobacterial biomass is not only an important source of humus formation, but also a catalyst for the process of formation and accumulation of organic humic substances that have an extremely important role in achieving production, environmental-forming and resource-regenerative functions which are basic attributes of the health of arable soils. Among the number of soil pedobiocenosis functions of nitrogen-fixing cyanobacteria are:

- nitrogen fixation and the continuous accumulation of biological nitrogen in the soil as a source of nitrogen for the humification process;
- supporting the air regime, especially the oxygen regime in the soil. At the same time, nitrogen-fixing cyanobacteria are indicator organisms of pedogenetic, pedofunctional, nutritional regimes, of salts and pollution with products of agricultural activity (fertilizers, phytosanitary products, heavy metals, etc.).

EMPLOYING ARCGIS MODEL BUILDER TO AUTOMATE THE PROCESS OF WATERSHED DELINEATION

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Geographic Information System (GIS) and Digital Elevation Models (DEMs) can be used for a variety of geospatial and hydrologic modeling operations. Watershed-based management of natural assets is becoming increasingly popular and requires an integrated strategy that typically begins with delineating the watershed's boundaries. By analyzing topographic maps generated by digital elevation imaging and adding the

data that has already been included in these images, watersheds can be delineated. The development and application of models for spatial natural issues using GIS technology has considerably increased. With the use of these technologies, spatial processes can be organized and integrated into more comprehensive systems that mimic real-world environments. Both the automated documentation of data management and methods for geographical analysis are supported by the geoprocessing models. When designing, revising, and managing geoprocessing functions models that lead to automation, ArcGIS Model Builder is extremely valuable. This a chain-like geoprocessing tool method that employs the result of one process as the input for the next one. The aim of this research is to create a model for automatically delineate the catchment area using a DEM. The approach enables important spatial and visual interpretations while simplifying the management of input and output data. All forthcoming investigations of the same type can use the model developed in this study as a starting point.

UMBELICEN - PROPHYLAXIS METHOD OF PARASITE IMMUNODEFICIENCY IN BOVINE

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The aim of the investigation was the study of complex antiparasite treatment of poliparazitism for the prophylaxis of immunodeficiencies of parasitic order. The studies were accomplished on 4 lots of 10 adult bovine (4-6 years old) of Holstein race. The results of coprologic analysis revealed an invasion extensity by *S. papillosus* of 56% and invasion intensity (II) -2-16 larvae, *Neoascaris vitulorum* - 59% and II - 5-8 eggs, *Eimeria* spp. - 65% and II - 2-14 oocysts. The poliparazitism was established in 54% of the cases. The associated parasitism (*S. papillosus*, *F. hepatica* D. lanceatum, *E. granulosus* larvae, *Eimeria* spp.) provokes the nonspecific stimulation of null and Ts lymphocytes and suppress the policlonal proliferation of immuno-competent cells involved in immune cellular response, thus reducing the level of B, T and Th lymphocytes. The antiparasite chemotherapy (Amprolium, Albendazolum 2,5%, Tylosinum 200) due to its immunotoxic effect decreased the level of B, T and Th lymphocytes, and the toxins resulted after the degradation of

parasitic elements induced the quantitative increasing of null and Ts lymphocytes. Therefore, it aggravates the pathologic process, provokes immunodeficiencies with long period of convalescence and decreases the resistance of animals to repeated infections. The tissular therapy associated with the parasitic one (Umbilicenum, Amprolium, Albendazolum 2,5%, Tylosinum 200), induced the increasing of B, T and Th lymphocyte level on the basis of null and Ts lymphocytes. The convalescence period decreased by 10 days, while the period of repeated infection increased by 30 days. In conclusion it can be said that parasite factor in parallel with immunobiologic resistance of the host can be also aggravated by antiparasite medication, that often doesn't reach the expected result and the adverse reactions are more pronounced than disease symptoms. Antiparasite preparations possess immunodepressive activity, decrease the immunobiologic reactivity, the therapeutic efficiency, intensify the disease and considerably reduce the resistance to repeated contamination. Keywords: poliparasitism, treatment, chemotherapy, lymphocytes, immunity, convalescence.

MONITORING OF THE POLLUTION LEVEL IN EDUCATIONAL BUILDINGS

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Poluarea aerului din clădirile de învățământ prezintă un interes deosebit, având în vedere timpul petrecut de copii, o categorie deosebit de sensibilă a populației, la școală sau grădiniță și expunerea acestora la diverși poluanți în astfel de tipuri de spații. Caracteristicile urbane locale, cum ar fi amplasarea clădirilor școlare în apropierea arterelor cu trafic intens, pot determina niveluri diferite de poluare în spațiile școlare situate în orașe. În acest sens, scopul activității de monitorizare este creșterea gradului de cunoaștere a nivelurilor de poluare din mediul școlar prin colectarea de informații specifice și desfășurarea de campanii de conștientizare a importanței calității aerului interior și a numeroaselor efecte negative pe care un aer poluat le poate avea asupra sănătății ocupanților. Monitorizarea nivelului de poluare a fost efectuată în clădiri publice de învățământ, respectiv patru școli gimnaziale și două grădinițe, situate în București, criteriul de alegere fiind nivelul de risc de expunere a ocupanților țintă, copii cu vârste cuprinse între 4 și 9 ani care își desfășoară activitatea la interior, timp de aproximativ 7h pe zi. Studiul s-a realizat în condiții obișnuite de exploatare a spațiilor școlare, la începutul

zilei, pe parcursul a două ore, înregistrându-se la fiecare minut concentrația totalului de compuși organici volatili (TCOV) și concentrațiile dioxidului de carbon (CO₂). Particulele solide cu dimensiuni de 2.5μm (PM_{2.5}) și 10μm (PM₁₀) au fost înregistrate în intervale de 5 minute. Pe întreaga perioadă de monitorizare ventilarea spațiilor analizate s-a realizat exclusiv prin ventilare naturală (uși, ferestre). Echipamentele au fost amplasate la 1 metru distanță față de perete și la o înălțime de prelevare de 140cm față de nivelul pardoselii pentru spațiile din școlile gimnaziale și de 100cm pentru spațiile din grădinițe, reperul fiind nivelul de înălțime al ocupanților vulnerabili. Valorile medii ale concentrației totalului de compuși organici volatili (TCOV) au variat între 554 și 2518μg/m³, depășindu-se valoarea admisă de normativul I5-2022, de 1000μg/m³, în trei cazuri (două școli și o grădiniță) din șase. Referitor la concentrațiile medii de CO₂ se constată că rezultatele obținute, în gama 1055 - 2050ppm, sunt mai mari decât limita de 1000ppm în toate spațiile monitorizate, limită admisă de normativul menționat. Concentrațiile medii de PM_{2.5} au variat între 25,1 și 89,9μg/m³, valori ce depășesc limita de 25μg/m³, iar concentrațiile de PM₁₀, între 63,7 și 307,4μg/m³, depășind limita de 50μg/m³, limite prevăzute de ghidul Organizației Mondiale a Sănătății și de normativul I5-2022. Rezultatele studiului arată că spațiile analizate sunt deficitare în ceea ce privește asigurarea calității aerului interior și a necesarului de ventilare. Pentru fiecare dintre acestea se impune crearea de măsuri cu caracter de remediere ce vizează în principal ventilarea adecvată a spațiilor și implementarea unor sisteme condiționare și purificare a aerului cu retenție de particule solide și compuși chimici.

THE RECOVERY AND RESILIENCE FACILITY A TOOL FOR BOOSTING GREEN TRANSITION IN EU?

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In the context of the COVID-19 pandemic, the Next GenerationEU (NGEU) program and the consequent National Recovery and Resilience Plans (NRRPs) were a reaction to support the EU countries and regions to repair the economic and social damages, but also address present and future challenges such as climate change, social inequalities and economic competitiveness on the global market. This research aims to assess the similarities and dissimilarities in planning green transitions as

they transpire from the NRRPs of member states; we include an assessment of the convergences and divergences regarding the approaches of different environmental components covered in the NRRPs of the EU countries and especially in the Eastern and Southern EU countries. We also look at the regional and local finances to correlate them with strategic actions and policy recommendations. The conclusions converge towards the idea that there is considerable heterogeneity at different territorial levels concerning the potential effects of NRRPs on transitioning towards a more sustainable and environmentally friendly society.

MANAGEMENTUL PROIECTELOR DE INVESTITII CARE GENEREAZA ENERGIE DIN SURSE REGENERABILE - UN GHID ÎN DOMENIUL DEZVOLTARII TERITORIALE

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Ideea Aristotelica a ORASULUI PENTRU OM-paradigma calauzitoare a specialistilor Societatea de consum apărută la sfârșitul secolului al XX-lea, alături de tendința de creștere a populației la nivel mondial, intensificarea procesului de urbanizare, dezvoltarea și difuzarea tehnologiei informației și a comunicațiilor, creșterea continuă a standardului de viață, reducerea ciclului de viață al produselor au contribuit la apariția unei revoluții în dezvoltarea asezărilor umane. În condițiile diminuării accentuate a resurselor naturale, a deteriorării rapide a calității aerului, apei, solului și a afectării ecosistemelor naturale, preocupările la nivel internațional pentru Managementul orasului în vederea Modificării mediului de viață au căpătat un caracter dinamic în direcția identificării celor mai bune soluții și tehnologii. În acest context, managementul localitatilor a devenit o problemă de fond a evoluției social-economice viitoare, un rezultat direct al unei dezvoltări prezente de tip linear. În prezent, există un consens general cu privire la faptul că o dezvoltare sustenabilă impune o gestionare adecvată a materiilor prime, a deșeurilor, a produselor secundare, a energiei, etc. care să permită conservarea resurselor naturale limitate ale planetei și protejarea mediului. Cantitatea de resurse utilizată într-o societate joacă un rol crucial în dezvoltarea spațială durabilă, pornind de la extracția resurselor naturale pentru activitățile de producție și consum, ajungând la materialele eliberate în mediu, cum ar fi eliminarea deșeurilor și a emisiilor în aer și apă. Conform Tabloului de bord al UE privind eficiența

resurselor 2015, se constată că România înregistrează cea mai mare creștere a consumului de resurse naturale din Europa Central-Estică, respectiv un consum pe cap de locuitor care a crescut cu 178% în ultimii 12 ani. Acest procent care ne indică faptul că avem de recuperat în materie de creștere a productivității utilizării resurselor, pentru a reduce decalajul față de celelalte state UE, dar și pentru a da un nou impuls în direcția dezvoltării de afaceri în zona economiei circulare și a economiei verzi. Noile ținte privind dezvoltarea spațială durabilă aduc în prim-plan necesitatea reconsiderării ciclului economic astfel încât România să recupereze decalajele privind promovarea managementului durabil al resurselor. Politică privind promovarea tehnologiilor curate, proiectarea ecologică, precum și gestionarea deșeurilor sunt direct influențate de schimbările economice și posibilitățile de finanțare. În acest sens, este necesară schimbarea mentalității tuturor părților interesate pentru promovarea unui comportament ecologic. Diversitatea și viteza propunerilor și a realizărilor declanșează revoluția în domeniul expansiunii urbane.

EVALUATING THE IMPACT OF NATURAL AND ANTHROPOGENIC PRESSURES AND THREATS ON ROSCI0434 SIRETUL MIJLOCIU (ROMANIA): A COMPARATIVE ANALYSIS

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This article presents a comparative analysis of the impact of natural and anthropogenic pressures and threats on the protected area ROSCI0434 Siretul Mijlociu. The study aims to investigate the extent to which anthropogenic factors contribute to the intensity of natural pressures and threats in the area. To achieve this, a systematic approach was employed, involving field observations and a review of relevant literature. The study found that natural pressures such as floods and landslides have a significant impact on the area, leading to erosion and habitat destruction. Anthropogenic factors such as extraction of sand and gravel, land-use changes, agricultural practices, and infrastructure development were also found to contribute to the intensity of natural pressures and threats. The results suggest that the intensity of natural pressures and threats in the area is amplified by the presence of anthropogenic factors. Therefore, it is crucial to consider the cumulative impact of both natural and

anthropogenic factors when developing management strategies for the protected area. The study recommends a holistic approach to conservation management that recognizes the interconnection between natural and anthropogenic pressures and threats. Overall, this study highlights the need for continued monitoring and assessment of the impact of both natural and anthropogenic pressures and threats on protected areas. This will enable the development of effective conservation management strategies that can mitigate the impact of these pressures and threats and ensure the long-term sustainability of the protected area.

**SLOPE STABILITY ANALYSIS OF A DAM. CASE STUDY:
HÂLCENI RESERVOIR, IAȘI COUNTY, ROMANIA**

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Geotechnical properties of an embankment material as the type of soil, density, cohesion, angle of internal friction, hydraulic conductivity, etc. affect the stability of slopes and therefore, these data can be utilized to determine the susceptibility of a slope to sliding. Slope stability is the resistance of an inclined surface to failure by sliding or collapsing. This paper presents stability analysis for the upstream slope of Hâlceni dam, performed by the finite element stability method Morgenstern-Price method using SEEP/W and SLOPE - GeoStudio program, under the condition of the drawdown water level. Firstly, the infiltration curve in the dam was drawn with SEEP/W - GeoStudio program, according to the maximum level of 55,86 maSL, measured during the flood in June 2019. Stability analysis during rapid drawdown is an important consideration in the design of embankment dams. During the rapid drawdown, the stabilizing effect of the water on the upstream face is lost, but the pore water pressures within the embankment may remain high. As a result, the stability of the upstream face of the dam can be much reduced. We analyzed the effects of slow drawdown and rapid drawdown from the maximum water level in the reservoir of 55,86 maSL, which was registered in the historic flood of June 2019. Built-in finite element algorithms used in the SEEP/W and SLOPE/W solved the analysis and

the results were obtained in the form of slip surfaces and a range of factor of safety (FS) values. For the critical slip surface, a critical factor of stability was calculated and compared to the admissible safety factor established in the legislation and the technical regulations in force in Romania. It is reported in the literature that the values of FS may range between 1,2-1,5 for the flood regime, for the rapid and slow drawdown.

SUSTAINABLE AGRICULTURAL PRACTICES AND CONTRACT FARMING - EVIDENCE FROM DAIRY FARMS IN DORNELOR BASIN - SUCEAVA COUNTY

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The economic impact of contract farming has been considered in various studies, but the analysis of its effects on the environment and on the sustainable agricultural practices adoption has not enjoyed the same interest. In this paper, the impact of contract farming on sustainable agricultural practices adoption was analyzed using data collected from 52 dairy farmers in the Dornelor Basin (Suceava County). The data were collected in a field survey, using the questionnaire, and were processed with the SPSS program. The results show a significant relationship between contract farming and the intensity of sustainable farming practices: farmers involved in contract farming adopt sustainable farming practices in a lower proportion. This study provides both new insights into the characteristics of contract farming and points of departure for future research addressing the dual challenge of agriculture - to produce sufficient food while reducing negative environmental impacts.

NITROGEN FIXING CYANOBACTERIA - REGULATORS OF NITROGEN CONTENT

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Cyanobacteria have a primary role in the biogenic migration of nitrogen on the Earth's surface, a fact that contributes to the maintenance of life on earth. Due to the ability to biologically fix atmospheric nitrogen, cyanobacteria occupy a basic position in the structural-functional organization of ecosystems in various natural regions. Atmospheric nitrogen fixed by cyanobacteria is important for ecosystems, and thanks to this process, about four times more nitrogen accumulates in the

environment than the amount arrived from atmospheric deposits. It is now well known that cyanobacteria contribute to nitrogen accumulation in terrestrial and aquatic ecosystems, largely due to their ability to biologically fix atmospheric nitrogen. However, it is not established whether these organisms contribute to maintaining the nitrogen balance in aquatic and terrestrial environments and whether they can be considered as self-regulators of this element. Thus, we present the results of research that highlighted the fact that some nitrogen-fixing cyanobacteria have the property of quantitative self-regulation of nitrogen in terrestrial and aquatic environments and maintaining its balance. In order to establish and verify the mentioned hypothesis, experiments were carried out in laboratory conditions (on a nitrogen-free liquid nutrient medium) and on the ground (in greenhouse conditions when growing crops and in open fields on agricultural land). During the experiments, the cyanobacteria strains *Nostoc gelatinosum* Schousboe ex Bornet & Flahault, *Nostoc flagelliforme* Harvey ex Molinari, Calvo-Pérez & Guiry and *Nostoc punctiforme* Hariot were trained. During the experiments, the quantitative changes in the forms of nitrogen in the soil, water and the amount of nitrogen fixed and eliminated by the cyanobacterial population were monitored. As a result of the experiments they established that the amount of NH_4^+ ions in the nutrient environments for the cultivation of cyanobacteria showed oscillations characterized by increases in concentration (up to maximum values of 3,3-3,9 mg/l) followed by decreases (up to 0,4-0,5 mg/l) and vice versa. Respectively, we find that the tested cyanobacteria have the property both to fix atmospheric nitrogen in the form of ammonium ions, within the limits of what is needed by the algal population, and to consume them, in the event that there is a surplus in the nutrient environment. Nitrate ions accumulated in the nutrient medium up to a certain limit after which they were consumed by the cyanobacterial population, a process that was repeated continuously. During the experiments, no nitrite ions were detected in the nutrient environment. This fact indicates that cyanobacteria can quantitatively regulate nitrogen in the aqueous environment and maintain it within the necessary limits. The analysis of the changes in atmospheric nitrogen fixed and removed in the nutrient environment for cultivating the researched cyanobacteria clearly shows the tendency of its fixation and consumption. This property is common to all researched cyanobacteria, but the period of its manifestation differs depending on the species. The same oscillations, characterized by the elimination of atmospheric nitrogen and its consumption, can also be seen in the case of the nitrogen eliminated in the nutrient environment for the cultivation of

cyanobacteria. The results of research carried out under greenhouse conditions, when administering the biomass of cyanobacteria investigated in the cultivation of tomatoes and cucumbers, highlighted the same legitimacy. The amount of atmospheric nitrogen accumulated in the soil differs depending on the administered species, the cultivated plants and the period of administration, but it is certain that they fix nitrogen up to a certain amount (which varies according to several factors) after which, if this amount is sufficient for the ecosystem, its consumption mechanism is triggered, and if it is deficient, nitrogen from the atmosphere is fixed. To verify if the identified legitimacy functions under open conditions, the biomass of experimented cyanobacteria was applied during the cultivation of sunflowers in an open field. The obtained results allow us to observe that the same principle of "quantitative self-regulation of nitrogen in the soil" performed by the experimented nitrogen-fixing cyanobacteria is respected, as well as the maintenance of nitrogen balance in the soil ecosystem. In the context of the mentioned, we can conclude that the nitrogen-fixing cyanobacteria *N. gelatinosum*, *N. flagelliforme* and *N. punctiforme* have the property of quantitative self-regulation of nitrogen in soil and water and probably have a primary role in ensuring the edaphic and aquatic climax.

STUDY REGARDING THE INTERDEPENDENCE BETWEEN THE TERRESTRIAL ECOSYSTEMS AND THE UNDERGROUND WATER CORPS

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Ever since the 1970s, the attention of specialists, and later of politicians, has been focused on the effects of the development/use of water resources on the environment and on the methods, that have been developed for the Evaluation of the Impact Associated (EIA) with these uses on the environment. There have been similar projects in the field of water. Much less effort has unfortunately been directed towards environmental impact assessment regarding water resource management strategies. This paper presents the study from the area of the Siret Basin Administration in accordance with the provisions of the Water Framework Directive 2000/60/EC and Directive 2006/118/EC regarding the protection of groundwater against pollution and damage. A new assessment of the habitat-underground relationship was carried out in 2018, taking into

account the time and space variation of the piezometric level hydrodynamic regime, controlled by natural factors (rainfall, temperature, evapotranspiration, infiltration, etc.) and anthropogenic factors (catchments exploited flows, drainages, etc.) as well as the physical and chemical characteristics of groundwater controlled by natural factors (communication with surface waters) and anthropogenic factors (pollution from various types of sources).

RISK FACTORS WITH IMPACT ON TOURISM IN THE PIATRA-NEAMŢ CITY

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The recrudescence of natural risk events on a global, regional or local scale it is currently increasing and impacting both natural systems and human society. The disruption of socio-economic activities also involves the tourism sector which, due to its closer dependence on the natural environment, is more vulnerable to the manifestation of various climatic, hydrological and geomorphological risk factors. The touristic potential (climatic and recreational, balneary, cultural-historical) and the activities related to the tourism sector from the Piatra-Neamţ city area could register dysfunctions as a result of the manifestation of the mentioned factors. This study aims to analyze the risk situations of the tourist activities from the Piatra-Neamţ city by evaluating natural hazards (probability and intensity) and vulnerability conditions (physical, economic and social dimensions). Our approach is mainly based on documentary investigation (various local, regional, national sources, scientific publications and statistical data) of some risk events covering the time period between 1887 and present and quantitative/qualitative data processing using GIS techniques for making a relevant mapping and the critical interpretation of the results. The study highlights the fact that some elements of the tourist infrastructure, as well as tourist objectives, fall under the incidence of geomorphological risks (e.g., the secondary ski slope on the eastern slope of Cozla Mountain, affected by landslides), climatic risks (e.g., the Tower of Stefan, damaged after being struck by lightning), biophysical risks (e.g., the Covid-19 pandemic), or social risks (e.g., economic difficulties as a result of activities disruption and the tourists number decrease). The identification of the characteristics causing the susceptibility to negative effects following the risk phenomena

manifestation and the assessment of the vulnerability of the tourism sector in the Piatra-Neamț city, constitutes a basic element in the strategy of risk management and sustainable development of the community.

CURRENT TRENDS AND FUTURE DIRECTIONS ON ENVIRONMENTAL REMOTE SENSING

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In understanding and monitoring environmental factors, remote sensing techniques play a crucial role. Remote sensing allows the acquisition of information about the Earth's surface and atmosphere on a global scale, without direct contact. The advantages of such an approach are minimal ecological disturbance, low costs, safety for scientists, real-time analysis of events and their effects, and multi-scale analysis of environmental modifications. Satellite imagery can be acquired at different wavelengths, optical and radar spectral formats, and interpreted to extract valuable water, soil, vegetation and atmospheric information. These initial data can be used in a wide range of applications such as weather and environmental forecasting, assessment of crop health, monitoring of water quality, detection of changes in land use, monitoring of forests, soil organic matter, etc. In view of the urgent need for sustainable development, a large number of remote sensing applications have already achieved a great deal, mainly through the use of remote sensing data from a variety of sources and retrieval methods. Through the comparison of data collected at different times, remote sensing facilitates the analysis of temporal trends and dynamic processes. Compared to in-situ data collection, remotely sensed data sets offer extended coverage, better resolution and often higher temporal frequency. Under the Copernicus programme, the European Space Agency (ESA) has launched a series of space missions known as the Sentinel family, each focusing on a different aspect of Earth observation: monitoring the atmosphere, oceans and land (Sentinel 1-6). Sentinel-2 is a mission with a multispectral imaging

instrument, taking high resolution images up to 10 meters. It provides detailed and accurate information about the earth's surface. The satellite's instrument collects data in 13 spectral bands, including the visible, NIR and SWIR regions of the electromagnetic spectrum. The case studies presented here are based on images from Sentinel 2. Its global coverage, frequent revisits and comprehensive spectral information provide a valuable tool for monitoring and managing the earth's resources and surroundings. Overall, remote sensing techniques help researchers, policy-makers and organizations make informed decisions, monitor change and address global challenges by providing valuable data and information on a range of environmental factors.

THE PLACE OF NATURAL SPIRITUAL ATTRACTIONS IN THE SPIRITUAL TOURISM TYPOLOGY. BEYOND THE PROMOTIONAL CLICHES

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The past decades have witnessed the emergence of new tourism practices that saw a shift of tourists' focus from mostly economic or proximity motivation for their travels to rather internal factors, such as the search for meaning. One of the most prominent forms of tourism focused on internal-driven motivation is represented by spiritual tourism. Organized spiritual tourism can be traced back to early 2000s, with the apparition of specialized tourpackages revolving around different civilizations, traditions and world's spiritualities and focused on activities and experiences leading to individual growth and development. This type of tourism is extremely dependent on certain types of attractions considered important by the community of spiritual tourists. The spiritual attractions cover a wide diversity from mountain peaks and caves to monasteries and historical locations. While an extensive research effort was put in identifying the main spiritual destinations, little effort was put in trying to understand how the behavior of spiritual tourists varies from one type of attraction to another. Our study fills this gap, by focusing on natural-based spiritual attractions and trying to understand how this type of attractions models the spiritual tourists' behavior and motivations. The research is based on a survey applied exclusively on spiritual tourists, one of the first instruments specifically designed to apprehend the complexity

of this type of tourism. Several key aspects were analysed, such as their frequency of visit, group dimension, or the lifechanging experience, among others. The results show that, despite the general tendency of considering the spiritual tourists similar in motivation and behavior, they tend to group in clusters (classes) induced by the type of attraction visited (natural, historical, religious or cultural), with the natural attractions being the most popular. The findings improve the taxonomy of spiritual tourism experiences advanced by Norman (2012) with several new dimensions.

ANALYSIS OF THERMAL PATTERNS USING LANDSAT SERIES THERMAL IMAGERY: SPATIAL CLUSTERS OF HOT AND COLD SPOTS IN URBAN ENVIRONMENTS OF NORTH-EASTERN ROMANIA

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This study explores the application of Landsat series (4, 5, 7, 8) thermal imagery, a powerful remote sensing technology, for a comprehensive analysis of thermal patterns within urban areas in North-Eastern Romania. By employing Getis-Ord G_i^* statistics, we aim to identify and characterize hot and cold spots of the urban area Land Surface Temperatures (LST) at the level of warm (May-September) and cold (November-March) seasons (1988-2021). This research seeks to provide valuable insights into the spatial distribution of temperature variations, contributing to urban planning and climate mitigation strategies. North-Eastern Romania urban areas are characterized by complex temperature variations influenced by factors such as land use, building density, and vegetation cover. Understanding these thermal patterns is essential for sustainable urban development and effective climate adaptation strategies. Using Imperviousness Density (IMD) data we find that details of the urban thermal landscape are closely tied to the spatial distribution of artificially sealed areas. LST at the urban-rural border change abruptly and are called the Surface Urban Heat Island (SUHI) "cliff". A large part

of the urban area has relatively shallow LST gradients and this represents the SUHI “plateau” (Getis-Ord G_i^* result = not significant). However, within the SUHI plateau, the most densely built-up area with dense and tall buildings are relatively high “hills” of warmth on the map of LST and these are the SUHI “peaks” (Getis-Ord G_i^* result = hot spots). For considered hot spots, the mean LST varies between 33-38oC during the warm season while during the cold season mean LST varies between 4-7oC. During the warm season, approximately 55% of the built-up areas are considered hot spots while during the cold season, only 38%. On the other hand, areas with relatively little or no urban development including vegetated parks, green spaces, forests, lakes, and rivers, are “valleys” or “pools” of relative coolness within the plateau (Getis-Ord G_i^* result = cold spots). For considered cold spots, the mean LST varies between 25-31oC during the warm season and between 2-4oC during the cold season. During the warm season, only approximately 4% of urban built-up areas are considered cold spots, while during the cold season, only 18%. The findings of this study will provide a detailed spatial distribution map of hot and cold spots within the major cities of North-Eastern Romania, leveraging the unique capabilities of Landsat series thermal imagery. The identified clusters will be quantitatively analyzed to reveal the characteristics and relationships between temperature patterns and urban features. The results will offer valuable insights into the urban heat island effect, localized thermal anomalies, and potential correlations with land use, vegetation cover, imperviousness and building density.

GEOPOLITICAL CHANGES AND THEIR INFLUENCE ON HERITAGE SITES - CASE STUDY MOLDOVA

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Geopolitics can have a significant impact on historical monuments, by destroying them, protecting them, managing them, and promoting them internationally. During armed conflicts or geopolitical tensions, historical monuments can become targets of intentional destruction. This may be the result of a desire to erase the symbols of a certain culture or to discredit an enemy. A notorious example is the destruction of statues in Palmyra during the Syrian civil war by ISIS. On the other hand, geopolitics can also protect monuments, by recognizing them as world

heritage by organizations such as UNESCO, which can contribute to their conservation and restoration. Some historical monuments need restoration and conservation work to keep them in good condition. Governments and international organizations may allocate financial resources to these projects, and the allocation of these funds may be influenced by geopolitical interests. For example, certain countries may wish to support restoration projects of monuments in allied countries or with which they have special relations in order to strengthen their influence or promote their image internationally. The present work wants to highlight the impact suffered by the monuments of the old principality of Moldova which is currently divided for geopolitical reasons into 3 countries Romania, the Republic of Moldova, Ukraine, and an internationally unrecognized state entity Transnistria. This work was co-funded by the European Social Fund, through Operational Programme Human Capital 2014-2020, project number OCU/993/6/13/153322, project title << Educational and training support for Ph.D. students and young researchers in preparation for insertion into the labor market.

**PLANT SPECIES IMPORTANT FOR POLLINATING INSECTS.
CASE STUDY: BĂICENI LOCALITY (BOTOȘANI COUNTY)**

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Recent studies consider pollination to be one of the most degraded ecosystem services. Pollination is an important stage for plant fruiting and is mainly carried out by pollinating insects such as the honey bees (the most common pollinator), bumblebees, butterflies etc. The decline of pollinators would be due to the complex interaction of several factors such as: habitat loss, climate change, food availability, pollution, pesticide treatments. Forests, grasslands, field crops, gardens and orchards provide favourable habitats for pollinators. The aim of this paper is to highlight the plant species that are beneficial to pollinators in the territory of Băiceni (Botoșani county, NE region of Romania). The identified plant species were analyzed on the basis of specialized literature, taking into account the following aspects: flowering period, flower grouping, flowers colour, economic - beekeeping weighting. 106 plant species were identified. Of these, 25 species in the forest ecosystem, 43 species in the meadow ecosystem and 38 species are cultivated (in fields or gardens). Most of the species identified in the study area have flowers grouped in

inflorescences and bloom in the spring-summer period. Flower colour ranges from white, yellow, yellow-green to blue-violet and red. 73 species have a significant economic-beekeeping weighting. The identified species represent an important resource for pollinators and thus contribute to maintaining the ecological balance of the ecosystems in the study area.

O RETROSPECTIVĂ A EVENIMENTELOR DE VÂNT CONVECTIV SEVER DIN ULTIMII 20 DE ANI

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Pe data de 20 iulie 2011, un sistem convectiv s-a format în Bulgaria și a traversat mai multe județe din sudul României. Furtuni puternice au fost prezente în cea mai mare parte a României și au fost parțial asociate cu un front rece. În data de 17 septembrie 2017, o furtună a afectat partea central-vestică a țării și a provocat dificultăți semnificative atât în prognoza pe termen scurt, cât în cea nowcasting. În urma acestei furtuni, 8 persoane și-au pierdut viața. Analiza datelor radar a relevat în ambele cazuri prezența mai multor supercelule, ecouri arcuite și rafale de vânt de peste 25 m/s pe distanțe mai mari de 300 km. Cele două evenimente ar putea fi considerate furtuni de tip "derecho". În cele din urmă, este analizată frecvența și cauza celor mai importante evenimente de vânt convectiv sever produse pe teritoriul României în sezonul convectiv (martie-septembrie) din perioada 2001-2022.

THE RELEVANCE OF AIR-INSTABILITY INDICES IN ASSESSING THE THERMOCONVECTIVE PHENOMENA WITHIN THE OPERATION AREA OF THE "TRAIAN VUIA" AIRPORT IN TIMIȘOARA, ON 10 JULY 2021

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Convective processes represent a major threat to society as they may produce serious environmental and social-economic disruptions through

their particular way and area of action. Therefore, monitoring thermoconvective phenomena in aviation is essential in ensuring safe flight conditions for passengers, by avoiding or reducing any potential risks in this respect. In order to analyze some of the potential conditions of atmosphere instability that might determine the onset and development of convective phenomena in the operation area of the “Traian Vuia” International Airport in Timișoara, there were used daily meteorological data for June, July, August and September during the 2003-2022 period, available at the National Meteorology Administration (ANM) for Timișoara airport. These data included: daily mean and maximum air-temperatures, daily rainfall amounts and rain-showers, severe weather phenomena (hail, lightnings, thunderstorms), gales and strong winds. Based on these, a more detailed analysis of air-instability indices was made next, mainly focusing on the followings: CAPE (Convective Available Potential Energy), SWEAT index (Severe Weather Threat Index), LI (Lifted Index), K-index, TT (Total Totals Index), SI (Shawalter Index), on the 10 July 2021, when severe convective cloud and storm systems developed on the operation area of the above-mentioned airport in Romania’s south-western parts. In doing this, the radar images showing the convective cells (as they were caught by the radar system in Timișoara) and the corresponding thermodynamic Skew-T diagrams also proved very meaningful and useful; all reflecting a precariously unstable atmosphere, with rainshowers and downpours, accompanied by lightnings, strong gales and hail.

UNVEILING THE POTENTIAL OF ZEBRAFISH AS AN ANIMAL MODEL FOR NEURODEGENERATIVE DISEASES: EXPLORING THE IMPACT OF TOXIC METALS

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Industrial activities in the past century have led to an increase in cases of health problems for both humans and animals. Heavy metals are well-known among the various harmful substances as particularly detrimental

because of their adverse effects on organisms. These toxic metals, which lack any biological function, pose a significant threat and are associated with multiple health issues. They can disrupt metabolic processes and even mimic essential elements sometimes. Fish represent an initial group of vertebrates that exhibits responses when the environment becomes contaminated with pollutants generated by human activities. The advancement of toxicity testing comprises newfound evidence regarding the toxicological impacts of pollutants on living organisms. With a better understanding of the toxic effects of different compounds and developing treatments for debilitating human diseases, the zebrafish has emerged as a progressively utilised animal model. This paper aims to assess and discuss the value of zebrafish as an animal model for neurological conditions, specifically Alzheimer's disease (AD) and Parkinson's disease (PD). It explores the benefits and limitations of using zebrafish as a valuable tool in studying these diseases.

RESEARCH ON THE INFILTRATIONS IN AN DRY DAM. CASE STUDY: CIUREA NON - PERMANENT ACCUMULATION, IAȘI COUNTY, ROMANIA

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The dam of the non-permanent accumulation Ciurea, located on the Nicolina River is a homogeneous earth dam with a maximum height of 16.0 m, made of dusty sands. The dam is designed to create a temporary retention of a significant volume of water, to reduce the flow peak on the river, and to increase the total time of the flood so that the negative effects of the flow are minimized. The paper presents the characteristic elements of the theoretical infiltration curve in the dam, calculated with established mathematical formulas. It also shows the infiltration curve in the dam drawn with SEEP/W - GeoStudio program, according to the maximum probable level of 79,70 maSL (highwater spillway crest level) and also to the maximum level of 68,55 maSL, measured during the flood in July 2013. It is observed that the regime of infiltrations through the dam body is similar to the theoretical way of behavior. Regarding the integrity of the

structure, a calculation was made of the stability factor of the upstream slope of the dam, in a high-water regime, when the water column in front of the tower has a height of 15.2 m. The dam was properly designed following the technical provisions in force in the design period (the year 1978) and behaved very well during the period of operation, according to the predicted behavior.

ENVIRONMENTAL MONITORING OF NAVIGABLE SECTOR OF THE DANUBE RIVER IN REXDAN RESEARCH INFRASTRUCTURE

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Our research activities focus on studying extensive aquatic ecosystems within the largest EU river basin, specifically the navigable sector of the Danube. Using a multidisciplinary approach that integrates various qualitative methodologies for examining chemical, physical, biological factors and biodiversity, as well as quantitative methods for dosing compounds with negative impact present in the environment, it becomes possible to achieve a clearer and closer to reality image of the quality of the environment in which we live. This paper presents the results of the analyzes that were carried out on different organs of Black Sea mussels in order to determine the concentration of metals with toxic potential. Analysis were made in the REXDAN Research Infrastructure of Dunarea de Jos University of Galati, Romania. One of the qualitative analysis and dosing methods that were used is based on the TXRF method, a method that allows us to obtain results very quickly and with a minimum of resources. The results obtained were compared with those that were obtained with ICP-MS method.

INFLUENCE OF GLACIOGENIC SEEDING ON THE RADAR CHARACTERISTICS OF HAIL CLOUDS

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An exploratory analysis of volume-scan, S-band, and C-band radars data using storm cell tracking software was used to calculate radar-derived parameters from 50 seeded and 50 non-seeded hailstorms (with hail > 2 cm, reported for the European severe weather database) during the summers of 2012 - 2022. Selected hailstorms were cells defined by radar reflectivity >50 dBZ and a maximum height of 45 dBZ echo above the environmental melting level > 4 km. All selected hailstorms had a lifetime of more than one hour. An independent samples t-Test was used to verify the differences between seeded and non-seeded hailstorm radar parameters. The seeded storm has lower mean values (between 7.4% and 9%) of heights of the maximum reflectivity level, cloud volume with reflectivity more than 35 dBZ, and vertically integrated water content. Also, in the case of two analyzed parameters (altitudes of the cloud upper boundary and maximum height of the 45 dBZ echo above the environmental melting), greater mean values (+10%) were recorded. An increase in the height of the upper boundary and maximum height of the 45 dBZ echo above the environmental melting of the clouds may indicate the stimulation of the development of seeded clouds, due to the so-called dynamic effect, in which the latent heat of condensation on the glaciogenic aerosol leads to an increase in convection and updrafts in the cloud. Furthermore, the decrease in heights of the maximum reflectivity level and vertically integrated water content are correlated with hail size decrease.

ANALYSIS OF THE EXPOSURE OF PRAHOVA'S CORRIDOR TO HEAT WAVES BY PARAMETERS OF FREQUENCY, DURATION, AND INTENSITY IN THE CONTEXT OF CLIMATE CHANGE

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The present paper analyzes heat waves through the lens of climate change in one of the most famous mountain tourist destinations in Romania, namely, Prahova's Corridor. The purpose of this paper is to primarily emphasize the relationship between tourism and climate change through the lens of extreme thermal manifestations such as heat waves, and it supports and complements other similar pre-existing studies in the field. The study is based on the gridded and temperature-homogenized daily climate data sets from the ROCADA database in the period 1961-2013, characteristic of the three weather stations related to urban areas in

the Subcarpathian (Câmpina) and Carpathian sectors of the analyzed territory (Sinaia and Predeal), and comparatively for a more thorough study of those at altitudes >2500 m (Vârful Omu), respectively from the bordering northern region (Braşov-Ghimbav). From the statistical processing and based on the calculations, a generalized warming trend of the Prahova Corridor climate and a statistically significant increase in the annual duration of heat waves only in its Carpathian sector (at least for the 90-95% threshold) and in accordance with the ideas of specialists, circulated both nationally and internationally.

THE INFLUENCE OF METEOROLOGICAL PARAMETERS IN THE DIURNAL AND SEASONAL VARIATION OF ATMOSPHERIC MICRO- AND NANOPARTICLES

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The main purpose of this work is to investigate whether meteorological parameters (temperature, relative humidity, atmospheric pressure) play an important role in modifying the micro- and nanoparticles concentration in an urban environment. The diurnal and seasonal variation recorded at REXDAN Research Center (Galati, Romania) was analyzed, based on data collected in situ from Rapid-E Real-Time Bioaerosol Detector which is an equipment based on Laser Spectroscopy. This work is carried out in the context where nanoparticles are not monitored by the competent institutions, the impact of nanoparticles on health being one that is being studied.

15 MINUTE CITIES IN RELATION TO URBAN SUSTAINABILITY. EVIDENCE FROM IASI MUNICIPALITY

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The 15-minute neighbourhood represents a highly discussed concept lately, in the context of a growing number of researches ever since the beginning of the covid-19 pandemic and of implementing a series of urban planning measures in several cities worldwide. The concept consists of all the facilities an inhabitant uses daily near her/his home. It is about the proximity by walking or cycling measured in a time unit,

specifically the 15-minute isochrone used the most. The present paper aims to study the benefits that implementing the principles of such a concept can bring to urban sustainability. The case study we work on is Iasi Municipality and its continuously sprawling periurban area. The hypothesis that we start with is that having a significant number and a large variety of facilities and services close to the residence would encourage inhabitants to use active means of transportation more and personal cars less. Moreover, there are implications for urban sustainability from the social and economic point of view through strengthening communities and developing the local economy. We use automatic methods of facilities and services extraction from Google Maps and manual checking of them, the calculation of accessibility to these facilities and the correlation of the obtained values to parameters that are related to the environment and urban green infrastructure. The results and the conclusion converge towards the idea that the 15-minute city design only sometimes overlaps with a more sustainable neighbourhood (we take two different neighbourhoods from Iasi as case studies). However, the presence of services (including green areas), the increase in active mobility and the consequent decrease in traffic and air pollution can transform the neighbourhoods and the city as a whole into a more sustainable and sound environment.

PROBLEMS OF ENVIRONMENTAL EDUCATION IN UKRAINE AND PROSPECTS FOR ITS DEVELOPMENT

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A gradual harmonization of Ukraine’s environmental legislation with the standard of EU laws is an essential condition for developing environmental education in Ukraine. Nevertheless, Ukraine faces a delay in enacting the law “On environmental education” which exists in the draft since as early as 2002. A similar delay is also observed in developing and enacting the Education Concept for Sustainable Growth. So far, environmental education in Ukraine is based on the approach to perceiving nature as an inexhaustible resource, without taking into

account the disastrous outcomes of such an attitude. And these outcomes have already led to irreversible changes and now it is necessary to fundamentally restructure the development approaches of general principles of environmental education, training of “professional environmentalists” for all links and systems of management, and maintenance of adequate levels of technogenic and environmental security of human activities. Modern environmental education in Ukraine is a systemic component of the national education system. Its main purpose is to create a new type of mindset, with a focus on humanistic and rational relationships between a human and the environment within the – nature – human – society – system. The Concept of environmental education in Ukraine has been adopted back in 2001. The Concept encompasses environmental knowledge and mindset shaping which requires treating the environment as a universal and unique value, the dependency of individual’s and humanity’s fate on the state of Earth’s biosphere and its separate components, including the Earth’s climate. According to the Concept, there are several levels of implementing environmental education. The first one is pre-school education. This level aims to nurture core environmental skills so that children perceive themselves as a part of an environment. However, the core role here still lies in education within families. The next and most important level of Ukraine’s continuous environmental education is a general secondary education, the course of which maintains and deepens environmental mindset, taking into account children’s age, the scope and level of their school knowledge at the elementary (1-4 grades), middle (5-9 grades), and senior (10-12 grades) levels. The professional environmental education in Ukraine is formally well-developed. There are specialized educational institutions at the level of middle special education with many of them training professional environmentalists. However, there are also negative prerequisites for the development of professional environmental education: there’s low prestige of this specialization amongst applicants, the existing system has low demand for these professionals, and it is required to continue ecological reforms of Ukraine’s economy to hold these professionals to higher standards. In Ukraine, there is also a postgraduate environmental education that ensures the continuity of environmental education and includes the system of competence and qualification advancement. With regard to informal education, the Concept assumes the adoption of programs and the development of projects in each separate region (and production branch). A vital element of the environmental education system and nurturing are extracurricular educational and pedagogic establishments. Extracurricular environmental

education is carried out in ecological and naturalistic centers, Palaces of children and youth, children's creativity houses, and junior naturalist stations. These establishments offer more diverse forms of environmental education and nurturing than schools do. However, extracurricular programs still pay little attention to the issues of natural resources exhaustion, water consumption, and search for alternative sources of energy; issues of the collection, sorting, compiling, and recycling of waste; overpopulation and hunger on the planet; issues related to the interference with natural plants' and animals' natural genotype using genetic engineering, production of products made out of genetically modified organisms; issues of city ecology, etc. In addition, such naturalistic centers are visited by few children with a related interest in natural science. Therefore, extracurricular environmental education is selective, in some cases elitist, and non-mass. At the current stage of education reforms, there must be established a new stance on environmental education as an instrument for the socialization of individuals and their adaptation to living in the urbanized environment under conditions of the development of a civil and informative society. Such an approach to perceiving environmental education enables its representation as a new educational branch with supra-objective functions, targeted at forming value-driven attitudes towards the environment: natural and artificial (anthropogenic) as well as the inner world of individual people, including their health, spiritual and tangible needs. Environmental education in Ukraine has to obtain the status of a strategic, large-scale, vital, and high-priority branch with extended and renewed meaning, form, and education methods.

SOIL CONTAMINATION DUE TO MILITARY EVENTS AND THE FUTURE OF ORGANIC PRODUCTION IN UKRAINE

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Ukraine has faced an unprecedented environmental disaster due to hostilities aroused by Russia against Ukraine. It concerns disruptions to ecosystems, complete pollution of Ukrainian agricultural lands, the

destruction of environmentally hazardous industrial facilities, deterioration of sanitary and hygienic values of drinking water, disruption in the operation of protected areas, and risk of radioactive contamination. The issues of environmental pollution as a result of military invasion should be analyzed, studied, and processed. Together with scientists from all around the world, it is necessary to develop all required methods and activities for the elimination of the issues. Even now, the world is aware of the disaster Ukraine is facing. And in the aftermath of the war, the disaster will have an even greater global impact – namely, complete contamination of Ukraine’s agricultural lands and the food security of Ukraine and the whole world. Before the war, the degradation of soil in Ukraine manifested itself in the: - loss of humus and soil nutrients; - water and wind erosion; - siltation and soil crusting; - soil compaction; - contamination with pesticides, radionuclides, and heavy metals; - soil acidification; - waterlogging; - loss of biodiversity. Because of war, new challenges are added to the existing challenges: - territories mined to a significant extent; - craters created by shelling; - weapon-scorched lands; - significant landslides; - destroyed military equipment on the fields. All this causes long-term degradation of the environment and causes great damage to the soil. The more time the hostilities last, the more damage is done to the environment and particularly to the soil. Without timely soil remediation measures, the country will end up with soil damaged by flooding, salinization, erosion processes, etc. Undoubtedly, this can lead to devastating consequences in agricultural production, erosion of the soil cover, water scarcity, desertification, and air and water erosion. Today, 30% of Ukraine’s territory is considered a high-risk area for agriculture. And the most detrimental factor is the violation of the soil cover. It primarily includes direct damage – mechanical deformations, thermal and chemical contamination, and surface littering. Mechanical impacts. Violation of the soil structure as a result of the movement of military equipment, rearrangement of troops, defense constructions, and craters formed by the bombing. Mine clearance also has a detrimental impact. As of March, the State Emergency Service of Ukraine reported about 2 million 591 thousand hectares of land that require examination for mines and unexploded remnants of war. Chemical influence. The issue requiring special attention is soil contamination with heavy metals and their compounds, which tend to migrate into the vegetative mass of plants. Physical impact. It includes changes in soil’s physical parameters due to the use of weapons and military equipment. Primarily, these are vibrational, radioactive, and thermal effects. In the foreseeable future, the agricultural lands of western Ukraine’s regions will be used for organic

production since they were not affected by military actions. As for the eastern regions' lands, their reclamation will take much time. Considerable amounts of territories will be preserved and removed from agricultural use altogether and for a long time. In Ukraine, there was an active harvesting campaign in the spring, and according to the Ministry of Agrarian Policy, the crop areas will decrease by 25%. Agricultural producers report that currently, mine clearance will be time-consuming and expensive. The country requires a high-quality examination of potentially contaminated areas, the introduction of new technologies, monitoring, screenings, the use of special equipment, drones, and most of all – international support. Soil recovery practices must become a key goal in Ukraine. Above all, it means a stable partnership between scientists, the education system, the state, and businesses to take important strategic steps for the restoration of soil fertility.

THE WASTE MANAGEMENT SYSTEM IN GALATI COUNTY AND THE IMPACT ON THE ENVIRONMENT

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The new massive investments in the entire waste management system in Galati county will certainly have an impact on both the population, from an economic perspective, and the reduction of the negative impact on the environment. According to this study, we have found that Galati County benefits from the most modern technology and infrastructure in terms of waste management, and once the management system is fully operational, the benefits will be reflected in the reduction of environmental pollution.

PECULIARITIES OF ACCUMULATION OF POLLUTANTS IN PLANTS OF ROADSIDE STRIPS OF CHERNIVTSI REGION

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The vegetation cover of road geosystems in Chernivtsi oblast was formed under the influence of natural and anthropogenic factors. The location of the region's territory in three physical and geographical areas indicates the diversity of natural vegetation along the roads that cross the region. The roads pass through both the forest-steppe and forested parts of the region.

According to the results of the study, the content of heavy metals in the ash of herbaceous plants (individual species of different associations) of road geosystems is discrepant. Zinc is characterized by the highest absorption rate (and the highest concentration) in general for herbaceous vegetation. Its content ranges from 7.8 to 91.5 mg/kg of dry weight. Cuprum ranges from 4.21 to 17.15 mg/kg. Plumbum accumulation is 0.97-4.78 mg/kg, and Cadmium - 0.12-0.42 mg/kg. The content of heavy metals in plant ash decreases with distance from the roadway. The content of Zinc in a five-meter strip varies from 43.4 mg/kg to 92.5 mg/kg, and in a hundred-meter strip - from 25.4 mg/kg to 62.8 mg/kg; the content of Cuprum in the five-meter strip ranges from 4.2 mg/kg to 14.5 mg/kg, and in the one-hundred-meter strip from 5.7 mg/kg to 13.5 mg/kg; Plumbum in the five-meter strip - 1.6 - 4.2, in the one-hundred-meter strip - 1.9 - 3.2. Cadmium is characterized by a significantly low concentration - its content in the vegetation cover ranges from 0.12 mg/kg to 0.32 mg/kg. The increased content of heavy metals in the highway road geosystems can be explained by the high traffic volume of vehicles moving towards the border of Ukraine and Romania.

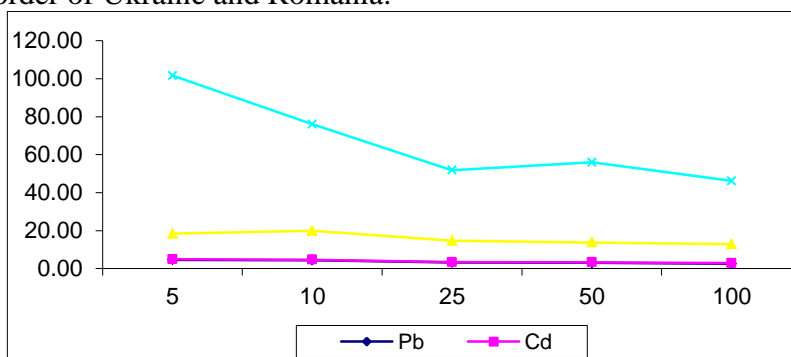


Fig. Diagram of heavy metals distribution in vegetation cover (phorb-gramineous association) of the highway M-19, E 85 (Chernivtsi-Porubne)

SMART TOURISM AND SUSTAINABLE DEVELOPMENT: THE EUROPEAN UNION EXPERIENCE

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The intensification of various economic activities, the growth of the world's population and their increasing mobility require intelligent solutions to protect the environment in the context of sustainable development. Tourism is an economic activity where a smart approach is

becoming increasingly necessary for sustainable development. Tourism resources have become smart tourism resources thanks to technological progress. The development of smart cities facilitates smart tourism, especially in urban tourism. The use of digital technologies helps improve the tourism experience, enabling sustainability and helping local businesses to grow. The COVID-19 pandemic, which has hit the tourism sector hard, has accelerated the process of digitisation at city level and therefore also in tourism, where competitiveness is fierce. European Union countries are among the most attractive tourist destinations and at the same time among the most committed to protecting the environment and supporting sustainable tourism development. The objective of this paper is to highlight the role of smart tourism in sustainable development within the European Union countries.

SOME CHARACTERISTICS OF THE MOVEMENT OF SOIL WATER IN THE HAPLIC STAGIC LUVISOLS ESTIMATED AFTER DEGRADATION OF SOME COPPER ALLOY COINS

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The study on water movement in the Haplic stagnic Luvisols was carried out on a with a small slope terrace platform in the middle third of the slope on Repedea Hill. The slope was arranged through earthworks, which caused a considerable change in soil moisture dynamics. In the construction and characterization of a representative soil profile, metal coins made of copper-based alloy were inserted on 5 levels of depth. After inserting the coins in 4 replications and taking the soil samples, the profile was covered with the soil material, respecting the initial order of the soil horizons. After 6 months, the coins were extracted and their degree of alteration was analyzed. The obtained results allowed us to draw some conclusions regarding some characteristics of the vertical and lateral movement of water through the soil on the terrace platform on which an apple plantation was established.

RECOMMENDATIONS FOR IMPROVING THE STATE OF TOURISM RESOURCES IN THE NORTHERN DEVELOPMENT REGION OF THE REPUBLIC OF MOLDOVA

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Because of unorganized tourism, most types of tourist resources are affected, of geological, geomorphological, climatic, hydrological, faunal and floristic origin. The state of natural tourism resources is in most cases alarming, being subject to human influence through physical degradation and pollution. The main activities that lead to the bad state of tourism resources is the negligence and ignorance of the treasure by locals and tourists. The main recommendations for improving the state of tourism resources in the region are: Maintaining, conserving and increasing the surfaces of green spaces in urban and rural localities in the Northern DR; Rehabilitation of the historical and touristic heritage of the cities of Ocnita and Singerei by creating recreation and leisure areas for locals and visitors; Monitoring of tourist activities, natural resources and conditions used and waste; Rehabilitation, modernization and equipment of museums in the region (Balti, Sorooca). What will serve as properly equipped and equipped tourist objectives; Punishing and sanctioning tourist activity with a preponderance of uncontrolled, unauthorized and illegal; The development of tourist routes and the facilitation of access to the tourist objectives of regional/national importance by renovating roads, accommodation places and arranged tourist attractions, rehabilitating mansions and other tourist objectives; Informing the population regarding ecological tourism, natural areas protected by the state, the vulnerability of the environment and the need to protect the environment; Promotion of the regional tourism potential through events to promote the regional tourism potential organized in different periods of time; Carrying out and promoting ecological tourism in the natural areas protected by the state; Creating a common route on the theme of common medieval history from Suceava to Sorooca by improving and restoring cultural and historical sites, developing the strategy for the visibility of the objectives, organizing symposia, exhibitions and festivals; In order to reduce environmental dust pollution from mining enterprises, it is necessary to plant protective forest curtains with tall tree species with widths of ten meters around the quarries. Expenditures for these purposes should be made from the company's income account; The creation of a cross-border cultural tourist route from Botosani to Balti by elaborating the tourism promotion strategy of the objectives related to personalities and locations from Romanian culture.

ECO-FRIENDLY CHITOSAN-BASED COPOLYMER FOR TOXIC HEAVY METALS REMOVAL FROM MINING WASTEWATERS

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Heavy metal pollution has been a major environmental problem in Romania, mostly due to the lack of control and remediation measures during and after ores exploitation. Therefore, the field of wastewater decontamination has gained a lot of interest among researchers. In this context, we succeeded to prepare a new -green- copolymer based on chitosan and apply it in the removal of toxic heavy metals from wastewater. The obtained copolymer was structurally and morphologically investigated by solid-state nuclear magnetic resonance (ss-NMR), scanning electron microscopy (SEM), X-ray photon electron spectroscopy (XPS), and Fourier transform infrared spectroscopy (FTIR). Thermogravimetric analysis (TGA) was used to evaluate the material's thermal stability. Furthermore, the material was used to remove heavy metals from contaminated water samples. Flame atomic absorption spectrometry (FAAS) measurements were performed to determine the metal concentrations. Equilibrium isotherms, kinetic 3D models, and artificial neural networks were applied to experimental data to characterize the adsorption process. Additional adsorption experiments were performed using metal-contaminated water samples collected in two seasons (summer and winter) from two former mining areas in Romania (Roşia Montană and Novăţ-Borşa). The results demonstrated high (51-97%) adsorption efficiency for Pb and excellent (95-100%) for Cd, after testing on stock solutions and contaminated water samples.

HABITAT SELECTION OF LARGE MAMMALS IN NATURAL PARK PUTNA VRANCEA

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The mission of the Putna-Vrancea Nature Park is to protect and preserve biological diversity, provide recreation and tourism opportunities and promote scientific and educational activities. The studied area provides the optimal framework for one of the best represented groups of wild vertebrates, the large carnivores. In line with the biodiversity assessment objectives, we surveyed large carnivores in the Vrancea Mountains and made a habitat selection. Transect survey techniques conducted monthly were used to estimate the presence of mammal populations (brown bear, wolf, Eurasian lynx) from March 2021 to March 2023. The presence of large carnivores was correlated with habitat type, land use, elevation and slope using GIS. Brown bears were identified in areas of grassland, meadows, beech, oak-hickory or coniferous forests and dwarf shrublands. The existence of wolves was confirmed in hay meadows, beech forests and dwarf shrublands, while the habitat selection of Eurasian lynx was validated mainly in beech or alluvial forests. The assessment reveals that large carnivores require large, un-fragmented habitats away from artificial surfaces. This conclusion leads to the need to continue periodically checking the presence of carnivores, estimating their populations and maintaining areas with favourable habitat conditions.

**DAILY GRIDDED DATA SET FOR AIR TEMPERATURE AND
RELATIVE HUMIDITY DERIVED FROM INDEPENDENT IN
SITU MEASUREMENTS IN IASI CITY FROM 2013 TO 2022**

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Climate studies increase in importance in the context of ongoing climate change especially due to their synergic effect in terms of warming of the urban environments. In this line, these studies require data measurements at local scale inside the urban tissue. Due to this demand, most of the current studies rely on remote sensing data, being based mainly on Land Surface Temperature that is not relevant in most of cases for thermal comfort/discomfort at the level of the human body. For this reason, mobile and in-situ measurements should be developed and used in combination with LST data. This study presents the results of the in-situ measurements on the area of Iași city during 2013 and 2022 in a network including up to date 9 monitoring points for air temperature and relative humidity and 4 weather stations. The main features of the measurements will be presented underlining both the characteristics of the current climate change in last decade and those of the urban heat island of Iași. The study advances also the methodology used for the elaboration of a gridded data set, with daily temporal resolution and 500 m spatial resolution over the area of Iași city for 4 climatic parameters (mean temperature, maximum temperature, minimum temperature and relative humidity). This data base is meant to be freely available and to serve the need for climate data of the urban studies researchers and stakeholders that should build their policies oriented toward sustainable cities on reliable and detailed data.

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VARIABILITATEA ȘI DISTRIBUȚIA TEMPERATURII AERULUI ÎN TIMPUL VERII ÎN AGLOMERAȚIA METROPOLITANĂ SUCEAVA-NE-TUL ROMÂNIEI. CAUZALITĂȚI ȘI CONSECINȚE BIOCLIMATICE

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Aglomerarea Metropolitană Suceava (AMSv) este localizată în nord-estul României, fiind suprapusă peste o zonă tipică de podiș. Aria de studiu cuprinde zona municipiului Suceava și împrejurimile sale, însumând o suprafață de 406,88 km². Împrejurimile Sucevei sunt reprezentate de un inel de localități rurale (Mitocul Dragomirnei, Pătrăuți, Șcheia, Moara, Bosanci, Ipotești și Adâncata), la care se adaugă un oraș (fostă localitate rurală) - Salcea. Ecartul altitudinal este cuprins între altitudinea minimă de 243 - în albia minoră a râului Suceava, din sud-estul ariei și cea maximă, de 538 m, în nordul ariei. Între aceste limite, se întâlnește o suprafață activă cu caracteristici variate, de la suprafețe naturale diverse, la cele antropice, cu o diversitate mare.

Pentru analiză, am utilizat datele temperaturii aerului din timpul verii (din anii 2019, 2020 și 2021), înregistrate în 31 de puncte de monitorizare din arealul AMSv, iar pentru realizarea hărților temperaturii suprafeței emise s-au utilizat un număr de 18 imagini satelitare Landsat 8 Colecția 2 Nivelul 2 pentru întreaga arie metropolitană, respectiv de la 8 imagini satelitare de același tip doar pentru aria administrativă a municipiului Suceava.

Hărțile termice realizate pe baza valorilor de temperatură obținute de la o rețea de 31 de senzori au fost comparate din punct de vedere al distribuției spațiale cu cele două hărți LST. Apoi, au fost extrase valorile LST către pixelii reprezentând locația senzorilor, care au fost ulterior comparate cu valorile corectate ale temperaturii aerului obținută de la senzori. Pe baza diferenței dintre temperatura reală (considerată cea corectată de la nivelul senzorilor) și cea modelată (din imagini satelitare) au fost determinați 3 indicatori statistici: Bias, RMSE și R2.

Pe baza acestora, am pus în evidență insulele de căldură urbană și de răcoare suburbană conturate prin observații in situ și analiză satelitară.

Din analiza valorilor de temperatură ridicată, a fost determinat numărul efectiv de ore în care indicele bioclimatic ITU a fost mai mare sau egal cu 60, respectiv 80 de unități. Acestea au determinat situațiile cu disconfort și risc biometeorologic.

TYPICAL PHENOMENA GENERATED BY GENTRIFICATION

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The concept "Rural Gentrification" was, for several years, denied. Lately it was possible a different approach because the evolution and development of rural settlements in Romania confirms this phenomenon common to both economically developed countries and countries that have more than modest evolution. Specialists from more and more countries shows the new dimension that this phenomenon is taking. Its analysis, starting from the causes passing through the specific problems (different from those of classic gentrification) and ending with the effects produced by this state amplified by various reasons, is normal. After, for a long time, the countryside was a victim of the "industrial explosion" and implicitly of the "rural exodus", in developed countries a process of reconsideration of this space that preserves unique cultural values and traditions began. Thus, the period of "urban-centrist orientation" began to be replaced gradually, in a different way, from one country to another, depending on the degree of development, with a period of reconsideration of the countryside.

It can be seen that the emergence of the health, social and economic crises of recent years marked a catalyst for many young families in an attempt to find the "cradle" of their family or their nation. This phenomenon could be related to the stagnation of the urbanization process. Rural-urban migration is increasingly going both ways. Young people from the countryside leave for the city to get higher incomes and to benefit from the anonymity of large and crowded spaces. Young families, from the urban environment, travel the road to the countryside in search of a healthy, safer environment that allows movement, a more modest lifestyle. The abandonment of urban-professional careers, careers built in aggressive environments that are not found under the dome of personal happiness, for a traditional family life was a strong reason for an urban-to-rural flow. It should be noted that some young people who decide to radically change their way of life, did not have any rural ancestry (at least

in the last 2 generations). The particularities of rural gentrification in Romania represent a subject that must be analyzed and understood. It must also be analyzed from the point of view of the impact it has on the local citizen, despised until recently by city dwellers. And because it will soon reach a social phenomenon, it is good to capture the medium and long-term trends and implications of rural gentrification.

CAN DESTINATION MANAGEMENT ORGANIZATIONS BECOME THE MAIN DRIVERS OF SUSTAINABLE TOURISM DEVELOPMENT IN ROMANIA?

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Destination Management Organizations (DMOs) play a crucial role in developing tourism destinations. As public interest NGOs bringing public and private stakeholders at the same table since the early 1990s, DMOs have strived to become instruments of sustainable tourism development through collaboration and partnerships, sustainable destination planning, stakeholder engagement and empowerment, promotion of responsible tourism among visitors, smart monitoring and measurement, capacity building and workforce training etc. The efforts to overcome the long-lasting transition of post-communist Romania from the early 1990s to the mid-2000s have engendered neoliberalist public policies and social attitudes. The accession to the European Union has put top-to-down pressure (that is Brussels-to-Bucharest, then Bucharest-to-province) on instrumentalizing and implementing sustainable development, including sectorial declinations, such as tourism. In the first Master Plan of Romania's National Tourism 2007-2026, the concept of sustainability (or durability) is poorly understood and uniquely used as a substitute for "long-lasting". The new National Strategy of Romania for Tourism Development 2023-2035 places a greater emphasis on sustainability, with a better overall

understanding; the keywords sustainable or durable are associated with environmental protection, use of resources, employment for vulnerable categories, tourism products, clean transport, nature and ecosystems, cities, heritage and culture, circular economy, practices. It also admits implementing policies necessary to access the funds offered through the National Recovery and Resilience Plan, 4 th Pillar. Social and Territorial Cohesion. C11 Tourism and Culture. The requirement pertains to

legislating and to operationalizing the DMOs or the Destination Management Organisations, which was already adopted by the Government Ordinance 86/2022 with important stakeholder consultation. This ordinance mentions the objectives of the DMOs as a governance body but fails to enroot tourism sustainability as a core dimension. With only such an operationalization framework offered by the legislation how can DMOs at different geographical levels implement sustainability policies? First of all, until now, tourism development was a strictly public matter; local, county, or national-level authorities held this responsibility. With the financing of DMOs with the accommodation city tax and other funds at four different levels (national – regional – county – local), public authorities delegate an important part of the soft tourism-related investments to DMOs, which will now be proposed and managed by a consortium of geographically-relevant stakeholders, thus improving governance, decision-making, and effectiveness of investments. Secondly, DMOs will have dedicated financing schemes through NRRP and other EU cohesion schemes which condition funding of the existence of a sustainable tourism strategy and a sustainable project. Thirdly, the legislative framework creates a geographical network of DMOs, where lower levels DMO structures (such as local or multi-local-level) can collaborate with similar organizations or other stakeholders to establish higher-level DMOs (such as county or regional level), thus creating a strong-base pyramidal network. Finally, DMOs do not have public pressure to implement populist projects, unlike the authorities, thus the geographical and environmental, social and economic realities of the destination will be key elements in drawing the destination policies.

MEDIUM TERM CLIMATE CONDITIONS IN CENTRAL MOLODOVA AT MADARJAC REASEACH STATION (2013-2022)

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In this study, we present the results of 10 years of meteorological measurements carried out at an automatic weather station (AWS) installed in the village of Mădârjac. The station is located at an altitude of 246 m, in the western part of the Central Moldavian Plateau, in Iași County, Romania. The observations, which cover the period from 2013 to 2022, provide valuable data for a region with few official weather stations.

The study presents the mean values and the variation of several climatic parameters (air temperature, relative humidity, precipitation, wind and solar radiation), which outline the general climate profile of the studied area. We have also included a comparison with the ERA5-Land reanalysis data for the weather station location at monthly, daily and hourly timescales, showing the existing biases of the reanalysis dataset for the region.

The main climatic characteristics of Mădârjac station are the mean air temperature of 10.5°C and the mean annual precipitation amount of 634 mm. It is noteworthy that our observations confirm the higher altitude gradient for precipitation in the Central Moldavian Plateau compared to other geographical regions in north-eastern Romania. In addition, the study briefly touches on the maximum rainfall intensity during heavy rainfall events and the associated risks.

LIST OF AUTHORS

A

ALBULESCU Andra-Cosmina, 18
AMIHĂESEI Vlad-Alexandru, 53, 71, 72
ANASTASIEI Ana-Maria, 26
ANDRONOVICI Diana, 5
ANGHELUTA Viorica, 24
ANTACHE Alina, 59
ARDELEANU Nicoleta-Nona, 45
ARGHIUȘ Viorel, 19
AXINTE Aurel – Dănuț, 31, 35

B

BĂBĂȚ Andrei, 11
BACAL Petru, 27
BACAL Svetlana, 14, 15
BACALOV Iurie, 22, 37
BACIU Călin, 69
BACIU Nicolae, 19
BALAN Ioan, 46, 58
BALAN Isabela Elena, 46, 58
BANDOC Georgeta, 14
BĂNICĂ Alexandru, 21, 43, 61
BARBACARIU Cristian-Alin, 19
BEJAN Iurii, 24
BISTRICEAN Petruț-Ionel, 25, 72
BOBRIC Diana-Elena, 51
BOIANGIU Răzvan Ștefan, 19
BRAGUTA Eugeniu, 17
BRĂNIANU Petru-Daniel, 32, 33
BREABĂN Iuliana-Gabriela, 45, 51, 53, 54,
70
BULAI Mihai, 74
BUNDUC Petru, 34
BUNDUC Tatiana, 24
BURDUCEA Marian, 19
BURDUJA Daniela, 27
BUȘMACHIU Galina, 14, 15

C

CALCIU Carmen-Irina, 23
CĂLINESCU Viorel, 66

CALMUC Mădălina, 59
CĂLMUC Valentina-Andreea, 59
CHELARIU Oana-Elena, 8
CHIHAI Oleg, 41
CHIRILA Anca Maria, 12
CHIRIȚA Elena, 22, 39
CHIȚEA Mihai-Alexandru, 47
CIMPOEȘU Maria Cristina, 50
CODREANU Miruna, 59
CONSTANTIN (OPREA) Dana Maria, 8
CONSTANTIN Daniel-Eduard, 61
CORDUNEANU Flaviana, 46
CRENGĂNIȘ Loredana, 46
CREȚU Ștefănel-Claudiu, 53, 72
CRIVOI Aurelia, 22, 37
CSIKI Emese, 30
CUJBĂ Vadim, 34

D

DERII Zhanna, 62, 64
DIMA Alina, 42
DIMA Mihai, 38, 49
DIRVARIU Lenuța, 19
DOBIRCIANU Sorin, 59
DOBRESCU Cornelia-Florentina, 17
DOBROJAN Galina, 22, 37, 39, 47
DOBROJAN Sergiu, 22, 37, 39, 47
DOBYNDA Iryna, 66
DRAGOMIR-BĂLĂNICĂ Carmelia, 73
DRĂGULEASA Ionuț-Adrian, 11
DRUȚA Adriana, 39
DRUȚA Elena, 22
DUMITRACHE Iulia, 4
DUMITRESCU Alexandru, 16, 71
DUMITRU Gabriela, 19

E

EREMEICO Serghei, 59
ERHAN Dumitru, 41

F

FEODOR Filipov, 68

FLOREA Daniel, 28, 35
FOȘALĂU Cristian-Manuel, 61

G

GABERI Valentin, 37
GANEA Iolanda-Veronica, 69
GÂRLEA Cristina, 73
GEORGESCU Lucian, 61, 66
GHERGHINA Carmen-Alina, 23
GIURMA-HANDLEY Catrinel-Raluca, 11, 40,
46
GRIGORE Elena, 8
GRIGORE Mihaela, 11
GROZA Octavian, 6
GROZAVU Adrian, 12, 21, 50

H

HACHI Mihail, 34
HAREA Olga, 5, 17
HAVRIS Loredana-Elena, 60
HORODNIC Vasiliță Dănuț, 72
HRIȚAC Robert, 71, 75
HRYTSKU Veronika, 62, 64
HRYTSKU-ANDRIESH Yuliia, 62, 64
HULUBA Aurelia, 44

I

IACOB Diana Elena, 57
IAȚU Corneliu, 8
IBĂNESCU Bogdan Constantin, 52
ICHIM Pavel, 3, 53, 71, 75
ILEA Raul-Gabriel, 16, 36
ILIE Nicoale, 28, 56
ILOVAN Oana Ramona, 4
ION Constantin, 70
ION Mihaela, 42
IONAC Nicoleta, 16, 36, 56
IRAȘOC Adrian, 56, 71
IRIMIA Irina, 55
ISTRATE Adrian-George, 51, 70
ISTRATE Marinela, 21
ISTRATE Vasiliță, 59
ITICESCU Cătălina, 59, 61, 66

J

JECHIU Iradion, 24
JELEAPOV Ana, 9
JIGĂU Gheorghe, 22, 37, 39, 47
JIJIE Roxana, 57
JITARIU Vasile, 70
JOLLI Virat, 15, 29

K

KOVBINKA Halyna, 66

L

LĂCĂTUȘU Anca Rovena, 23
LACATUSU Codrin, 68
LARION Daniela, 18
LAZĂR Ionuț-Lucian, 59
LAZĂR Nina, 59
LEFTNER Giorgiana, 16
LOZOVANU Dorin, 34
LUCA Alexandru Lucian, 32
LUCA Mihail, 32, 33

M

MĂCICĂȘAN Vlad, 19
MANEA Alexandrina, 23
MANOLACHE Steluța, 13
MANTA Daniel-Robert, 56
MARIN Cornelia, 73
MARTÎNCU Ioan-Corneliu, 11, 40
MAZILU Mirela, 11
MELNIC Galina, 41
MIHAI Florin Constantin, 12
MIHĂILĂ Dumitru, 25, 72
MIHU-PINTILIE Alin, 4
MILITARU Ion, 70
MINEA Ionuț, 8, 75
MITROI Raluca, 35, 38
MIU Iulia-Viorica, 10, 13
MOROZ Ivan, 68
MUNTEAN Octavian Liviu, 19
MUNTEANU Angela, 5

MUNTELE Ionel, 21

N

NAN Alexandrina, 69
NIACȘU Lilian, 26
NICOARĂ Mircea, 57
NICULAE Iulian Mihăiță, 13
NICULAE Mihăiță-Iulian, 10
NICULIȚĂ Mihai, 14
NISTOR Alina, 25
NISTOR Bogdan, 25
NIȚĂ Amalia, 11
NIȚĂ Andreea, 13

O

OPREA Eugen, 19

P

PĂDURARU Emanuela, 57
PARASCHIV Viorel, 3
PASCARIU Alexandru-Ion, 38, 49
PATRICHE Cristian-Valeriu, 14
PETRESCU Laura-Elena, 16, 36
PETRIȘOR Alexandru-Ionuț, 4, 5, 7
PETRIȘOR Liliana Elza, 5
PÎNDARU Lavinia-Corina, 10, 13
PIOARCĂ-CIOCĂNEA Cristiana-Maria, 10, 13
POPA Ana-Maria, 10
POPA Andreea-Silvia, 38, 49
POPA Oana Paula, 15
POPESCU Doru-Dorian, 31
POPESCU Eduard, 28, 35, 53, 56
POPESCU Oana-Cătălina, 5, 7
PRĂVĂLIE Remus, 14
PRISĂCARI Maria, 27
PRISĂCARIU Alin, 72
PRYSAKAR Vitalii, 66

R

RADU Cezar Doru, 68
RĂDUCU Daniela, 23

RĂILEAN Veronica, 27
ROMAN Aurelian-Nicolae, 30
ROMANESCU Ionuț-Petronel, 33
ROȘCA Bogdan, 14
ROȘIAN Gheorghe, 19
ROȘU Adrian, 61
ROȘU Lucian, 61
ROZYLOWICZ Laurențiu, 13
RUSU Mărioara, 47
RUSU Ștefan, 41

S

SANDU Florentina, 55
SAVIN Veronica, 27
SFÎCĂ Lucian, 3, 53, 71, 72, 75
SIMIONOV Ira, 59
ȘIRBU Dragoș Andrei, 28, 35, 53, 56, 59
SIRBU Emil, 31, 35
SOCHIRCA Vitalie, 24
SPIRIDON-URSU Petronela, 54
STOICA Paula, 11, 40
STOLERIU Alexandra-Petronela, 51
STOLERIU Andreea-Florina, 51
STOLERIU Oana Mihaela, 52
STRATU Anișoara, 55

T

TACHE Antonio-Valentin, 5, 7
TĂLĂMBUȚĂ Nina, 41
TATU Florina, 8
TELIȘCĂ Marius, 35, 38, 40, 49
TIMISH Rodika, 62, 64
TIMOFTI Mihaela, 59
TODIRASCU-CIORNEA Elena, 19
TODIRICĂ Ionuț-Emilian, 11, 35
TOPA Denis Elena, 58
TOPOLNICEANU Alexandru, 58
TUDOSE (POP) Iuliana, 67
TURCHIN Boris, 37, 39

Ț

ȚOPA Maria-Cătălina, 66

U

UNGUREANU George, 58
URSU Adrian, 54

V

VÂNĂU Gabriel-Ovidiu, 10
VASILE Vasilica, 42

VÎNȚU Gabriel, 13
VIZITIU Olga, 23
VOICU Cristina-Georgiana, 3
VOICULESCU Mirela, 61

Z

ZABORILĂ Anca, 11, 35, 40, 49
ZAMORNEA Maria, 41