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BOOK OF ABSTRACTS

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NON-IONIZED AMMONIA POLLUTION LEVEL OF THE SMALL RIVERS WATERS IN THE CENTRAL REGION OF REPUBLIC OF MOLDOVA

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In order to maintain fish life, the Council Directive of 18 July 1978 on the quality of freshwater, which must be protected or improved provides that non-ionized ammonia in salmon and cyprinid waters may be in concentrations of ~ 0,005 mg/dm^3 (indicative) and ~ 0,025 mg/dm^3 (obligatory). It presents a danger for aquatic biological diversity in concentrations from 0,03 to 2 mg/dm^3 NH3 depending on the species and age. This conditions also are specified in Chapter II (Specific substances to be introduced into surface waters, pt. 8) of the Republic of Moldova Government Decision no. 802 of 9 October 2013.

The study includes evaluation of non-ionized ammonia in the water of some portions of the Dniester and Prut river tributaries, which crosses the central region of the Republic of Moldova. In river Raut (upstream of Balti town and downstream of Varvareuca village), Ciulucul Mare, Ciulucul Mic, Camenca (Gura Camencii village) the ammonia concentration in different years (1981-2019) was low, but in the Raut river water, downstream of the town Orhei at 50C was of 0,029-0,35 mg/dm3 and at 150C - 0,065-0,528 mg/dm^3.

The calculation of the NH3 content in the water from the left tributaries of the Prut river that crosses the central region of the Republic of Moldova at a temperature of 50C and 150C shows high values in the water of the Garla Mare river, Medeleni village - Catranac village (0,394-0,818 mg/dm3), r. Garla Mica, liman (0,141-0,327 mg/dm3), r. Delia, s. Parlita (0,84-1,78 mg/dm^3), r. Narnova, Nisporeni city and Leuseni village (0,27-0,73 mg/dm^3), Lapusna river, Voinescu village (0,277-0,65 mg/dm^3).

Thus, in the water of different years (1981-2019) on many portions of the Dniester and Prut river tributaries, which crosses the central region of the Republic of Moldova, the concentration of ammonium (NH3 + NH4+) was high, and depending on the pH and temperature the calculated non-ionized ammonia content exceeded the value of 0,025 mg/dm^3.

INTEGRATED FRAMEWORK FOR DETECTING THE AREAS PRONE TO FLOODING GENERATED BY FLASH-FLOODS IN SMALL RIVER CATCHMENTS

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In the present study, the susceptibility to flash-floods and floods was determined for the Izvorul Dorului river basin in Romania. In the first phase, three ensemble models were used to determine the susceptibility to flash-floods. These models were generated from the combination of 3 statistical bivariate methods, namely Frequency Ratio (FR), Weights of Evidence (WOE), and Statistical Index (SI), with Fuzzy Analytical Hierarchy Process (FAHP). The result resulted from the application of the FAHP-WOE model had the best performance obtaining an AUC-ROC value of 0.837 for the training sample and another of 0.79 for the test sample. Furthermore, the result offered by FAHP-WOE was integrated into the Flow Accumulation method, through which the valleys with a medium, high, and very high torrential susceptibility were identified. Based on these valleys' locations, the susceptibility to floods generated by flash-floods was estimated. Thus, in the first stage, a buffer zone of 200 m was delimited around the identified valleys where it was considered that floods from flash-floods could occur. Once the buffer zone was established, ten flood conditioning factors were used to determine the flood susceptibility through the Analytical Hierarchy Process model. Approximately 25% of the total delimited area was attributed to high and very high flood susceptibility.

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RESEARCH REGARDING WATER RESOURCES MANAGEMENT. CASE STUDY: HĂLCENI RESERVOIR, IAȘI COUNTY, ROMANIA

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Water resources management is a complex activity of planning, developing, distributing and managing the optimum use of water resources. The reservoirs situated in Moldova area are exploited by Water Basinal Administration personnel, according to the Operating Regulations and Dispatcher Graphs. The Dispatcher Graph is a diagram for the operating rules of the reservoirs, in which the ordinate is the accumulated volume and the horizontal axis is the time of one year. The method of calculation is based on chronological strings of data resulting from direct records.

As case study for the calculation of a Dispatcher Graph, Hălceni reservoir from Iași county was chosen. The catchment of river Miletin is affected by diverse climatic conditions, as both drought and floods affect it, sometimes even during the same year.

The calculation of the Dispatcher Graph is imperatively necessary when several beneficiaries require water supply. The discharge flows that can be delivered to the customers are calculated taking in account the following: the flows delivered meet the required probability of exceedance, the flows delivered should exceed by far the minimum flow required downstream, to decrease the periods of time when the required flows can not be delivered, to avoid overfilling of the reservoir.

For the calculation the following data were used: monthly average flows on Miletin river, recorded at Șipote hydrometric station for 67 years, multiannual monthly average norms of evaporation, recorded at the evaporimetric cork for 15 years, evaporation surface for Hălceni reservoir at the normal level of retention, volume of the reservoir at the *Normal Level of Retention* and the volume appropriate to the *Minimum Level of Exploitation*.

To calculate the line for the assured regime the following demands were considered: water supply for population and industry, water supply for downstream fish nurseries, sanitary discharge. It is necessary to update this Dispatch Graphic when modifying the calculation hypotheses,

especially the flow requests, as registered in the subscriptions for exploitation/use of the beneficiaries' water resources.

PERCEPTION OF THE POPULATION OF THE SUCEAVA METROPOLITAN AGGLOMERATION ON CLIMATIC RISK PHENOMENA

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The study is based on the survey from January 2019 untill January 2021 of a number of 514 inhabitants who live permanently or are temporary residents in the municipality of Suceava and neighboring localities, regarding the risk-climate phenomena that occur in this geographical area. The questionnaire was designed and applied in electronic format, it included a number of 28 items grouped on five components of analysis. Respondents were grouped into several age groups and socio-professional categories. We have drawn up a complex radiograph of the way in which the population of Suceava relates to these dangerous phenomena, which can be useful both scientifically, but especially practically for the authorities and the population.

DYNAMICS OF GENERAL INCIDENTS OF THE POPULATION IN THE NORTHERN DEVELOPMENT REGION AND ITS DEPENDENCE ON ENVIRONMENTAL QUALITY

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It is established that the first place after the general incidence of the population in the North Development Region (NDR) is district Sangerei, being about 49 percent higher than the average on the NDR. On the second place is Bălți municipality, exceeding by 45.2% the average value registered in the NDR. On the third place in the general incidence of the population from the NDR, is placed district Glodeni, being 30.8% higher than RDN. The dynamics of respiratory diseases is in an increasing trend from 896.5 cases in 2010 to 1535.5 in 2019, and there is an increase of about 71.3 percentage points. Respiratory diseases are in the first place and constitute 44.7% of the total number of diseases. The largest number of these diseases in the NDR are in Bălți municipality, later Glodeni,

Săngerei, etc. Diseases of the cardiovascular system remain in second place, with an average value of 194.0 / 10000 cases and constitute 7.3 percent of the total number. This group of diseases has an increasing character, from 173.0 / 10000 in the year 2010, to (239.0 / 10000 cases towards the year 2017. The highest value of the incidence in the NDR for Săngerei districts, Bălți municipality, Glodeni district and al. it is explained by the quality of the environmental components in the given localities. Among the Development Regions of the Republic of Moldova, the highest value, incidence, was registered in Centr DR (2780.6 / 10000), followed by UTA Gagauzia DR (2743.4 / 10000), NDR (2672.0 / 10000) and South DR with 2174.3 / 10000, cases. It is established that the general incidence of the population depends on the degree of environmental pollution (air emissions) in the given locality.

CONFLICT IN EASTERN UKRAINE AND RUSSIAN-UKRAINIAN RELATIONS

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The conflict in eastern Ukraine is one of the most interesting issues in the modern world. The controversy between Russia and Ukraine continues unabated and reached a particularly large scale in 2014. That year really turned out to be a turning point for Ukraine, as the country had to fight on two fronts: the Donbass and the Crimean region. The Ukrainian revolution ended the rule of pro-Russian Yanukovych in 2014, although events in the country did not end without the use of force, and finally President Yanukovych escaped in February 2014. The issue is even more interesting because there is a confrontation between the population and the ruling government. Pro-Russian policies were unacceptable to the citizens and they took to the streets and protested. Apart from all this, the conflict in eastern Ukraine is not just an internal crisis of the country, In July 2014, the situation in Ukraine escalated into an international crisis, with the United States and the European Union confronting Russia when a Malaysia Airlines plane crashed over Ukrainian airspace, killing 298 people aboard. Cyber-attacks have also been added to the unrest in the country. When discussing the conflict, it is also necessary to mention what motivates Russia. Moscow is trying to restore the pro-Russian course in Ukraine and minimize Western influence. Ukraine, which is now a unitary state, meaning its territories will not have independent state status, is being asked to federalize the state and include the country in the

constitution. This means that Ukraine will not be able to join NATO, and the autonomous regions will be able to conduct their own domestic policy. Thus, it can be said that the conflict in Ukraine is still ongoing and the given topic is interesting to discuss.

IDEI DE `SMART CITY` PENTRU O CETATE MEDIEVALĂ - SIGHIȘOARA

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Un oraș inteligent -smart city-, reprezintă o zonă urbană care utilizează diferite tipuri de senzori de colectare a datelor electronice pentru a furniza informații care sunt utilizate pentru a gestiona eficient resursele acestuia. Conceptul de smart city cuprinde șase mari domenii: smart enviroment, smart mobility, smart gouverment, smart people, smart living și smart economy. Lucrarea de față își propune să prezinte aspecte ale dezvoltării urbane a municipiului Sighișoara ce pot fi încadrate în categoria smart city. Deși este un municipiu mic, cu o populație de 24.447 locuitori, conform INSEE la data de 1 ianuarie 2020, și are vatra așezată pe una dintre cele mai vechi localități istorice din România, fiind în același timp un sit UNESCO, acesta cunoaște în ultimii ani o aplicare a proiectelor de tip smart în domeniul urbanismului. Fără a intra în contradicție cu vestigiile medievale ale municipiului, în Sighișoara se încearcă împletirea ambientului de tip istoric cu noile tehnologii ale secolului XXl bazate pe digitalizare. Internetul Lucrurilor (IoT) este deja prezent în oraș prin implementarea programelor în transporturi, infrastructurăși parking. Sunt în curs proiecte privind construcția de ansambluri rezidențiale smart și trecerea digitalizării în industrie și agricultură. Noua provocare apărută la nivel global datăvirusul SARS-COV-2 impune o dezvoltare mai alertă a sistemelor de tip smart care ajută la respectarea normelor impuse de autorități fără a crea un disconfort cetățenilor. Cetățeanul inteligent este cel mai important instrument în lupta împotriva pandemiei. Un cetățean care învață să comunice cu autoritățile și instituțiile publice cu ajutorul internetului, care își plătește taxele și impozitele online este unul dintre răspunsurile tehnologiei la problemele ridicate de pandemia COVID-19. La ora actuală, la nivelul UE sunt disponibile peste 7 miliarde de euro, fonduri europene pentru dezvoltarea smart a comunităților. Sighișoara se află în topul orașelor care au văzut această oportunitate de dezvoltare.

GIS SOLUTION FOR COMPUTING THE TRAVEL TIME FOR MULTIMODAL TRIPS TO ROMANIAN RESORTS OF TOURIST INTEREST

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Tourists, like any other users of the transport system, seek to move safely from origin to destination with an adequate trade-off between speed, comfort and cost. The aim, therefore, from a tourism transport planning perspective, is to minimise connections and where necessary, make them as efficient as possible. Multimodal solutions allow travellers to adopt the less polluting modes of transport whenever possible, fostering a more sustainable journey. Digital solutions and integrated planning services offer potential for sustainable, user-friendly and effective multimodal trips. To this end, the ROSMARTTRAVEL IT application, developed within the PNCDI Program - PN-III-P2-2.1-PED-2019-1216, - SMART Platform for evaluating the cost of multimodal transport to tourist resorts in Romania -, aims to provide digital information services on multimodal travel to resorts of national tourist interest in Romania. The methods used are specific to GIS applications, more precisely the ARCGIS Network Analyst module that allows the calculation of the shortest intermodal route. The modeling of the system network, for the calculation of the access times was made within a theme of Geodatabase feature classes type. Setting the network properties requires checking the matching geometry between roads, railways, localities and resorts and modeling the spatial relationships for all network components and entering attribute fields for the two linear themes - national roads and railways. The connectivity policy in the realization of the network for the used data prioritized the long-distance railway transport, and the road transport participated in the analysis only over short distances. Finally, the network analysis service was performed in the ARCGIS PRO program and was published on the WEB using ARCGIS Online routing. From a technical point of view, the ROSMARTTRAVEL application calculates the travel time from any locality in Romania to any tourist resort in Romania, using long-distance rail transport and short-distance road transport. In this sense, the database on national roads and railways in Romania was

updated and the topology was restored. Topics on localities and resorts were checked for geographical positioning in relation to topics for combined transport - national roads and railways, so as not to exceed the maximum allowable positioning errors. Finally, all these themes were implemented in a Geodatabase database and the Map of the combined network of roads and railways to the tourist resorts in Romania was created. The next step was to implement the ARCGIS PRO Network Analyst module which allows the calculation of the shortest intermodal route or the calculation of the fastest travel cost in terms of time. Finally, the application containing the Map of the combined network of roads and railways to the resorts Romania and the Network Analyst utility for calculating the cost of travel was published on the WEB using ARCGIS Online. Multimodal transport it requires the combining of various transport modes throughout a journey can increase the use of sustainable types of transport, improve the connectivity of urban and non-urban areas and, as a consequence, boost the attractiveness of touristic destinations. Pre-trip information is an important contribution to successful marketing of public transport and national railways. GIS IT solutions use specialized search engines for intermodal transport in order to identify the optimal transport route and to meet the main requests of passengers such as departure time, mode of transport selected, purpose of travel, traffic conditions, number of transfers etc. The ROSMARTTRAVEL application, even if it is in the first design phase, is useful for all passengers using combined transport (railway - road network), because it benefits from time points for traveling from any point in Romania to any tourist resort of national interest or local.

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BREXIT -THE UNITED KINGDOM AND THE EUROPEAN UNION

Revazi DIDEBASHVILI

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This issue does not lose its urgency, Brexit is a very remarkable event, which surprised the highest officials of many countries of the world with its results. As for the topic of the study itself and the issue of the UK's withdrawal from the EU in general, a referendum was held on 23 June

2016 in the United Kingdom with the sole question of whether Britain should remain part of the EU. As a result of the referendum, 51.9% voted to leave the union. 71.8% of the population took part in it. The initiative to oust him belonged to the then Prime Minister, David Cameron. As we know, he promised to hold this referendum in case of winning the 2015 elections. The argument of his supporters was that the British people did not express their opinion about being in the European Union after the 1975 referendum, which in itself limited the freedom-loving nation. It is unknown at this time what he will do after leaving the post. Any scenario is possible, including stopping the exit process. The European Union joined Britain in 1973. Initially, the Left Front opposed joining the European Union and ceding part of its sovereignty to Brussels. Later, however, the right-wing front fought against the EU. The main points of the so-called "soft" version of Brexit are as follows: 1. Maintaining a free trade area for goods, which means not to disrupt and protect the ties established during the years between the EU and the UK. 2. Development of a simplified customs order, which in itself implies a lack of control between the two parties. Brexit had many supporters and, at the same time, many critics. The event completely changed the agenda. One thing is clear, however, that the United Kingdom is willing to lose established ties and trade with both the EU and its key strategic partners.

ABORDĂRI ALE TIMPULUI ÎN ECOLOGIA URBANĂ

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Orașele sunt ecosisteme complexe caracterizate printr-o dinamica spațială și temporală semnificativă. Ele includ deopotrivă componente naturale și seminaturale (*infrastructura verde-albastră*) și componente socio-economice (*infrastructuri gri, structuri sociale, terenuri agricole*). Dintre acestea, infrastructurile verzi-albastre sunt considerate structurile care contribuie decisiv la asigurarea sustenabilității și rezilienței orașelor, fiind cel mai important furnizor de servicii ecosistemice. Lucrarea investighează principalele dimensiuni ale timpului care pot fi considerate în cercetarea ecosistemelor urbane, respectiv: (i) durata, (ii) simultaneitate, decalaj și întârziere, (iii) tendințe și tranziții, (iv) cicluri și histerezis, (v) moșteniri, (vi) momente temporare critice și (vii) procese stohastice și deterministe care afectează capacitatea de anticipare a evoluțiilor viitoare. Considerând municipiul București, este fundamentată

importanța considerării timpului în eologia urbană și sunt punctate aspectele care necesită o abordare mai detaliată în viitor.

INDIVIDUALS BELIEFS AND RISK PERCEPTION DURING COVID-19 IN NORTH-EAST REGION OF ROMANIA

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COVID-19 represents a major global disaster that has to be managed by all countries in a comprehensive systematic manner looking not only to present challenges but also to future implications. The success of the battle against COVID-19 is in direct relation to public perception, behaviour and attitudes towards infection control measures and overall changes in managing social/interpersonal relations and public spaces. The present study aims to investigate risk perceptions regarding the coronavirus disease (COVID-19) outbreak and consequences, among the general population from North-East Region, Romania. It is an assessment of the knowledge, beliefs and practices of the population, but also the vulnerabilities and the changes/disruptions of the social relations in specific areas of the region. The paper is a cross-sectional assessment of risk perception using 702 questionnaires applied online and on-site in December 2020. It is an in-depth exploratory analysis using both descriptive statistics and also more complex methods (such as ANOVA) to describe the diversity of attitudes, perceptions and behaviours of different categories of population (by sex, age, education, occupation, revenue etc.) in North-East region (also compared to other Romanian regions). The results explore the relation between the population beliefs and the available evidence at the time of the survey to assess the calibration of beliefs based on risk-related socio-demographics. The conclusions reveal, by one hand, the disparities between realities and perceptions in the North-East Region and, by the other hand, the necessity for promoting clear and reliable public information related to the pandemic, but also the need to rethink and reconfigure urban and rural areas and social-economic activities for designing safer and healthier places.

FLOOD RISK ANALYSIS FOR A CASCADE OF RESERVOIRS. CASE STUDY – RESERVOIRS ON THE GURGUIATA RIVER, IAȘI COUNTY, ROMANIA

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Flood risk analysis is an important part of large-scale water management studies that aim to identify the consequences of floods, and how to act on overflows to eliminate their adverse effects.

Water-management systems of which storage and flood-control reservoirs form an important part, greatly change the natural flow regime of the rivers. Reservoirs are the basic elements of water-management systems. The main purpose of the reservoir is to correct the flows of a river to correspond to the optimal use of water and flood mitigation. We can distinguish 3 different types: isolated reservoirs, reservoirs operating in parallel, and reservoirs operating in series (cascade).

To explain the attenuation of the flood wave through a reservoir, it is necessary to know the flood wave hydrograph at the dam location, the flood wave in natural regime with the imposed probability of exceedance, and the approximation of the flood wave in the arranged regime. Graphical or numerical methods are used to calculate flood attenuation in the reservoirs. The PULS method admits as simplifying hypotheses the horizontality of the water level on the surface and the instantaneous propagation of the flood wave hydrograph, along the entire length of the reservoir. The PULS method is based on the equation of continuity written in finite differences.

Our case study focuses on a flood risk analysis for the cascade of rivers on the Gurguiata River, Iași county. On the Gurguiata River, there are 9 small reservoirs formed by frontal dams located in the series: Gurguiata, Strîmbu, Contas, Valea Mare, Ureche, Cîrjoaia, Savia I, Savia II, Cicadaia, and 6 fish ponds located lateral to the Gurguiata River. Downstream on the Gurguiata River, there is Plopi reservoir that has the main purpose of flood mitigation.

The propagation of the characteristic flood waves through the whole cascade of the upstream reservoirs was studied, to identify the maximum

inflows, outflows, and the maximum levels of the water achieved downstream, due to the implications of the turbulence effects created by the dam of Plopi reservoir.
Considering that 5 of the dams of the reservoirs were found not to meet the requirements for safe exploitation according to the current legislation, large water management studies were carried out for the hydrological and hydraulic modified regime, to identify the necessary technical solutions.
Based on several scenarios for the exploitation of the ponds, extensive structural works were dimensioned and subsequently carried out at the retention dams and highwater spillways were built.

ASSESSMENT OF BIOCLIMATIC RESOURCES THAT SUPPORT THE SUSTAINABLE DEVELOPMENT OF TOURISM FOR SEVERAL REPRESENTATIVE RESORTS LOCATED IN THE WESTERN PART OF ROMANIA

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The study aims to analyze the climate and bioclimate for five tourist resorts or locations with tourist vocation, located in western Romania (Băile Felix-1 Mai, Stâna de Vale, Vlădeasa, Băile Herculane și Semenic) from the perspective of its potential for outdoor tourism activities - in general, or for health tourism - in particular. Tourism in these 5 places can be developed sustainably by capitalizing on all the factors and resources that the nearby geographical environment makes available to investors, tourism administrators and tourists. For this, the temporal and spatial specificities of climate and bioclimate must be well known and judiciously used in order to be able to be exploited sustainably by current and future generations. The main working tool in the detailed assessment of the values of climate and bioclimate for tourism, will consist of the calculation and analysis of a relevant bioclimatic index Physiologically Equivalent Temperature (PET), a climate-tourism index (TCI) and the preparation for the 5 places, climate-tourism schemes (CTIS). These indices and schemes will be calculated and analyzed, based on the daily

data of the meteorological elements that enter into their calculation, for the period 1961-2018.

DYSFUNCTIONS CAUSED BY ALIEN INVASIVE SPECIES IN URBAN AREAS: CASE OF STUDY - *AILANTHUS ALTISSIMA*

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Studying the impact of invasive alien plants species is necessary for understanding the negative and positive effects they have on society and the ecosystem. Sector 4 is situated in the south part of Bucharest, with 26˚5'45''east longitude and 44˚24'49'' north latitude. The research study area is based on a sample of urban tissue from Sector 4 - Bucharest. This paper will focus on the analyses of the distribution and impact of *Ailanthus altissima* in a mixed of functional areas. The objectives of the study are: spatial analysis of the distribution of *Ailanthus altissima* species depending of the functional areas and their characteristics, assessment of population perception and the effects induced from invasive species into society. The main methods used in making this study are: applied observation files (1036 files in total), the mapping of Ailanthus altissima species and questionnaires filled using the online environment (100 in total). Survey123 application was used for collecting the field data, mapping, filling the observation files and keeping track of the physical characteristics (height and canopy), that were measured with the Lasermeter. For gathering the online data, the online soft, there was used Google forms. The results - assessment of dysfunctions by spatial analyzing the distribution of *Ailanthus altissima* species (distribution analysis after age, height, density, the crown of the trees, sex etc.) and assessment of the population perception (the graphical item correlation). After mapping the 1036 *Ailanthus altissima* trees, it was found that the height of the trees is between 1-17 meters, the crown has between 1-12 meters, the age is between 1-20 years (found using the builder models from ArcGIS Pro), and the sex: feminine and masculine. In the future, it is desired an analysis on a regional scale of the invasive alien species, making an assessment of the Ailanthus altissima effects, in urban and rural areas. In the near future, interviewing the population from the areas taken as case of study, will be taken into account. The final results are useful both scientifically, because they represent a subject in a continuous

evolvement, but also from an administrative point of view, in order to know the current situation and to be able to achieve a management and functional control of the *Ailanthus altissima* species.

HEALTH ISSUES OF THE NORTHERN DEVELOPMENT REGION (REPUBLIC OF MOLDOVA)

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The purpose of this paper is an analysis of the evolution of the health of the population in the Northern Region (NDR), an area shaded in this respect, which is in a demographic decline, with a negative natural increase, the demographic aging of the population, being characterized by a decrease in the birth rate due to the very low fertility rate, an accelerated domestic and international emigration, a high level of mortality (we emphasize that the mortality rate in this region is the highest in the country). According to official data in 2019, among the main causes of death of the population, we can mention those of the respiratory system (62%), tumors (15%), diseases of the digestive system (7%), accidents and trauma (6%). This pessimistic picture from the demographic point of view, represents a complex and serious problem with real long-term negative effects on the regional socio-economic development, from which the state officials must urgently take mitigation and remedial measures.

THE GEOSTATISTICAL ANALYSIS OF THE ATMOSPHERIC PRECIPITATION IN EUROPE ON A WEST-EAST LINE TRANSECT

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The general warming trend of the planet cannot be denied (the average global air temperature has increased by approx. 0.85ºC between 1880-2012 (IPCC, 2013). The direct consequence of this warming is an increase in extreme weather events and hence in climate risks. The monitoring and assessing precipitation, identifying the physical laws governing its course in order to be able to estimate and forecast it in the future is therefore of great interest nowadays. Using geostatistical spatial analysis methods, this paper aims at identifying the correlations between

longitude and precipitation (due to the specificity of the European climate, given by the major influence of the western circulation) and then an estimation - using linear regression equations - of precipitation amounts depending on longitude. Two variables were calculated for the statistical analysis: the proportion of the mean number of days with precipitation ~ 10 mm of the multiannual mean of precipitation days ~ 0,1 mm) and the precipitation ratio between the mean precipitation quantities in summer, compared to those in winter (hereinafter referred to as summer/winter precipitation ratio). The geostatistical analysis carried out on a sample of 40 weather stations aligned from west-south-west to east-north-east argues the existence of a strong correlation between longitude and the multiannual mean of days with precipitation ~ 10 mm and between longitude and the summer/winter precipitation ratio.

GROUNDWATER DROUGHT EVOLUTION IN EASTERN ROMANIA IN THE LAST DECADES

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Drought at all levels of the natural components (atmospheric, hydrological, pedological and hydrogeological), have two direct and indirect negative effects, on the ecological systems, water resources, social, as well as economic aspects of life. Standardized groundwater index (SGI) have been used to analyze the evolution of the drought phenomena in Eastern Romania, for 1, 3, 6 and 12 months - time-scales, applied to seven groundwater bodies.

The SGI values, for all the groundwater bodies, are significantly lower, due to the cumulative effect of the lithological characteristics and the depth of the phreatic level. The cumulated frequency for the different types of drought, supersedes the frequency of drought-free periods, which emphasizes the negative effect of the lack of precipitation on the entire region. However, the occurrence and frequency of extreme and severe groundwater droughts is found to be diminished, in favor of the moderate and minor drought phenomena. Besides, for the 1-month SGI, the frequency of the extreme drought is 0 for the hydrogeological drillings with depths of the hydrogeological level of under 5 m, for all the water

bodies, with slight increases to frequencies of 1-3% for the hydrogeological drillings with the hydrogeological level located at 5 to 10 meters, or over 10 meters. Due to the cumulated effect of the geological conditions and the time-scale for the groundwater drought, most extreme and severe hydrogeological drought periods occur for the 6 and 12 month-SGI (for ROPR01 and ROPR06 for wells with groundwater level under 5 meters, for ROPR02 and ROPR04 for wells with groundwater level between 5 to 10 meters, or for ROPR01 and ROPR07 for wells with groundwater level over 10 meters)

In the larger context of climate scenarios which envision, regionally speaking, an increase in air temperature, and a decrease in the atmospheric hydrological input, the increase of the groundwater droughts frequency is obvious, with direct effects on all natural components that are dependent on the hydrological resources (soil moisture, streamflow etc.).

CONSIDERATIONS ON THE INTERNATIONAL MIGRATION OF THE POPULATION IN THE NORTHERN DEVELOPMENT REGION (REPUBLIC OF MOLDOVA)

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This study aims to analyze the peculiarities of international population migration in the Northern Development Region (NDR), an area located in the northern extremity of the Republic of Moldova, which includes a stable population of 974,558 inhabitants (2019) concentrated in 3 municipalities (Balti , Edinet, Soroca) and 11 districts (Briceni, Edinet, Donduseni, Drochia, Falesti, Floresti, Glodeni, Ocnita, Riscani, Singerei, Soroca). NDR is subject to a real demographic decline (being the most affected region in the country), characterized by a negative natural balance (continuous decline in the birth rate and high mortality rate), an aging and accentuated depopulation, these being supported by an intense internal and international migration. On the whole, in the post-war period the phenomenon of migration was mainly focused on an internal migration (village-city). However, after the independence of the Republic of Moldova (1991) and the opening of the borders to the west, internal migration gradually turns into an international migration. Over time,

external migration has been divided, geographically, into two distinct directions: the migratory flow to the CIS states, which is largely part of the currently declining temporary labor migration, and the flow to the European Union states, which from temporary circulatory migration, has gradually turned into long-term or permanent migration. The global pandemic situation has affected migration in both directions, its intensity being considerably diminished. This international dynamic of migration leads to essential changes in the regional demographic structures, especially through the erosion of the 25-35 age group (aspect highlighted by the reduction of the active labor force). Thus, in the medium and long term the NDR will face a pessimistic scenario in terms of socio-economic status (development, infrastructure modernization) without taking clear measures of administrative-territorial officials, to mitigate the demographic decline and reduce the phenomenon of international migration.

PLANNING GREEN INFRASTRUCTURE IN EU AND ROMANIA: A COMPARATIVE ANALYSIS OF LEGISLATION

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The term “green infrastructure” began to be used in the ‘90s, with many definitions and approaches differing in theory and practice. In the literature, the concept operates with ideas and terms such as connectivity, accessibility, provision of benefits (ecosystem services), support for ecological, social and economic functions, and multi-functionality. In practice, due to its spatial elements and scales to which it can be applied, the green infrastructure has been integrated into urban or regional planning. Although the central European pillar of green infrastructure is the Natura 2000 network, biodiversity directives have been found insufficient and other instruments are needed at EU level for a better connectivity of networks. Therefore, Member States have created ecological networks and other equivalent instruments included in their national legislation, particularly biodiversity policies. On the other hand, in the documents dealing with spatial planning, the term “green infrastructure” was initially used for the European Natura 2000 network, supporting the idea that spatial development must be in harmony with nature conservation. This paper examines how green infrastructure was

included in key European policies in general and spatial planning policies in particular. The results show that starting from the European Union Strategy on Ecological Infrastructures and up to the recent Territorial Agenda 2030 and the New Urban Agenda, many other political documents refer to the advantages of creating green infrastructures in European urban and rural areas. They demonstrate that developing nature-based solutions and green infrastructure networks linking ecosystems and protected areas can help preventing urban sprawl and adapting to climate change. This research, carried within the framework of the European project - ConnectGREEN - Restoring and managing ecological corridors in mountains as the green infrastructure in the Danube basin', was necessary to provide a reference framework for the current situation in Romania, because although some European member states have plans and strategies implicitly or explicitly referring to the ecological infrastructure, most countries - including Romania - miss a national strategy dedicated to the green infrastructure.

SIMULATION OF FLOODPLAINS ON RIVERS IN URBAN AREAS

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The paper presents the result of research on simulating the flooding of a flood on a stretch of river located in an urban area. The study area was located on the section of the Trotuș River that crosses the city of Comănești, Bacău County. The simulation was performed with the HecRas program for several scenarios differentiated by the value of throughput flows (Q1%, Q2%, Q5% and Q10%,). In order to apply the simulation program, it was necessary to carry out complex studies such as topographic, hydrological, hydraulic, the way of endowment with river regularization works, the constructive characteristics of the regularization works, etc. The presence of the riverbed regularization works modifies locally flood parameters and implicitly the parameters of the flood band. The simulation highlighted the positive, but also negative, cooperation of the arranged and unarranged river sectors with regularization works for the formation of the flood band. Also, the simulation highlighted the need to rehabilitate the existing regularization works, but also the need to carry out new works. The research results can be capitalized on the detailed

simulation of the flood strips on river sections equipped with riverbed regularization works.

THE COMPETENCY LEVEL IMPACT ON CITIZEN PARTICIPATION IN ALGERIA: A PRACTICAL STUDY

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The participation process is a part of a logic solidarity, where human, democratic and citizen values take shape in the identity construction of an actor. From this process arise the competency that enable the citizen as a main actor in the process of participation to act in an effective way.
On this account, we presented in this work a competency analysis model serves as a support and reference framework for future research in order to study the level of citizens competency in a participatory process.
The methodology followed to accomplish this work is presented synthetically in the first part of the article, followed by the presentation and discussion of the results obtained using the SPSS statistical software in the second part.

IMPACT OF CLIMATIC FACTORS ABOUT THE IRRIGATION REGIME OF THE EAST ZONE OF ROMANIA

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The paper presents the result of research on the impact of changes in climatic factors in the eastern part of Romania, especially in the eastern part of Moldova. The research area is located within the existing irrigation facilities in the meadow and on the terraces of the Prut River. Climate change over the past 30 years has negatively affected the distribution of annual rainfall, a situation that has favored the emergence of long-term droughts in eastern Moldova. This area presents a high risk of drought given the characteristics of the continental climate with a tendency to aridity. The research was directed on the modification of the parameters of the irrigation regime applied in "Albița Fălciu Complex Irrigation and Drainage Development", Vaslui County. Climate change has changed the zone temperature and precipitation regime, mainly from 1981 to 2018. Studies have shown a tendency to reduce the volume of

precipitation received by this area. Between 1981 and 2010, a volume of precipitation was registered in the eastern part of Moldova of about 459.6 l/m2 compared to 575.1 l/m2 on the Romanian territory. The decrease in the volume of precipitation negatively influenced the irrigation regime of the crops and implicitly the need for water taken from the Prut River. The net irrigated area varies considerably from year to year depending on the volume and distribution of annual rainfall. The current evaluation of the irrigation norms indicated an increase of them by about 17 - 28% compared to those registered 40 years ago. The increased value of irrigation rules coupled with the low volume of current rainfall puts a lot of pressure on the Prut River to ensure an additional need for water in these climatic conditions.

IDENTIFICAREA ȘI CARTAREA HABITATELOR DEPENDENTE DE APĂ DIN CURSUL DE MIJLOC AL FL. NISTRU (PE TERITORIUL REPUBLICII MOLDOVA)

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CHE Nistreană a indus un șir de efecte asociate activității complexului asupra ecosistemelor râului, cum ar fi: reducerea conectivității longitudinale, modificarea debitelor medii lunare ale fluviului, variații intra-zilnice ale nivelului apei (hydropeaking), modificarea regimului termic al apei, mortalitatea peștilor în zona din amonte de baraj, modificarea regimului sedimentelor, generarea unor inundații artificiale, reducerea conectivității laterale, modificarea vitezei apei, reducerea bruscă a nivelului apei ca urmare a hydropeaking-ului și modificarea parametrilor fizico-chimici.

Ecosistemele naturale din bazinul fl. Nistru, reprezentate preponderent prin ecosisteme forestiere și de luncă, fie au suprafețe reduse și sunt puternic deteriorate (pajiștile), fie sunt amplasate la limita arealului natural de distribuție (pădurile mezofile central-europene). Construcțiile hidroenergetice au impact asupra vegetației forestiere riverane din aval de construcție, prin: a) modificări ale compoziției fitocenotice și apariția unor specii caracteristice zonelor neinundate; b) diminuarea reproducerii speciilor riverane pioniere/înaintașe; c) alterarea funcționalității pădurilor inundabile, din zona riverană (diminuarea capacităților fiziologice și reproductive ale arborilor, cu un declin evident al ecosistemelor formate din plop și salcie). Cel mai evident impact al deficitului de umiditate (indus de scăderea nivelului apei și a inundațiilor de primăvară) îl resimt

arborii tineri/puieții și arborii bătrâni (prin inhibarea formării/dezvoltării semințelor, germinarea lor și a stresului indus de lipsa apei/scăderea nivelului freatic). Modificările în regimul hidrologic, cumulate cu schimbările climatice, dar mai ales cu impactul antropic cauzat de schimbarea modului de utilizare al terenului (agricultura intensivă și suprapășunatul), pot fi considerate ca generatoare ale unui impact cumulat asupra zonelor cu vegetație de stepă naturală.
Conform metodologiei europene (Directiva 92/43/CEE, Manualului de interpretare a habitatelor Natura 2000, etc.), dar și datelor privind modul de utilizare a terenurilor (Corine Land Covery), în cursul de mijloc al fl. Nistru s-au identificat și cartat 12 tipuri de habitate dependente de apă, din următoarele categorii: Habitate de apă dulce (ape stătătoare și ape curgătoare); Habitate stâncoase; Habitate de mlaștină; Habitate de pădure(păduri de stejar și carpen dacice, păduri aluviale, păduri de gorun și galerii cu Salix alba și Fraxinus sp.); Habitate de stepă; Habitate de luncă și Habitate de tufișuri. S-a determinat faptul că cele mai afectate habitate de interes comunitar, supuse impactului activității CHE Nistrean sunt cele amplasate în luncă inundabilă sau în imediata ei proximitate, ca: 91E0* Păduri aluviale cu Alnus glutinosa și Fraxinus excelsior; 6440. Pajiști aluviale ale văilor râurilor; 92A0. Galerii cu Salix alba și Populus alba și 6430.Comunități ale lizierei cu ierburi înalte hidrofile.
Pentru păstrarea biodiversității în regiune, inclusiv a habitatelor intens afectate de impactul CHE Nistrean, se recomandă prezența viiturilor ecologice de primăvară (cu efectuarea unei evacuări ecologice de la jumătatea lunii aprilie până la mijlocul lunii mai, cu un debit de cel puțin 420-500 m3/s); păstrarea stariței, bazinelor de apă, deblocarea/curățarea zonelor de trece a viiturilor ecologice în zonele umede/albia majoră a Nistrului; promovarea speciilor forestiere adaptate condiții pedo-climatice din regiune (inclusiv la modificările de mediu actuale), managementul corect al zonelor umede, etc.

THE IMPACT OF CLIMATE CHANGE ON EVACUATORS FROM EARTH DAMS

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The paper deals with a common problem recently, namely the impact of climate change on the operation of hydrotechnical constructions. With global warming, there has been an increase in the frequency and intensity

of extreme weather events in recent years. Climate change has caused hydrological risks in the river network, represented by fast and frequent floods for short periods of time. Rainfall is no longer evenly distributed throughout the year, but is concentrated in short intervals and with a high intensity. This has a significant impact on the operation of water evacuators from earth dams. Rapid floods coupled with anthropogenic factors have led to partial or total degradation of large water evacuators, but also bottom drains. The failure and damage of the evacuators from a series of earth dams (category C and D) in the area of Moldova in the last 25 years confirms this aspect (eg. dams Mileanca, Ezer, Polonic, Popeni, Arborea etc.). In order to reduce the disasters caused by the operation of large water evacuators, it is necessary to analyze, re-evaluate, simulate the flow phenomenon and adopt rehabilitation programs and their modernization.

STATE OF PROTECTED NATURAL AREAS IN THE NORTHERN DEVELOPMENT REGION OF THE REPUBLIC OF MOLDOVA.

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Rezultatele cercetărilor prezentate în acest articol au fost obținute cadrul etapei a II-a (2021) a Proiectului instituțional aplicativ „Evaluarea stabilității ecosistemelor urbane și urale în scopul asigurării dezvoltării durabile” implementat de Institutul de Ecologie și Geografie.

Regiunea de Dezvoltare Nord a Republicii Moldova include în componența sa următoarele raioane: Fălești, Sîngerei, Glodeni, Florești, Rîșcani, Dondușeni, Drochia, Soroca, Edineț, Ocnița, Briceni și municipiul Bălți, cu o suprafață totală de cca. 10 mii km². Regiunea posedă un patrimoniu al ariilor naturale protejate (ANP) deosebit de variat.

ANP din regiune posedă resursele turistice principale formate din suprafețele forestiere, izvoare, cascade, peșteri, grote, stânci, ravene, dealuri, toltrii, movile, râuri și lacuri.

Fondul ANP de Stat din RD Nord cuprinde: rezervaţia ştiinţifică „Pădurea Domnească”; 103 monumente naturale, inclusiv 32 de complexe şi obiecte geologico-paleontologice, 10 hidrologice, 4 botanice cu vegetație silvică pe o suprafață totală de 61,8 ha și 57 arbori seculari; 12 rezervaţii naturale, inclusiv 9 silvice și 3 rezervaţii de plante medicinale; 12 rezervaţii peisajere cu o suprafață de 4605 ha; 6 rezervații de resurse, cu

o suprafață de 98 ha; 12 Arii cu management multifucţional, inclusiv 1 Sector reprezentativ cu vegetaţie de stepă, 10 sectoare reprezentative cu vegetație de luncă, 127,5 ha de perdele forestiere de protecţie; 10 monumente de arhitectură peisajeră, de 47,5 ha; 1 zonă umedă de importanţă internaţională cu o suprafață de 15553 ha ceia ce constituie 54% din suprafața totală a ariilor naturale protejate de stat din această regiune.

Activitatea economică care, pe parcursul ultimelor secole, a cunoscut o evoluție considerabilă. Cu toate acestea, activitatea economică intră în conflict cu misiunea de conservare și protecție a mediului înconjurător, cauzându-i daune semnificative.

Unele dintr cele mai importante probleme a stării ANP din RD Nord o constituie poluarea fizică, biologică și chimică a apelor cu ape și resturi menajere, industriale, agricole.

În grote înscrieri de nume, caricaturi, graffiti, desene necenzurate și ne la locul lor, ciopliri nechibzuite și demoralizătoare în rocă, hârtii cu dorințe din lumea superstițiilor, ruguri aprinse în interior cu substanțe ca plastic ce elimină fum negru la rândul lui tapetează rocile în culori întunecate, deșeuri solide ca plastic (butelii, pungi), sticlă (butelii, spartă), metal (folii ascuțite, țăvi sparte, cuie, sârmă) cu pericol pentru lumea animală cât și pentru om cu preponderență copii și vârstnici.

Campinguri neautorizate cu impact asupra regiunii de desfășurare prin tasarea solului și a covorului vegetal, ruperea crengilor și a altor părți vegetale a lumii vegetale ce sunt folosite în diferite scopuri, intimidarea a mai multor specii de animale din zona dată prin dereglarea ciclurilor lor vitale zilnice în ecosistemele lor vitale, deșeuri rămase, viceuri improvizate, arderea covorului ierbos, ruguri cu durată lungă și neântreruptă, aprinderea copacilor uneori și incendii, ruperea de flori și omorârea unor specii de animale sunt doar o parte din prejudiciile aduse naturii de către această activitate în locurile neamenanjate și nemonitorizate!

Localnicii nu cunosc despre existența și importanța ANP din regiunile sale, nu apreciază și estimează valoarea reală a acestor obiective din acest motiv sunt deteriorate, poluate, distruse, dezapreciate, nimicite, neglijate, neângrijite, transformate, folosite nerațional, exploatate (cariere), schimbarea destinației și modului de folosință (gunoiști, depozite în ravene și alte forme de relief exogen) ceia ce micșorează din ptențialul lor natural și turistic.

Unele ANP cu preponderență pe teritoriu cărora sunt mănăstiri, o parte a rezervaţiei ştiinţifice, izvoarele din unele localități sunt bine monitorizte și îngrijite.

CHANGES IN THE SPACE OF MUNTENII DE JOS AND PERIPHERAL AREAS. NATURAL AND ANTHROPIC ASPECTS

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The municipality of the Muntenii de Jos, 5 km away from the municipality of Vaslui, is situated at the intersection of hills with the Vasluiet and Barlad valley. After 1990 the land use has suffered a series of metamorphosis either by a correct use or by changing the initial use. On the other hand, there have been other changes concerning the assembling aspect of the building blocks, the economic activities, the structure of the road network, the way in which situations with potential risk are managed. Some land has been covered with forest overcoats to stop landslides, other land has been left in dilapidated, but the structure of the cultivated land and the overview of the municipalities that are part of the municipality have changed.

VEGETATION FIRES IN IAȘI COUNTY (2006-2016). EXPLORATORY ANALYSIS

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Our communication is part of a broader framework, namely that of doctoral research, which has as object the activity of ISU Iași in the period 2006-2016. During the analyzed period, the interventions caused by vegetation fires represent 7.68% of the total ISU actions. Although reduced in the total activity of the ISU, this share deserves to be investigated more closely, given the current context related to climate change and environmental protection.

The purpose of our research is to reflect on the causes of vegetation fires that occurred in Iasi County between 2006 and 2016, and the results will be subsequently compared with those obtained in the entire national territory (the database is not complete for that level). Our research aims to clarify the causes of vegetation fires in the analyzed territory with the help of geostatistical methods. Do they have natural causes related to climate change (increase in average temperatures) or rather anthropogenic causes related to traditional practices (stubble burning) or various incidents of human origin (arson, negligence, or other causes)?

Depending on the research results, the interest of decision-makers (public authorities) and action (ISU) can be focused either on a general strategy to adapt to climate change or on a local strategy aimed at educating the population to prevent this type of incident.

CHANGES IN PRECIPITATION EXTREMES RELATED TO AGRICULTURE AND WATER RESOURCES BASED ON GRIDDED DAILY DATA IN ROMANIA

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Climate change is one of the most frequent topics in climatic literature over the last three decades. One of the major concerns with a potential change in climate is that an increase in extreme events will occur. In this paper, we focused on spatial distribution and changes occurred in extreme precipitation indices in Romania over a 53-yr period: 1961-2013. Gridded daily precipitation data have been used at a spatial resolution of 0.1° x 0.1° (about 11 km x 11 km). A set of 14 indices related established by the Expert Team for Sector Specific Indices for agriculture and water resources sectors has been calculated. They are both frequency and intensity indices and among them, four are fixed-threshold indices (R10, R20, CDD and CWD), four are station-related thresholds (R95p, R99p, R95pTOT, R99pTOT) and six indices were detected without using a threshold (Rx1 day, Rx3 days, PRECPTOT, SDII, SPI, SPEI). The main findings of the study are: most of the indices registered increasing trends, but not statistically significant at country level, except for the drought-related indices (CDD, SPI and SPEI), which were detected to have dominant decreasing trends. In the northern half of the country increasing trends were dominant and in southern one, those decreasing registered a larger spatial coverage. only SPI and SPEI recorded dominant significant changes: for SPI the trends are almost equally divided between increasing and decreasing and for SPEI, more than 70 % of the country was characterized by significant decrease.

STUDIUL FLORISTIC AL ECOSISTEMELOR URBANE BĂLȚI ȘI FLOREȘTI

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Problemele ecologice ale ecosistemului urban necesită un studiu complex pentru a evidenția căile evoluției în aspect global. Studiul floristic al ecosistemelor urbane la etapa actuală de dezvoltare a societății umane este determinat de procesul de urbanizare, care s-a intensificat începând cu a II - a jumătate a sec XX. Urbanizarea influențează structura și compoziția vegetației unei regiuni, reduce efectivul speciilor, speciile cu amplitudine ecologică îngustă dispar, specii neautohtone își manifestă caracterul invaziv etc. în rezultatul schimbărilor apar forme noi de specii izolate, se stabilesc trăsăturile lor specifice. Studiul diversității floristice al ecosistemelor urbane Bălți și Florești din regiunea de Nord a Republicii Moldova a fost efectuat în baza cercetărilor a 7 stațiuni stabilite: I - Zona de vile or. Bălți, confluența r. Răut cu r. Copaceanca; II - Lacul Komsomol, or. Bălți; III - r. Răut or. Bălți, Gara auto; IV - r. Răut confluență cu deversarea SEB, or. Bălți; V - Zonă de agrement, Parcul din s. Vărvăreuca, r-nul. Florești; VI - r. Răut lângă pod, or. Florești; VII - r. Răut aval de or. Florești. Primele 4 stațiuni au fost stabilite în ecosistemul urban Bălți, iar următoarele 3 stațiuni, în preajma ecosistemului urban Florești. Aceste cercetări au fost efectuate în teren pe parcursul perioadei de vegetație a anului 2020-2021 prin metoda transectelor lineare, care constă în notarea succesiunii fitoindivizilor de-a lungul unei linii sau a unei bande, a cărei lungime se stabilește în funcție de tipul de vegetație studiat. În analiza compoziției floristice s-au luat în considerare în primul rând, numărul de specii componente, care oferă informații asupra gradului de homeostazie a sistemului dat. Determinarea speciilor de plante superioare s-a efectuat conform determinatoarelor de specialitate. Spectrul floristic în aceste stațiuni este reprezentat de 110 specii, grupate în 91 genuri din 27 familii de magnoliofite. Cele mai reprezentative sunt familiile Asteraceae și Poaceae cu câte 26 și 16 specii corespunzător. Trebuie menționat, că la începutul perioadei de vegetație, condițiile meteo au favorizat o dezvoltare mai bună a florei urbane, comparativ cu starea ei din anul precedent. Astfel, în majoritatea stațiunilor cercetate gradul de acoperire constituie 95 - 100 %. Componenta floristică din ecosistemele cercetate este reprezentată de speciile ruderale, spontane și segetal-ruderale. Ponderea maximală le revine speciilor ruderale și segetal-

ruderale. Flora acestor ecosisteme s-a format pe calea pătrunderii speciilor spontane autohtone, care s-au adaptat la condițiile urboecosistemului și a speciilor alohtone, care au pătruns pe diferite căi pe teritoriul Republicii Moldova. Studiul floristic al ecosistemelor urbane din regiunea de Nord a Republicii Moldova a demonstrat, că flora acestor ecosisteme urbane se deosebește evident de flora zonală tipică stepelor (Stepa Bălți), care conform datelor bibliografice este reprezentată de 163 specii de plante vasculare.

LE RECHAUFFEMENT CLIMATIQUE ANNUEL DANS LES STATIONS DE BUCAREST ET DE SIBIU : CERTITUDES ET INCERTITUDES

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If global warming is an observed fact, several uncertainties remain. They concern the temperatures of the past and those of the future. After showing that the warming is well proven for the two stations of Bucharest and Sibiu, we show the stochastic nature of this trend, and the difficulties encountered in appreciating its intensity from 1880 to 2019. Finally, we highlight some breaks in that evolution.

LARGE SCALE FLOOD ANALYSIS - A CHALLENGE FOR AUTOMATED GIS MODELING

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Floods have always been one of the most devastating natural phenomena, inducing both high casualty numbers, and material and property damage. For these reasons, flood prediction and management are crucial aspects studied at both drainage basin levels, and for specific floodplain sectors. Considering common issues, such as lack of data, large areas that require analysis, or limited computational capabilities, automating flood analysis for large scale areas is quickly becoming a modern necessity. The current study addresses the issue of automating flood analysis for drainage basins, on a relative, dimensionless scale. This involves comparing drainage

basins of the same order of magnitude, based on the Horton-Strahler classification. A model was developed to quickly and efficiently provide a quantitative comparison in GIS environment, in table form. This model performs a multitude of operations which involves morphometric analysis, based on the Digital Elevation Model and a series of terrain indices that correspond to a higher or lower degree of flood vulnerability. The final results generated in the drainage basin table of attributes reveals normalized values, which can be compared to assess which basins are more vulnerable to floods. This is useful for large scale flood analysis on drainage basins, in order to emphasize where measures, funds and repairs have to be performed, in order to best mitigate the negative effects of floods.

DETAILS OF DISTRIBUTION OF QUALITATIVE CHARACTERISTICS OF SOLAR IRRADIANCE

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This paper presents data on the variation of qualitative characteristics (spectral composition, position of the maximum and short-wavelength boundary) of the solar spectrum in the ultraviolet and visible regions. The latitudinal and seasonal distribution of solar radiation maximum has been established. It is hypothesized that the corolla color of flowering plants is the result of adaptation to the solar spectrum maximum.

ASSESSMENT OF THE IMPACT OF BĂLȚI AND FLOREȘTI URBAN ECOSYSTEMS (REPUBLIC OF MOLDOVA) ON THE SURFACE WATER QUALITY OF THE RĂUT RIVER BASIN IN THE MIDDLE SECTOR

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As a result of the physico-chemical determinations performed in the autumn of 2020 (21.09.2021) after pH (7.2-8.55) denotes class I water quality r. Răut in the limits of urban ecosystems Bălți and Florești.
Oxygen regime indicators (CCO-Cr and CBO5) indicate the quality class between values II-V. After CCO-Cr water r. Răut corresponded to class II quality, and downstream of the discharge of water from the Biological Treatment Plant (SEB) Bălți as well as in the urban ecosystem (EU) Floresti class III quality. The CBO5 values for the N section of the Bălți

urban ecosystem (EU) up to the confluence with the SEB fall into quality class II, downstream of this class III, and within the limits of EU Florești class V quality.
Analyzing the evolution of the concentration of ammonium ions (NH4+) it can be seen that the values recorded were between (0.38-0.91 mg N/l), which corresponds to quality class II for surface waters.
The water samples taken from Răut River in all research sites had a nitrite ion (NO2-) content of 0.036-0.12 mg / l corresponding to quality class II and III (good - moderately polluted). Quality class III was registered on the segment of the bus station and up to the confluence with the discharge of SEB Bălți.
The concentration of nitrates (NO3-) was in class I quality (very good) for surface waters.
According to the total phosphorus content (P tot), the water samples taken from the Răut river for most sites are classified as moderately polluted (quality class III). The content of 1.255 mg P/l was recorded in the water of the rowing lake, which corresponds to polluted waters or pollution class IV.

BILANȚUL NUTRIENȚILOR ÎN ECOSISTEMELE PARCULUI NAȚIONAL "ORHEIUL VECHI"

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Bilanțul nutrienților (azot și fosfor) a fost studiat pentru calcularea încărcărilor compușilor azotului și fosforului care ajung până la ecosistemele acvatice. În studiu au fost incluse zonele funcționale a parcului: terenurile împădurite, zonele umede, zonele de agrement/turism, ariile locative, terenurile agricole. În baza analizei componentelor de mediu și studierii surselor statistice au fost calculate încărcările a compușilor biogene provenite din fiecare zonă funcțională și contribuția lor în poluarea ecosistemelor acvatice. În baza cercetărilor a fost stabilită ca aproximativ 25-30% din azotul tehnogen și 5-10% de fosfor ajunge până la ecosistemele acvatice în primul rând din procesele erozionale. Analiza activităților sectoriale arată că cea mai importantă sursă de poluarea este activitatea turistică și localitățile aflate în limită a parcului național. Pentru reducerea încărcărilor a nutrienților asupra mediului se prevede elaborarea planului de management a parcului și programei de măsuri asociate cu fișele de proiecte necesare pentru reducerea

nutrienților cu 25-50% spre anul 2030 conform Programului Național "Moldova 2030".

RIVER WATER RUN DEEP - COLLABORATION AND CONFLICTS IN THE EIA PROCEDURE FOR SMALL HYDROPOWER PROJECTS

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Energy is essential to socio-economical development and improved quality of life. Hydroelectric energy is a continuously renewable electrical energy source who is strongly promoted in order to achieve sustainable development and also to mitigate climate change. Romania is a developing country, who is caracterized by the fact that in the past decade the construction of several hundred small hydropower plants on the Carpathians rivers have caused and continue to cause serious environmental problems. This type of investment projects, implemented also in protected areas, generated important conflicts at national and international level, considering their role in conserving natural biodiversity and ecosystems. In this paper, we use social network analysis to investigate the actors involved in such conflicts, highlighting the roles of each actor, and the connections established in different conflicts. We selected two case studies from Romania, subject to the EIA procedure: (i) the SHP project propoals implemented on the Nera river (SHP 1 and 2) and (ii) the SHP project proposals implemented on Bistra Mărului river, (respectively Șucu and Olteana). Our results highlight that the most involved and influential actors in the conflicts were especially the citizens and non-governmental organizations (who had a position against the implementation of projects) and the institutional administrations at national and regional levels (who had pro position for project implementation). Furthermore, the most significant collaboration is observable in the case of non-governmental organizations. Through our study, we try to provide innovative information in order to find solutions to design a more collaborative EIA procedure and inform environmental policy by describing the conflictual patterns, network weaknesses, opportunities for greater involvement of key individuals and perspectives of building new bridging communication hubs to avoid or reduce environmental conflicts.

SOLUȚII GEOSPAȚIALE PENTRU DIMINUAREA EFECTELOR COVID-19. DECIZII INTELIGENTE BAZATE PE ANALIZA SPAȚIULUI GEOGRAFIC PENTRU CREAREA UNOR NOI CENTRE DE VACCINARE ÎN REGIUNEA MOLDOVEI.

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Contextul actual al pandemiei de COVID-19 a adus numeroase provocări sistemului de sănătate, activităților economice, dar și cercetătorilor și statisticienilor. De la finalul lui 2020, campania de vaccinare caută să decurgă cât mai eficient și să facă astfel încât vaccinul să fie cât mai accesibil populației. Un cuvânt important îl au în acest sens o bună distribuție a centrelor de vaccinare, statistica spațială, precum și analizele GIS care pot fi efectuate. Lucrarea de față își propune să identifice cele mai bune soluții pentru eficientizarea amplasării centrelor de vaccinare împotriva covid-19 în regiunea Moldovei, prin astfel de analize. Instrumente de tipul Network Analyst sunt extrem de utile în găsirea celor mai potrivite locații noi pentru aceste centre, raportate la cele deja existente, dar și la populație și la rețeaua rutieră. Rezultatele indică un grad mare de acoperire a populației din Moldova, însă regiuni populate precum Colinele Tutovei, sau mai puțin accesibile, ca Munții Vrancei, duc lipsă de centre de vaccinare. Cu ajutorul noilor centre, timpul de transport până la această facilitate ar scădea considerabil în toate zonele deficitare din acest punct de vedere, iar multe dintre ele ar putea servi drept opriri pentru potențiale centre mobile. Bineînțeles, rata vaccinării într-un anumit areal nu depinde exclusiv de accesibilitatea la centrele de vaccinare, ci și de anumiți factori subiectivi sau locali, precum tipul de vaccin, dimensiunea listelor de așteptare sau decizia personală a fiecărui individ, motiv pentru care este esențială și o campanie de informare cât mai eficientă.

POLUAREA SOLURILOR ȘI IMPACTUL SISTEMIC AL UTILIZĂRII TERENURILOR

Lucreția FILIPAȘ**,** Dalma DARLACZI
Liceul de Arte C. Baba

Patrimoniul natural al solului și al terenurilor este în pericol deoarece sunt resurse finite, neregenerabile, aflate într-o continuă degradare, ceea ce le afectează capacitatea de funcționare. Terenurile și solul sunt esențiale pentru existența sistemelor naturale și a societății umane, dar activitățile

umane amenință funcționarea resurselor funciare totale, inclusiv a solului prin cultivarea excesivă a hranei, a producției de biomasă, biocombustibil și gestionarea biodiversității solului. Fenomenele reale care contribuie la această degradare sunt printre multe altele contaminarea și impermeabilizarea solului. Aceste fenomene sunt provocate de către intensa activitate umană (folosirea excesivă a terenurilor, cantitatea de substanțe nutritive utilizate și ulterior abandonarea lor).
Fiecare proces are un efect asupra caracteristicilor principale ale pământului, cum ar fi: poluarea, degradarea solurilor, utilizarea terenurilor și starea vegetației. Aceste caracteristici determină cantitatea rezervelor de resurse funciare, funcționarea lor, precum și fluxurile de produse și servicii. Procesele de degradare a solului implică necesitatea protejării, întreținerii şi îmbunătățirii calității solului. Proprietățile solului, precum și factorii de formare a solului, cum ar fi clima, utilizarea terenurilor sau gestionarea solului determină gradul de degradare și poluare a solului.

EVALUAREA CALITĂȚII VIZUALE A PEISAJULUI DIN JUDEȚUL SUCEAVA ȘI CORELAȚIA SA CU CALITATEA MEDIULUI LOCUIT

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Peisajul, fundalul pe care ni se desfășoară viețile, va avea un impact manifest asupra a ceea ce înțelegem în științele sociale prin “calitatea” acestor vieți. Lucrarea de față caută să investigheze măsura în care impactul peisajului reușește să depășească sfera subiectivității si amprenta lasată de peisaj asupra unui indice adeseori asociat unei vieți “bune”: calitatea mediului locuit. Concentrându-ne pe județul Suceava, am folosit programul ArcGIS pentru a corela la nivel de UAT 1706 de evaluări peisagistice, obținute prin sondaj, cu indicii tehnico-edilitari ai localităților. Participanții au răspuns unui chestionar online, unde au acordat scoruri de la 1 la 5 unor fotografii reprezentative fiecărui tip de peisaj identificat de noi. S-a confirmat o preferință pentru cadrele naturale bogate. Odată calculată regresia dintre calitatea vizuală a peisajului și calitatea mediului locuit, am obțiunt o corelație negativă, dar slabă, care ar corespunde unei situații socio-economice dezechilibrate. Ramâne de înțeles ce pași să urmăm pentru a o transforma într-o corelație

pozitivă și strânsă, prin explorarea potențialului de creștere economică adus de proiecte de reabilitare peisagistică direcționate spre turism.

THE MICROCLIMATOLOGY OF ROMANIA'S COLDEST AIR POOLS: ANALYSIS AND COMPARISON

Andrei BÂRLEA

This presentation aims to describe, analyze and compare several cold air basins in some of the mountainous areas of Romania. The bulk of the paper is focused on the basins present in the Apuseni mountains, in karst regions, these having a unique particularity: they are closed basins, allowing the cold air to accumulate at night through katabatic and radiative cooling.
Comparisons are being made between the closed basins, open valleys and mountain top weather stations, in order to check the regular differences in temperature between the aforementioned topographical features/ landforms and strive to understand the factors driving the very high temperature inversions and daily temperature amplitudes.
An open-basin is thrown into the analysis as well, proving that very low temperatures and thermal inversions depend also on the shape of the basin, sky view factor and even vegetation.
Additionally, included in the presentation are some of the most notable international features of this kind, some of them being introduced even in the international flow of synoptic data by their corresponding country weather services.

IMPACTUL ACTIVITĂȚILOR ANTROPICE ASUPRA STĂRII PEISAJELOR GEOGRAFICE DIN SPAȚIUL REPUBLICII MOLDOVA ÎN SECOLUL XXI

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Gradul apreciabil de antropizare a mediului din perioada modernă a determinat o diminuare progresivă a stabilității ecologică a peisajelor geografice îndeosebi în condițiile predominării peisajelor agricole care, în spațiul Republicii Moldova, în prezent, alcătuiesc aproximativ 74% din suprafața totală. În baza datelor Cadastrului funciar al Republicii Moldova (2004-2020) și a datelor statistice privind numărul populației a fost apreciat un sistem de indicatori a stării peisajelor geografice (indicele de naturalitate a peisajelor, indicele de artificializare a mediului, indicele

modificărilor de mediu) și cuantificată presiunea antropogenă asupra peisajelor geografice prin diverse activități agricole, silvicultură, construcții etc. pe unități administrativ teritoriale (raioane și comune). Ca perioadă de referință au servit datele anilor 2004 și 2020. Caracteristicile indicilor și presiunilor umane asupra peisajelor au fost procesate prin utilizarea tehnicilor SIG, fiind elaborate modele cartografice și apreciat gradul de stabilitate ecologică a diferitelor categorii de peisaje pe unități administrativ teritoriale.

Indicele de naturalitate (Inat) redă pondera peisajelor naturale (în %) la suprafața totală. Acesta s-a diminuat în perioada 2004-2020 de la 14% până la 12%, ceea ce reprezintă peisaje cu echilibru ecologic puternic afectat. Valori mai apreciabile ale indicelui de naturalitate se înregistrează în perimetrul Podișului Codri. În unele comune din această regiune Inat denotă o stabilitate naturală sau chiar valori apropiate de cea naturală.

Indicele de artificializare (Ai) reprezintă raportul dintre suma spațiilor construite, industriale și a drumurilor de comunicare la suprafața totală a unității peisagistice. În perioada 2004-2020 acest indice practic nu s-a modificat, fiind în jur de 0,08.

O caracteristică a gradului de stabilitate a peisajelor reprezintă și Indicele de transformare evironmenrală (Etr.e.M) care se apreciază ca raportul suprafeței terenurilor cu peisaje naturale (forestiere, de fânețe și pășuni) la cele cu terenuri construite. Valoarea medie a indicelui Etr.e.M. în anul 2004 a fost de 9,67, în anul 2020 acesta s-a diminuat esențial, înregistrând 3,84. Creșterea ponderii terenurilor construite, se înregistrează în limitele municipiilor Chișinău și Bălți și în raioanele Cahul, Dubăsari, Ialoveni, Ocnița și U.T.A. Găgăuzia, ce se explică, preponderent, prin creșterea ariilor construite în centrele raionale, în municipii, în unele cazuri, și prin defrișări.

A fost apreciat indicele presiunii umane asupra mediului prin utilizarea peisajelor forestiere (Pf) care se apreciază ca raportul dintre suprafața peisajelor forestiere la numărul de locuitori. Conform FAO / UNESCO (1964), limita minimă pentru menținerea echilibrului ecologic al mediului este de 0,3 ha de pădure per cap de locuitor. În 2004 valoarea medie a indicelui Rf. a fost de 0,145, în 2014 - 0,180 și în 2020 valoarea medie a înregistrat 0,198, fiind însă și în prezent cu mult mai mică în raport cu valoarea minimă necesară pentru asigurarea echilibrului ecologic al mediului. Ponderea unităților teritoriale cu valori ale Pf 0,300 este de 20,65%. Creșterea în perioada de referință a valorii medii a indicelui presiunii umane este determinat în mare parte de diminuarea numărului populației cu 742,9 mii locuitori.

GEOPHYSICAL EVALUATION OF GROUNDWATER SALINIZATION HAZARD IN FRACTURED AQUIFERS: VAMA VECHE AREA, ROMANIAN BLACK SEA COAST

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The salinization of freshwater resources represents a worldwide hazard in coastal areas. This process, known as saltwater/seawater intrusion, may have natural causes (e.g. sea level rise or saltwater migration through fractures in coastal rock formations) or may be caused by anthropogenic activities (e.g. overexploitation of wells by excessive groundwater pumping). The outcomes of this contamination are a reduction in aquifers' freshwater storage and the abandonment of groundwater production wells. In Romania, saltwater intrusion was identified through geophysical methods in the southern part of Black Sea's coast, in Costineşti and Vama Veche resorts.

A direct physical effect of salinization is the reduction in aquifers' electrical resistivity. Consequently, geoelectrical surveys are the preferred geophysical technique used for the delineation and characterization of saltwater intrusion phenomena. In 2019, a joint geophysical research project was carried out in Vama Veche resort by the University of Bucharest—Department of Geophysics and the Geological Institute of Romania—Geohazard Department. Financed by the Society of Exploration Geophysicists—Tulsa, OK, S.U.A. (SEG/TGS grant "Hydrogeophysical investigation of the environmental hazards from the Romanian Black Sea coastline") and by the Romanian Ministry of Education and Research (grant PN 19-45-01-02), the project aimed to assess the saltwater contamination of the aquifer hosted in late Middle Miocene (Sarmatian) limestones and to delineate probable fractures or faults acting as seawater intrusion pathways. Electrical Resistivity Tomography (ERT) was performed on eight profiles of 1800 m total length with N–S, W–E, NNE–SSW, and WNW¬–ESE orientations, and a

detailed magnetometric survey was conducted on an area exceeding 59000 m2. The ERT surveys indicated that the saltwater contamination occurs at approximately 45–49 m depth and extends at least 500 m from the coastline. Both the geoelectrical and the magnetometric surveys highlighted significant structural–tectonic features of the area, such as the dipping toward east and north of the Sarmatian limestones hosting the aquifer and the presence of a system of faults or fractures with NW–SE/WNW–ESE and N–S orientations, most likely responsible for the seawater migration inland.

WARM SEASON OF 2020 IN THE OLTENIA REGION

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The warm season of 2020 in the Oltenia region was characterized by weather close to the thermic average of the season, with positive deviations of the average maximum temperatures of up to 0.9˚C. The rainfall regime was above the average of the reference interval 1981-2010, with the deviation being 5 l/sqm and the weather influenced by the Azoric high ridge mostly in the second half of the interval.

The paper proposes a climatological and synoptic study of May, June, July, August, September and inherently of the warm season of 2020, with a thorough analysis of the meteorological conditions, that generated the unstable weather episode from 26.09.2020.

The warm season of 2020 in the Oltenia region was marked by cold and rainy weather in the first month (May). In June, the maximum average temperature deviation was negative and the minimum average temperature deviation was positive. The rainfall regime was poor only in a restricted area of the western region. July was close to normal regarding the thermic aspect and the maximum/minimum average temperature deviation was positive and the rainfall regime was poor in the eastern area of the region.

The final months of the season (August and September) are marked by a lack of precipitations in most of the region and by higher-than-normal temperatures, with significant values in September when the minimum/maximum average temperature deviation in Oltenia was 3,8˚C, respectively 2,4˚C.

We identified the number of warm days (Tmax-29,5˚C), hot days (Tmax-34,5˚C), tropical nights (Tmin-19,5˚C), HTI-80 units and the days in

which the amount of rainfall exceed 15 l/sqm. In order to get an accurate assessment of the analyzed period, the above-mentioned meteorological elements must have specific values for the warm season at least at five meteorological stations in Oltenia. The result was that September was a warm month, keeping the summer months characteristics in the first two decades of the month, even though September is the first fall month.
The unsteady weather of this interval (26.09.2020 00:00-18:00 UTC) was determined by the evolution of the pressure fields on ground level: Azoric high ridge that extended above the Scandinavian Peninsula favored the cold air supply of the low that acts above Central Europe and the belt found above the northern region of the continent determined movement from N to S of the above-mentioned low. The low-pressure field on ground level was also sustained in the troposphere at 500 mb by a geopotential thalweg, Oltenia's placement on the anterior side of it leading to meteorological phenomena and to the arrival of the specific of atmospheric instability.

THE IMPACT OF ROAD TRANSPORT EMISSIONS ON AIR QUALITY IN BRAILA, ROMANIA

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Road transport, including accessibility and individual mobility is considered unanimously as a fundamental element of contemporary living. The study area is considering Braila County with a total population of around over 305,000. The area it is well served by 6 national roads, 27 county roads and 42 communal roads and contains some of the most heavily trafficked stretches of road in the Romania. A major concern for road transport is sustainable development and reducing the negative effects on the environment of chemical or noise pollution. The emissions analysed in this study CH_4 , CO, CO_2 , N_2 O, NH_3 , NOx, $PM_{2.5}$ and PM_{10}, were collected by the Agency for Environmental Protection Braila during 2015-2019 based on questionnaires according to EMEP/EEA air pollutant emission inventory guidebook. The highest level of pollutant emissions was recorded in 2017, to be exact 191714,5 Megatons. In this article we analysed 5 categories of pollution sources: Cars, Vans and transport trailers, Heavy vehicles, Motorcycles and Non- Road vehicles and other mobile equipment. From the point of view of the amount of

emissions CO_2 , NOx and PM_{10} are the main pollutants resulting from road transport, and cars are the main source of pollution.

MODIFICĂRILE POSIBILE ALE TEMPERATURII ȘI PRECIPITAȚIILOR ÎN SECOLUL XXI ÎN REPUBLICA MOLDOVA

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Începând cu anii 80 al secolului trecut se observă o creștere a temperaturii medii globale, care sa extins și în secolul XXI. În aspect global, practic în fiecare an, temperatura medie anuală este mai mare decât în anul precedent. Aceste procese sunt prezente și la nivel regional și local. Pentru diminuarea consecințelor negative ale schimbării climei este necesar de a evalua aceste modificări în viitor în anumite intervale de timp prin utilizarea modelelor climatice globale (GCM) și a diferitor scenarii

În acest studiu au fost utilizate materialele Raportului AR5 al Comisiei Interguvernamentale pentru Schimbări Climatice (IPCC, AR5, Annex 1: Atlas of Global and Regional Climate Projections + Supplementary Material). Perioadă de referință include anii 1986-2005, iar anomaliile (diferențele) posibile ale temperaturii și precipitațiilor în Republica Moldova în perioadele 2016-2035, 2046-2065, 2081-2100 au fost estimate utilizând 4 scenarii a căilor reprezentative a concentrației (RCP2.6, RCP4.5, RCP6.0 și RCP8.5 W/m2). Distribuțiile spațiale în perioada de referință ale temperaturilor medii sezoniere și anuale și ale precipitațiilor medii anuale și în perioadele calde și reci au fost modelate utilizând metoda ecuațiilor de regresie și distribuția spațială a reziduurilor. Rezultatele sunt prezentate împreună ca hărți pentru fiecare RCP și utilizând aceeași legendă pentru fiecare tip de interval sezonier.

Analiza creșterii temperaturii medii ΔT în secolul XXI în Republica Moldova față de perioada de referință conform scenariilor și sezoanelor enumerate arată că ΔT în cazul RCP2.6 crește slab până în anul 2065, apoi scade, atingând valori anuale și sezoniere în anotimpurile de iarnă, primăvară, vară și toamnă 1.36, 1.36, 1.20, 1,55 și 1.35°C corespunzător către anul 2100. În cazul RCP4.5 ΔT crește, dar cu tendințe de stabilizare cu valori anuale și sezoniere 2.51, 2.53, 2.28, 2,83 și 2.43 °C în anul 2100. Trendul ΔT în cazul RCP6.0 este linear cu valori anuale și sezoniere corespunzătoare 3.14, 2.94, 2.75, 3.65 și 3.22°C în anul .2100.

În cazul scenariului RCP8.5 ΔT crește accelerat. În anul 2100 ΔT va atinge valori 5.08, 4,89, 4,26, 6.12 și 5.04 °C. Cantitatea medie anuală de precipitații va crește către anul 2100 conform scenariilor RCP2.6 și RCP4.5 cu 17 și 6,9 mm, dar va scădea conform RCP6.0 și RCP8.5 cu 8,9 și 34,9 mm corespunzător. În perioada rece a anului precipitațiile vor crește cu 6-13 mm, iar în perioada caldă vor crește cu 12,3 mm numai conform scenariului RCP2.6, dar vor descrește cu 43 mm (RCP8.5). Studiul a fost efectuat în cadrul proiectului 20.80009.7007.08 „Modelarea spaţio-temporală a factorilor abiotici de mediu pentru estimarea stabilității ecologice a peisajelor”.

MICRORELIEFUL PSEUDOCARSTULUI ANTROPIC CONTEMPORAN (I). STUDII DE CAZ DIN NORD-ESTUL ROMÂNIEI

Viorel PARASCHIV

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Definirea procesului carstic pe structurile antropice este diferită de la un autor la altul, demonstrând faptul că este destul de puțin cercetat și argumentat științific geografic, deocamdată, iar termenul care să fie acceptat de cercetătorii domeniului generează ambiguități științifice. Paraschiv (2008, 2015) a denumit produsele rezultate din procesele carstice de pe construcțiile din beton cu armătură metalică drept antropocarst sau carst antropic. Bîra (2016) le-a denumit procese carstice în structurile antropice din beton pornind de la determinările lingvistice citate de bibliografia internațională, adică pe - disoluția cimentului din structurile de rezistență ale construcțiilor - realizate din agregate minerale, ciment și apă. Condițiile de formare ale acestui tip de microrelief sunt dintre cele mai diverse, în corelație directă și în funcție de parametrii mediului, naturali sau antropici, individual sau asociați și mai ales sezonier în funcție de gradul de poluare a aerului. Petrișor (2016) explică cauzal tipurile severe de degradare a constucțiilor pe fondul poluării prin: patină, fisuri mecanice, chimice și degradare preexistentă, fluorescență, cruste și plăci de exfoliere Pe baza studiului bibliografic îndelungat, de cca 15 ani, am căutat să explicăm și să stabilim legitățile care stau la baza formării antropocarstului. Observațiile de teren din numeroasele vizite internaționale de pe toate meridianele lumii (Paris, Roma, Veneția, Viena, Amsterdam, Maputo, Veracruz, Ciudad de Mexico, Cancun, Sankt Petersburg, Moscova, Vladivostok, Irkutsk, Trondheim, Oslo, Malmî, Istanbul ș.m.a.) ne-au determinat să explicăm un posibil algoritm de

evoluție recentă a antropocarstului urban. Imaginile culese din orașul Iași și împrejurimile acestuia, precum și cele din țară, se constituie în mini-studii de teren cauzale care confirmă teoriile existente oferind date noi asupra extinderii fenomenului la scară generală și mondială, dar și a importanței studierii acestuia.

MAIN CLIMATOLOGICAL FEATURES OF UV RADIATION IN EUROPE

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The main purpose of our study is to highlight at european scale the regions and the time intervals in which the UV quantity is healthy for human organism, but also those time intervals in which the UV radiation is harmful for human health. The data used in this study is extracted from the Tropospheric Emission Monitoring Internet Service (Temis), which is hosted by the Royal Netherlands Meteorological Institute, for the entire European continent, for the period 2003-2019.
Our analyze is based on the statistical processing and also on the cartographical processing of these data. The maps of UV monthly mean at local noon at European region provide an overview looking at the regional variability of UV index, and also the anomalies from some regions. Likewise, to understand the regional differences there were selected forty-six different locations to show the difference latitudinal and altitudinal effects over the UV index in the European region. For every selected location is established a significant rising of UV index over the spring and the early months summer.
Although North European region receives the smallest quantity of UV radiation, this region has the most incidence of skin cancer among European population, according World Health Organization. For instance, at Sodankyla station, located in Northern Finland, the harmful UV interval is missing completely and the healthier UV interval for human organism is very short, beginning with the second half of April until August, in comparison with Penhas Douradas station, from Portugal where the interval of harmful UV radiation is considerably bigger: beginning from May until the beginning of September with a quantity of over 8Kj/m2 of UV radiation at local noon. At the same time for Penhas Douradas station the healthy UV interval for synthesis of vitamin D at the

skin level is big: beginning with the second half of January until the beginning of November.

REALIZĂRI ȘI PROBLEME ÎN DEZVOLTAREA SISTEMELOR DE APROVIZIONARE CU APĂ ÎN LOCALITĂȚILE URBANE ȘI RURALE DIN REGIUNEA DE NORD A REPUBLICII MOLDOVA.

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Rezultatele cercetărilor prezentate în acest rezumat fost obținute în cadrul etapei a II-a (2021) a Proiectului instituțional aplicativ „Evaluarea stabilității ecosistemelor urbane și rurale în scopul asigurării dezvoltării durabile" implementat de Institutul de Ecologie și Geografie.
Aprovizionarea suficientă cu apă potabilă calitativă a populației reprezintă unul din obiectivele principale ale dezvoltării durabile regionale. În pofida regimului pluviometric mai favorabil, resursele de apă disponibile ale Regiunii de Dezvoltare (RD) Nord a Republicii Moldova sunt valorificate insuficient atât în scopuri menajere, cât și în scopuri agricole sau industriale. Acest fapt se datorează, cu precădere, capacităților actuale reduse de captare și distribuție a apei, în special din râurile Nistru și Prut, debitelor reduse ale celorlalte râuri și ale surselor subterane, în special din proximitatea complexelor hidroenergetice de pe râurile Nistru și Prut.
În anul 2019, în RD Nord funcționau 293 sisteme publice de aprovizionare cu apă, inclusiv 26 ÷ în mediul urban și 267 ÷ în mediul rural. Numărul și lungimea apeductelor publice, precum și volumul de apă furnizate de acestea diverselor categorii de utilizatori, sunt condiționate atât de de numărul și dimensiunile localităților componente, în special a celor urbane, care dispun de apeducte funcționale extinse, precum și de rezervele disponibile de apă din surse subterane sau de suprafață și capacitățile tehnico-financiare de exploatare a acestora.

Lungimea totală a apeductelor publice în regiunea de studiu este de cca 3,5 mii km, inclusiv 2,4 mii km (69%) în localitățile rurale și 1,1 mii km (31%) – în mediul urban. În anii 2010-2019, acest indicator s-a majorat de de 1,7 ori sau cu cca 1,4 mii km, inclusiv în mediul rural – de 3,7 ori sau cu 1762 km. În prezent, cele mai extinse apeducte se atestă în raioanele Florești (535 km), Râșcani (454 km) și Sângerei (417 km) situate în proximitatea municipiului Bălți și conectate parțial la apeductul magistral Soroca-Bălți. Lungimea minimă a apeductelor se constată în raioanele

Ocnița (63,7 km) și Dondușeni (97,8 km) cu dimensiuni mai mici și cu un număr redus de localități conectate la apeductele publice. Extinderea conexiunilor la apeductelor magistrale Soroca-Bălți, Prut-Fălești, Prut-Glodeni și Prut-Edineț va impulsiona construcția apeductelor publice în aceste raioane și va majora cererea pentru apa captată din râurile Nistru și Prut.

Mai puțin de jumătate (47%) din populația RD Nord are acces la apeductele publice, inclusiv 82% în mediul urban și doar 29% în mediul rural. Accesul maxim se atestă în municipiul Bălți (82%), precum și în raioanele Râșcani (69%), Sângerei (53%) și Fălești (45%), iar accesul minim – în raioanele Ocnița (21%), Briceni (25%) și Dondușeni (26%). În mediul rural accesul minim se atestă, de asemenea, în raioanele Ocnița (0%), Briceni (15%), Soroca (17%) și Dondușeni (19%).

Circa 7,5 mil. m^3 (70%) din apa furnizată este destinată consumatorilor din mediul urban, inclusiv 4,3 mil. m^3 (40%) – în municipiul Bălți. De asemenea, volume mari de apă sunt livrate în raioanele Soroca (937 mii m^3), Florești (794 mii m^3), Râșcani (786 mii m^3) și Sângerei (728 mii m^3). Volumul minim a fost furnizat în raioanele mai mici și cu un nivel de acces redus la apeductele publice, inclusiv în raioanele Ocnița (151 mii m^3), Briceni (333 mii m^3) și Glodeni (422 mii m^3).

În pofida extinderii rapide a rețelelor de aprovizionare cu apă, consumul de apă per capita este redus și constituie doar 69 litri/zi, inclusiv 81 litri/zi în mediul urban și 52 litri/zi în mediul rural, ceea ce este de cca 2 ori mai puțin decât normativul consumului de apă pentru populație.

RESILIENCE CAPACITY AND PERFORMANCE IN EUROPEAN CONTEXT. INSTITUTIONAL DIMENSION

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The analysis of resilience capacity, from an institutional perspective, involves the identification of specific elements, which adapt relatively quickly to disturbing circumstances. As a result, the extent to which attention is paid to the major role of rules in society is what determines the degree of resilience of territories. Usually, high institutional quality is associated with an ability to absorb shocks more easily, while institutional fragility is correlated with low resistance to vulnerabilities. In order to act towards the construction of effective institutional arrangements, there are necessary: time, cooperation and costs. Based on these premises, the resilience of institutions and the resilience of the governance systems in

the European Union were calculated, both at the national and regional level, by capturing two periods (resistance period versus recovery period).

PARTICULARITĂȚILE CAPTĂRII ȘI UTILIZĂRII RESURSELOR DE APĂ ÎN MUNICIPIUL BĂLȚI

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Scopul prezentului studiu constă în analiza utilizării resurselor de apă pe activități social-economice, identificarea problemelor principale privind valorificarea și gestionarea resurselor de apă în municipiul Bălți - centrul administrativ al Regiunii de Dezvoltare Nord a Republicii Moldova. Rezultatele cercetărilor prezentate în acest studiu au fost obținute în cadrul Proiectului instituțional aplicativ "Evaluarea stabilității ecosistemelor urbane și rurale în scopul asigurării dezvoltării durabile" implementat de Institutul de Ecologie și Geografie.

Municipiul Bălți este amplasat în Regiunea de Dezvoltare Nord a Republicii Moldova, are în componența sa 2 comune: Sadovoe și Elizaveta. Suprafață totală a mun. Bălți este de circa 78 km^2 și 128 mii locuitori sau 14% din populația regiunii. Municipiul Bălți este amplasat în limitele bazinului hidrografic al fluviului Nistru, fiind traversat două râuri: Răut și Răuțel, pe o lungime de 21,4 km. Rezervele de apă subterană explorate în municipiu sunt de 89,3 mii m^3/zi, din care circa 64% este apă potabilă. Totodată, din cauza calității reduse a apelor subterane și costurilor mari de tratare a acestora, a fost construit apeductul magistral Soroca-Bălți, care a permis aprovizionarea municipiului cu apă potabilă de calitate bună captată din albia fluviului Nistru și la costuri operaționale mult mai reduse. În prezent din surse subterane se alimentează doar unele întreprinderi și organizații care dispun de sonde proprii și rezerve de calitate bună.

Conform datelor Inspectoratului pentru Protecția Mediului, în municipiul Bălți se utilizează, în medie, 4,8 mln. m^3 de apă, din care 69% este destinată pentru necesități menajere. Cel mare furnizor de ape menajere este întreprinderea Municipală "Regia Apă-Canal" Bălți, care prestează serviciile publice de aprovizionare cu apă și sanitație. Pentru producere s-a utilizat un volum de 1,5 mln. m^3 de apă (31%), dintre care cea mai mare parte este livrată, de asemenea, la întreprinderea municipală menționată. Pe poziția secundă se află industria alimentară, care utilizează pentru producere 381 mii m^3 (25%), iar pe poziția a treia - sectorul

termoenergetic, cu 264 mii m^3 (17%), în special la Centrala Termoelectrică SA"Cet-Nord".
În perioada analizată, se atestă o tendință negativă a volumului total de apă utilizată (25% sau cu 1,4 mln. m^3), condiționată de reducerea multiplă (de 3,5 ori) a volumului de apă utilizat pentru producere. În același timp, volumul de apă utilizat pentru necesități menajere s-a majorat cu peste 600 mii m3 (20%), ca urmare a extinderii apeductelor și evidenței mai complete.

ANALIZA ECONOMICO-FINANCIARĂ A SERVICIILOR DE APROVIZIONARE CU APĂ ÎN AȘEZĂRILE URBANE DIN REGIUNEA DE DEZVOLTARE NORD A REPUBLICII MOLDOVA

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Rezultatele cercetărilor prezentate în această lucrare au fost obținute în cadrul etapei a II-a (2021) a Proiectului instituțional aplicativ "Evaluarea stabilității ecosistemelor urbane și rurale în scopul asigurării dezvoltării durabile" implementat de Institutul de Ecologie și Geografie. În perioada anilor 2010-2019, veniturile din furnizarea apei, în așezările urbane ale Regiunii de Dezvoltare (RD) Nord a Republicii Moldova, au constituit în mediu ~8,1 mil. MDL și au crescut de cca 1,3 ori. Cea mai mare creștere a veniturilor provenite din servicii de aprovizionare cu apă se atestă în orașul Ocnița (~4,9 ori), unde consumul mediu de apă per locuitor a sporit de ~6,4 ori. Iar cea mai mică creștere a veniturilor din servicii de livrare a apei, se înregistrează în orașul Edineț (~1,1 ori), unde consumul mediu per locuitor s-a majorat de ~1,2 ori. Tariful mediu al serviciului de aprovizionare cu apă, în regiunea de studiu, constituie 15,8 MDL/m^3 și s-a majorat de ~1,3 ori. În orașul Glodeni se înregistrează cel mai mare tarif mediu la alimentare cu apă (20,5 MDL/m^3), iar cel mai mic tarif mediu la acest tip de serviciu se atestă în orașul Sîngerei (10,8 MDL/m^3). Costul mediu la 1 m3 de apă livrată, în RD Nord este cca 16,5 MDL/m^3 și a crescut mai accelerat decât tariful mediu, sporind de ~2,1 ori. În orașul Florești se înregistrează cel mai mare cost mediu la servicii de livrare a apei, dar cel mai mic cost mediu al serviciului de furnizare a apei, a fost determinat în orașul Sîngerei. Diferența dintre tarif și cost la servicii de alimentare cu apă, în perioada anilor 2010-2019, în RD Nord, este negativă și constituie -0,7 MDL/m^3. Acest fapt se datorează intensificării

proceselor inflaționiste și majorării semnificative a prețurilor de achiziție la energie și materialele necesare prestării serviciilor de aprovizionare cu apă, dar și neajustării tarifelor respective.

ROCLIB - BIAS CORRECTED CORDEX RCM DATASET OVER ROMANIA

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In this study, we present a bias corrected climate gridded data set over Romania's territory. Our data sets consist of 10 Regional Climate Models (RCMs) from Coordinated Downscaling Experiment-European Domain (EURO-CORDEX) forced by five general circulation Models (GCMs), two scenarios, four variables, at a daily temporal resolution with ~10 km spatial resolution. Two bias correction methods were used: quantile mapping (QM) and Multivariate Bias Correction with N-dimensional probability (MBCn) were evaluated for historical data (1971- 2005) following a 2-fold cross-validation approach. Thus, it was found that regardless of the climatic scenario, for the temperature data both categories applied methods obtain similar results, with the mention that MBCn method corrects better the extreme negative values. The analysis of the precipitation data revealed an obvious differentiation between the results of the two categories of methods, the data calibrated with the multivariate method having statistical properties closest to those of the reference data.

Additionally, based on the MBCn adjustment outputs, we present the future climate change signal at the seasonal and annual scale. Overall, a positive signal was resulted for air temperature and precipitation. During the winter, both scenarios show an increasing in precipitation amount (>30%) and a continue augmentation of temperature at the end of the century (>4ºC). Regarding the spatial patterns, for air temperature, the eastern, southern and northeastern part are expected at the highest temperature changes, and for precipitation, the central part is expected to become more wet, meanwhile the southwestern and the southeastern small parts will have long dryer periods.

Also, our results confirm the importance of the bias correction method for the RCMs.

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FRAMEWORKS FOR DESIGNING SUSTAINABLE ENERGY SUPPLY SYSTEMS ON REGIONAL LEVEL

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Environmental degradation alongside climate change poses threats to both Europe and the planet. In this context, EU Member States have taken initiative and completed the roadmap for the European Green Deal to achieve sustainable economies, wanting to set an example for all other countries in the world. The European Union aims to become climate neutral by 2050 by eliminating greenhouse gases, with achieving this ambitious objective of paramount importance.
The European Green Deal wants to be a plan to transform the Union into a fair, healthy, sustainable and prosperous society, but also to restore the way man interacts with nature, is an open, inclusive and evolving initiative to combat climate change. It calls on regions, local communities, industry, schools and civil society to share information on climate change and environmental degradation, as well as how they address these existential threats. Actions under the European Green Deal aim to reduce pollution and restore biodiversity but also to stimulate resource efficiency and the transition to a circular economy. They are needed in all branches of the economy by proposing, among other things, investments in green technologies and innovation, as well as decarbonization of the energy sector. This last aspect concerns the large producers of conventional electricity and heat, which are currently strongly anchored in the supply of energy in particular by burning fossil fuels (lignite, brown coal or coal) in thermal power plants. It is known that greenhouse gases, including carbon dioxide, are found in the

emissions produced by coal combustion. If for SO2 and NOx emissions solutions for their retention have been implemented by installing combustion gas desulphurization and denitrification plants, for CO2 and CO there are yet no efficient solutions, as there is currently no BAT regulation at European or global level. In these circumstances, energy producers will have to look for solutions to adapt to the requirements of the European Union, to provide as clean energy, using as few fossil fuels as possible. The vision is to get neutrality in terms of greenhouse gas emissions until 2050.

Identifying solutions by which fossil fuel based energy producers can diversify their portfolio of alternative resources is a challenge for them as well as for the regions in which they operate, given that large masses of people work in this type of industry, these areas being often mono-industrial ones. Co-opting in the energy production basket technologies based on renewable resources, as photovoltaic plants, that can be located on land, free of technological loads belonging to the energy processor, is one of the solutions nowadays considered to be sustainable ones. Thus, the ecological footprint is reduced and by this the overall environmental impact.

THE ASSESSMENT ALGORITHM FOR SUSTAINABLE DEVELOPMENT GOALS IN THE HUKIV, DERELUY, AND VYZHENKA RIVER BASIN SYSTEMS OF CHERNIVTSI OBLAST

Serhii KYRYLIUK

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The study deals with an integral assessment of hydromorphological and geoecological conditions of the Hukiv (flatland type of river), Dereluy (foothill type of river), and Vyzhenka (mountainious type of river) river basin systems. The indicators characterizing the river basin in the best way as a holistic system, the channel, floodplain, and watershed altogether, in natural reference conditions and in terms of human economic activity are addressed.

The assessment hydromorphological test and geoecological monitoring of small rivers (SWOT-analysis) in accordance with the developed universal algorithm for hydromorphological assessment of small river basins for the sustainable development goals are generated and fulfilled. Interpretation maps for the sustainable development of the Hukiv, Dereluy and Vyzhenka rivers are created. The practical importance and relevance

concerns the potential application of the proposed monitoring and the algorithm to solve methodological and applied problems related to the functioning of the systems "basin-river-human" and "basin-river-riverbed" in terms of modern human activity and needs; the need to modify consumer-type stereotypes for the use of natural resources, as well as to provide recommendations for enhancing the resource-efficient and sustainable activities in basin systems and small rivers.

Previous studies in the field and relevant mathematical calculations contributed to developing an algorithm for the ecological and hydromorphological assessment of basins for the sustainable development goals. The latter enables to critically delimit the river basins areas according to the need for sustainable development. The diverse indicators forming its basis characterize small river basins in various ways. The algorithm operation principle is the sequential summation of indicators of individual blocks: transformation of the river network (by length and number of tributaries of different order), anthropogenic transformation, conflicts of the nature use types (quantitative, dynamic indicator and intensity), erosion hazard, floodplain assessment (in response to the land use type), the riverbed processes hazards, hydromorphological assessment of the riverbed state and coastal vegetation (according to the quality classes), the assessment of land use and the degree of the basin territory study. The points of the algorithm blocks are arranged in an ascending order in relation to the component intensity of the block. The minimum possible number of points is 14, the maximum is 57. This algorithm may be considered universal in relation to the assessment of the hydrological factor of the natural environment not only in the study areas, but also in the similar ones. The algorithm does not consider the economic and social components of potential sustainable development.

The algorithm enables to identify specific problems in the functioning of the system "riverbed-floodplain-basin-human" and respond in a timely manner to these challenges, minimizing the influence of the factor from the outside or inside. The work involves constant monitoring of indicators and, if necessary, mapping of the possible development ways for the timely response measures.

CHARACTERISTICS AND MOBILITY OF DISSOLVED ORGANIC CARBON AND TRACE METALS IN THE GANGES-BRAHMAPUTRA RIVER, BANGLADESH

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The Ganges and Brahmaputra rivers in Bangladesh play a fundamental role as a source of organic matter and carbon to the sea. Sources and characteristics of dissolved organic carbon (DOC) and three trace metals arsenic (As), Iron (Fe), and Manganese (Mn) were investigated in these two rivers and their confluence round a year. In monthly collected water samples, DOC varied from 1.58 to 3.09 (mg/L) for Ganges, from 0.76 to 3.52 (mg/L) for Brahmaputra and from 0.91 to 2.8 (mg/L) for confluence and the average DOC value of the Ganges, Brahmaputra and confluence were 1.914 (mg/L), 1.599 (mg/L) and 1.4 (mg/L) respectively. Organic matters transported through these two rivers had a good relation to the water discharge pattern. Analytical result of trace metals analysis indicated that As concentration varied from 0.03794 to 0.776 mg/L for the Ganges, 0.0793 to 0.4012 mg/L for the Brahmaputra and 0.3866 to 1.9162 mg/L for confluence and the average arsenic (As) concentration of the Ganges, Brahmaputra, and confluence were 0.5588 mg/L, 0.2079 mg/L, and 0.8278 mg/L respectively. Fe concentration varied from 2.15 to 7.5 mg/L for the Ganges, 1.32 to 10.23 mg/L for the Brahmaputra and 2.87 to 9.17 mg/L for confluence, and the average Fe concentration of the Ganges, Brahmaputra, and confluence were 4.57 mg/L, 5.187 mg/L, and 5.188 mg/L respectively. Mn concentration varied from 0 to 10.8 mg/L for the Ganges, 0 to14.4 mg/L for Brahmaputra and 0 to 13.7 mg/L for confluence and the average Mn concentration of the Ganges, Brahmaputra, and confluence were 3.95 mg/L, 3.46 mg/L, and 4.49 mg/L respectively. Mn transportation and concentration variation did not follow any specific trend or pattern. But As and Fe transportation and concentration showed little relations with water discharge pattern. Based on the monthly data of trace metals and DOC, it is realized that the sources and transportation of trace metals and DOC depend on monsoon seasonal dynamics, land use patterns, and biogeochemical processes. Although the water of these two major rivers is not heavily polluted, concerned authorities should take proper steps for better management and monitoring for sustainable use.

RESURSELE DE APĂ A RÂURILOR MICI DIN CADRUL REGIUNII DE DEZVOLTARE NORD A REPUBLICII MOLDOVA

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Resursele apelor de suprafață din cadrul Regiunii de Dezvoltare Nord sunt reprezentate de râuri și acumulări de apă. Principalele râuri sunt cele mari: Nistru și Prut. Acestea însă sunt situate la frontiera de Vest și Est a regiunii. Râurile interne devin a fi mai importante in condițiile distanțării de resursele de apă principale către interiorul regiunii. Prezenta cercetare are drept scop evaluarea resurselor de apă a râurilor mici și medii din cadrul Regiunii de Dezvoltare Nord (RDN). În cadrul bazinului hidrografic Nistru din limitele RDN principalul râu intern este Răut (161 km in limitele RDN), afluenții săi fiind Cubolta (110 km), Căinari (100 km), Ciulucul Mare (45,6 km in limitele RDN). Râuri mai mici sunt Camenca (36,6 km) și Soloneț (43 km). În limitele bazinului hidrografic Prut afluenții principali sunt Camenca (113 km), Ciuhur (80,8 km), Racovăț (69 km), Vilia (33,8 km in limitele RDN). Monitorizarea râurilor se efectuează din anii '60-70 ai secolului trecut asupra scurgerii râurilor Răut, Cubolta, Căinari, Vilia, Draghiște, Ciuhur. Râul Răut are un debitul mediul al apei de 1,46 la postul Bălți, afluenții acestuia Cubolta și Căinari - 1,65 m3/s (post Cubolta) și 1,29 m3/s (post Căinari). Stratul scurgerii râurilor se încadrează în limitele 43-60 mm, iar volumul 41-52 mil.m3. În bazinul Prut, cel mai mare râu este Camenca, care însă nu este supus monitorizării. Râul Ciuhur este monitorizat in partea superioară a acestuia, debitul fiind evaluat la 0,28 m3/s (post Bîrlădeni). Valorile debitului râului Vilia și Draghiște se ridică la 0,59 m3/s (post Bălășinești) și 0,45 m3/s (post Trinca). Volumele de apă ale râurilor din bazinul Prut cuprind valori intre 4,4 - 19 mil.m3, stratul scurgerii fiind mai mare: 55-71 mm Dinamica scurgerii de apă a râurilor medii și mici din bazinul Nistru este caracterizată prin tendințe de scădere a scurgerii râurilor Cubolta și Răut, pe de altă parte trendul hidrografului debitelor medii anuale a râului Căinari, a cărui șir de date este mai lung, nu prezintă variații de creștere sau descreștere. Tendințele scurgerii de apă a râurilor din bazinul râului Prut, sunt în ușoară creștere în cazul râului Vilia, și în scădere pentru Draghiște, Ciuhur, Căldărușa. În cadrul evoluției temporale a scurgerea de apă a râurilor medii și mici se observă perioade cu debite mai mari precum și mai mici. Volume mai mari de apă se observă în anii '70 și '80 și 2000. Valori mai mici au fost înregistrate în anii '60, '90 precum și din 2010 până în prezent. Analiza scurgerii lunare

arată că cele mai importante resurse de apă se formează în perioada de primăvară urmată de cea de vară. Cele mai mici resurse se formează toamna și iarna. Schimbările climatice din ultimele decenii au determinat reducerea resurselor de apă, evidențiindu-se lunile martie-iulie. În sezonul rece modificări semnificative ale debitelor de apă nu se observă.

HAILSTORM RISK ASSESSMENT FOR CROP AREAS IN MOLDOVA REGION

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Estimating the impact of hail on agricultural land is needed in order to streamline damage reduction methods. In this regard, hail risk maps were prepared for the region of Moldova for the main types of crops (wheat and rye, corn, potato, sugar beet, sunflower, vegetables, orchards and vineyards). The methodology that we used consists in determining the risk map, as the product between the hazard map (average annual number of days with hail), the exposure map (agricultural crop value) and the vulnerability map (the percentage occupied by a certain agricultural crop in the administrative units). The areas with high risk for wheat and rye crops are in the southwest of the studied region, the communes from Dealurile Fălciului and the hilly and depression area between Moldovei valley to the north, Bistrița valley to the south and Culoarul Siretului to the west. For the maize crop, the areas where the level of risk is highest are those in the Siret Corridor, Tazlău-Cașin Depression, Tutova Hills and the Tecuci Plain. In the case of sugar beet, the regions with medium and high-risk level are in the Suceava Plateau, the Neamț Depression, the Cracău-Bistrița Depression and the Siret Corridor between Bacău and Pașcani. For potato cultivation, in most areas of Suceava and Neamț counties the level of risk is very high. The hail risk map for vegetables clearly indicates that the areas in which vegetables are intense cultivated are the most exposed. The first area with the most administrative units included in the high-risk class is Matca-Ghidigeni from Galati county and those from the south and east of Vrancea county. Other areas with medium and high risk are located in the west and northwest of Iași County (Târgu Frumos-Pașcani area), the Cracău-Bistrița Depression and the Siret Corridor between Roman and Bacău. In the case of vines, the highest risk level is characteristic of the wine-growing areas of Vrancea

(Panciu-Țifești-Odobești-Cotești), Galați (Nicorești-Ivești and Dealul Bujorului), Vaslui (Huși Vineyards and Dealul Fălciului) and Iași (Iași area -Răducăneni and Cotnari Vineyard). For fruit tree plantations, the areas with high and medium risk are larger than in the case of vineyards and scattered over the entire studied area. Areas from Dealul Mare-Hîrlău and the Fălticeni Plateau can be noticed for the northern part and from most of the central region (Corni-Runcu Peak, the Moldavian Central Plateau and the Bârlad Plateau). In the southern part, a higher degree of risk is also maintained in the administrative units with the vineyards of Vrancea and Galați, on the administrative territory of Galați Municipality and of the neighboring communes.

DREPTUL OMULUI LA CLIMĂ STABILĂ ÎN CONTEXTUL PROBLEMELOR DE MEDIU GENERATE DE SCHIMBĂRILE CLIMATICE

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Având în vedere faptul că evoluția climei îngrijorează și preocupă întreaga umanitate, în ultimele decenii s-a pus tot mai pregnant problema constituirii și dezvoltării unui nou concept juridic, având ca element central dreptul fundamental al omului la climă stabilă.

Pe plan legislativ sunt de evidențiat, ca repere fundamentale, câteva documente internaționale în domeniu: Convenția-cadru privind schimbările climatice (1992); Protocolul adițional de la Kyoto (1997); Acordul de la Paris (2015). La acestea trebuie adăugate Pactul verde european (2019), prin care Uniunea Europeană s-a angajat să atingă neutralitatea climatică până în 2050 și Legea europeană a climei (2020), cu privire la aceasta din urmă Consiliul UE și Parlamentul european ajungând în luna mai a acestui an la un acord provizoriu privind cadrul privind legislația Uniunii Europene în domeniul climei pentru următorii 30 de ani.

În acest context legislația privind clima va garanta că toate politicile Uniunii Europene vor contribui la obiectivul neutralității climatice și, implicit, la respectarea dreptului la o climă stabilă. Totodată, având în vedere importanța legăturii dintre climă și toți factorii naturali ai mediului, inițiativele politice și legislative vor contribui la menținerea sau îmbunătățirea biodiversității, precum și la protejarea și refacerea ecosistemelor.

LIVESTOCK AND LAND USE IN ROMANIA - SPATIAL STRUCTURES

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Social incidents, including riots, related to food shortages in the last decade, as well as increasing environmental entropy are elements that describe the fundamental dilemma of present civilization, namely the resolution of tensions between accelerated socio-economic dynamics and the qualitative/quantitative degradation of natural resources. In this context, our communication provides a radiography of the pressure exerted by the livestock on the surfaces occupied by pastures in Romania. The main difficulty in performing the analysis comes from the lack of relevant statistical information. In order to frame the phenomenon as accurately as possible, we used several data sources: CLC 2018 and INS for the land use, INS (including RGA/GAC - General Agricultural Census 2010) and ANSVSA/NSVFSA-National Sanitary Veterinary and Food Safety Authority for livestock. The results obtained are rather indicative, given the considerable differences between the statistical series, concerning both the evolution of land use categories and the dynamics of livestock. Despite these differences, the analysis shows the existence of spatial regularities, which can serve as a support for the administrative decisions of local, county or national authorities.

SCHIMBARILE CLIMATICE ÎNTRE STRATEGII ȘI EFECTE

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Schimbările climatice determină recesiuni economice, migrații sau, integrând, afectează sănătatea umană, bunăstarea și viața pe pământ. În viitorul apropiat, aceste modificări ale climei vor determina o amplificare a problemelor actuale de sănătate și vor presupune noi riscuri și presiuni pentru mediu și factorii determinanți, sociali și economici ai sănătății.Strategianațională privind schimbările climatice a fost o preluare a Strategiei Uniunii Europene fără a se plia pe particularitățile naționale. Uniunea Europenaă a lansat o nouă Strategie privind schimbările climatice ca urmare a costurilor pe care le presupun efectele schimbărilor

climatice (prezente din ce în ce mai activ în viața oamenilor) și România se va mobiliza să realizeze o nouă Strategie Națională pentru schimbări climatice. Ce ar trebui să conțină noua Strategie? Care ar trebui să fie rolul acestei Strategii și cum ar trebui să fie consideratele efectele actuale și viitoare ale schimbărilor climatice sunt teme la care această lucrare încearcă să răspundă.

QUANTITATIVE TOOLS TO ASSESS CLIMATIC IMPACT ON ENERGY CONSUMPTION. CASE STUDY: BUCHAREST TOWN AREA.

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In the context of ongoing climatic changes, with rising air-temperature values, it is imperative to find most convenient and efficient ways to reduce greenhouse gas emissions as much and fast as it is possible. Among the basic principles in this respect, as stated in the Sustainable Development Goals (SDGs) by the UN in 2015, together with the EU objective to cut CO2 emissions by 55% until 2030, to use existing local resources wisely and to exploit new renewable or alternative energies are very important, calling for immediate action in all domains of activity. Obviously, each country and community will have to choose its own best way to tackle the problem, depending on the climatic conditions prevailing in certain areas and periods of time. Any thorough analysis of existing climatic conditions, especially referring to air-temperatures values and variations, may be very important and useful tools to assess the energetic needs for various uses, but especially for heating or air-conditioning energy requirements. Starting from this premises, this study first revises what are the specific quantitative climatic tools to assess the energy demands for indoor heating or air-conditioning, depending on certain thermal standards being used in applied (technical) climatology and bioclimatology, and then shows how such climatic tools may properly be used for objective energy assessments. More specifically, by starting from hourly and daily air-temperature values being recorded in Bucharest city during 1981-2010, this study makes an inventory of the most relevant thermal indices (such as heating degree-days and cooling degree-days) that may be used in technical climatology assessments, showing what are

the most important reference and critical values that should be taken into consideration for optimal energy savings.

IMPORTANȚA INTEGRĂRII MĂSURILOR DE MANAGEMENT ȘI A OBIECTIVELOR DIN PLANURILE DE MANAGEMENT ALE ARIILOR NATURALE PROTEJATE, ÎN PLANURILE DE URBANISM ȘI AMENAJARE A TERITORIULUI

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The urban and agricultural activities expansion, uncontrolled tourism, poaching, hunting, fishing and overgrazing, are just some of the human activities that lead to natural habitats reduction.
The Natural Areas Management Plans contain a series of management measures and objectives such as:

- the management of biodiversity;
- the management of natural resources;
- information, awareness and ecological education;
- monitoring and evaluation.

The national legislation demands the integration of the above measures and objectives into all urban planning and territorial development strategies, but at the present very few localities have applied the law.
The aim of this paper is to prove that this integration is essential for a sustainable development of the communities and biodiversity conservation.

THE SOCIO-SPATIAL TRANSFORMATION OF URBAN LANDSCAPES

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"Landscape" refers to a part of a territory as perceived by people, whose character results from the action of natural and/or human factors and their interrelations. Since about forty years, an awareness of the environmental problems develops in our urbanized societies. If the preoccupations are then more ecological, they are posed more and more in terms of landscape from the 80's during which an awareness of landscape issues begins.
Thus, the landscape is not only a banal arrangement of objects, but it is a construction specific to each individual, according to a perceptive model elaborated by his personality, his culture, his civilization in which he

lives. It is these various representations joined together which make emerge the idea of landscape. Men inherit a common cultural heritage that they share, and because they communicate between them, they structure this diversity of representations.
Our hypothesis is that this relationship could be the foundation of urban landscapes. In this perspective, we consider the urban landscape as a "relational phenomenon" with multiple dimensions and capable of unfolding over the long term with a spatial, societal, symbolic and common future.

TOXICITY AND MECHANISMS OF INDIVIDUAL AND MIXTURES OF HEAVY METALS IN THE ENVIRONMENT: A FISH PERSPECTIVE

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European Union's chemicals legislation is mainly based on evaluations of individual substances. As humans and the environment are exposed to an extensive array of substances, a public concern emerges about the potential adverse effects occurring from interactions among these substances when present simultaneously in a mixture. Currently, no consensus exists on how metals interact in mixtures, although the toxicity of metal mixtures has been extensively studied in the last five decades. Two mathematical models are commonly used to assess the ecotoxicological effects of mixtures: (1) the addition of concentration (CA) assuming a similar mode of action (MoA) of the individual compounds of a mixture and (2) independent action (IA) based on the premise of dissimilar MoAs. The rationale for this endeavour was to review the recent studies on the toxicity and corresponding mechanisms associated with lead (Pb), mercury (Hg), cadmium (Cd), and arsenic (As), individually and as mixtures.

THE CONCEPT "PHYSICAL FERTILITY" OF THE SOIL: THEORETICAL AND APPLICATIVE SUPPORT

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Despite the fundamental achievements of contemporary pedology in the interpretation of soil fertility, so far, the utilitarian approach predominates, its management being reduced only to measures for supporting the nutrient resources of the soils.

In this context, two models of soil fertility management were outlined: a) substrate-mineral based on mineral fertilization and b) pedo-biological based on the combination of mineral and organic fertilization in both physical factors being underestimated and neglected.

At the same time, starting with the second half of the 19th century, the concept of "physical fertility" of soils was developed, which was based on its approach through the prism of bioroutine soil organization (V.V.Dokuceaev, P.A.Kostâcev), developed in the first half of the 20th century (A.G.Doiarenco , V.R.Williams, V.I.Vernadschi), and later theoretically based on the research of N.A.Kacinschi, I.B.Revut, V.AK.ovda.

The mentioned researches contributed to the further examination of the anthropo-natural pedogenesis by applying the principles of Soil Physics, in particular, through the prism of the structural-functional organization processes of the pedosystem (Jigău, 2004 a, 2004 b, 2009). According to this concept, soil fertility is its feature to ensure the unidirectional realization of the processes of structural - functional organization of biopedoplasm and the achievement of basic soil functions: carbon - sequestrational, hydrological, hydrophysical, productive, self-organizing, self-regulating, self-conserving and self-reproducing.

The driving force of the processes of continuous structural-functional organization are the processes of humus formation and those of accumulation - stabilization - sequestration of organic carbon in the soil. In this sense, the basic function of the humification process assume the supply of newly-formed humic substances in the soil, whilst the basic function of humus assumet the aggregation - structuring of the biopedoplasm.

Through this prism of ideas, the soil fertility management ensures the simultaneous solution of the social-economic and environmental problems.

PROCESSES AND MECHANISMS PERFORMED IN THE FRAMEWORK OF ORGANIC CARBON SEQUESTRATION-STABILIZATION IN CHERNOZEMS WITH THE PARTICIPATION OF NITRO-FIXING *CYANOPHYTE ALGAE*

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It is unequivocally recognized that the algal flora in the soil, along with other groups of living organisms, is a component part of the process of aggregation-structuration of the soil mass. At the same time, however, its role is reduced only to the direct participation of algae in the sequestration-stabilization of organic carbon in structural aggregates.

In our more recent research (Jigău and co-authors, 2019 a, b, 2021) the role of cyanophyte algae in the sequestration-stabilization of organic carbon in soil is examined through the concept of the priority role of algae in the functioning of the soil microbiome. In the opinion of the cited authors, carbon sequestration-stabilization is the product of a complex of processes that are performed with the direct and indirect participation of nitrogen-fixing cyanophyte algae and involves several hierarchical structural-functional levels of integration of biotic and abiotic matter in the solification process.

The lower level involves the formation of bacterial-algal cenoses that are characterized by a single algal-bacterial trophic level.

The successive hierarchical level includes all the processes of intimate mixing of mineral colloids (‹0.2 μ) and living matter (billions of microorganisms) and is characterized by three trophic levels (consumer, sequestrational-consumer, sequestrational-resource-reproductive) and the formation of biopedoplasm / pedostructural matter. Within it, interacted and interdetermined processes of transformation of mineral and living matter are carried out (Zubcova, Karpacevschi, 2001).

The evolution of pedostructural matter is determined by the continuous passage of microbiotic living matter into the pedoplasm, after death, and the permanent formation of new masses of living matter based on mineral elements and energy resulting from the decomposition of minerals and organic matter gaining living matter attributes.

The subsequent evolution of the processes of sequestration-stabilization of organic carbon takes place within the mechanisms of structural-functional integration of soil-specific pedostructural matter at higher hierarchical levels:

- organo-mineral complexes (‹1 mKm) in the composition of which the humus is stably sequestered by the formation of compounds with clay minerals and oxides-hydroxides of iron and aluminum;
- ultramicroaggregates (‹5 mKm) formed by the association of organo-mineral complexes;
- microaggregates (‹0.25 mm) formed by the association of ultramicroaggregates and soil elementary particles.

Within these three groups of aggregate formations, the renewal of organic carbon occurs with a periodiciy from 100-300 years.

The hierarchical system "macroaggregate" involves 4 subsystems, quantitative, qualitative and functional different by indexes of sequestration and stabilization of organic carbon.

1. 1-0.25 mm aggregates with maximum degree of aggregate stability, moderate-high carbon sequestration capacity, but very high stabilization capacity;
2. 5-1 mm aggregates with maximum sequestration capacity of organic carbon accumulated in the site and high stabilization capacity;
3. 5-10 mm aggregates with moderate organic carbon sequestration capacity and low stabilization capacity;
4. aggregates ›10 mm with minimum carbon sequestration and very low carbon stabilization capacity.

STRUCTURAL - FUNCTIONAL PARAMETERS OF ARABLE CHERNOZEMS IN THE NISTRU - PRUT AREA

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Within the contemporary stage of anthropo-natural pedogenesis, the evolutionary trend of arable chernozems is determined by interdetermined and interdependent processes of physical degradation accompanied by various negative ecological-genetic and agroproductive effects materialized in changing the direction and intensity of typogenetic processes.

An integrative index of these changes is the structural - aggregate composition of chernozems characterized by micro - and macrostructural parameters.

The generalization of research in the field showed that in the composition of the microstructure of arable chernozems (<0.25 mm) microaggregates predominate > 0.01 mm (68 - 84%). From which, about 40 - 60%

belong to the fraction 0.05 - 0.01 mm. The content of microaggregate clay (<0.001 mm) makes up < 3%. At the same time, however, the indices of aggregate instability show that within the current humus contents the degree of vulnerability of the soils to disaggregation increases. As a result, a stable tendency to increase the content of aggregates > 5 mm of agrogenic origin is established in the arable layer. In their composition predominate formations > 10 mm. Instead, the content of the 5-1 mm aggregates, responsible for the ecological functions of the soils, is reduced. In their composition the content of aggregates 3 - 1 mm is about 1.7 times lower than in non-arable chernozems. The content of hydrostable aggregates > 0.25 mm is less than 50%, and the 1 - 0.25 mm. aggregates predominate in their composition.

The specified changes lead to a reduction in the sequestration-stabilization capacity of carbon in the structural aggregates and an increased vulnerability of soils to more severe climate phenomena. The reduction of the content of aggregates 5 - 1 mm is the main cause that leads to the increase of the degree of vulnerability of the soils to drought, while the increase of the content of > 1 mm causes the reduction of the anti-erosion resistance of the soils.

TROPHIC SPECTRUM OF THE AMUR SLEEPER (PERCOTTUS GLENII) POPULATION IN THE SUCEAVA RIVER BASIN

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The trophic spectrum study highlights not only the diversity of food but also the association between the consumer and prey, in this case, the relation between fish and macroinvertebrates. In the present study, the aim was the quantitative and qualitative analysis of macroinvertebrates from the stomach content of the Amur sleeper (*Percottus glenii*) population living in the Suceava river basin. Fish sampling was achieved by the electronarcosis method, and the macroinvertebrates were identified using a stereomicroscope, up to the smallest possible taxon. Their importance in the fishes feeding was represented by ecological indicators,

such as the Shannon-Wiener index, based on the relative abundance of prey, which was used to estimate the dietary diversity of each fish species. The analysis identified 43 groups of macroinvertebrates, of which the dominant representatives are *Astellus aquaticus* and *Baetis sp.*, and reduced values were recorded by species of the genus *Valvata*. As an invasive species, *Percottus Glenii* is not pretentious about prey, consuming a wide range of macroinvertebrates.

VULNERABILITY OF URBAN FLOODS IN ASSOCIATION WITH THE SEWAGE SYSTEM AND GEOGRAPHIC FEATURES IN THE GIULEȘTI-SÂRBI NEIGHBORHOOD OF BUCHAREST, ROMANIA

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The study aims to analyse the vulnerability of floods and their impact in the Giulești-Sârbi area, the marginal northwestern neighborhood of Bucharest. The location of the accumulation lake has hydrological importance for the studied area. The anthropogenic dam is one of the sources of floods, but the most inefficiency of the sewage system is the actual principal cause, which frequently flows back when there are significant increases in rainfall. The motivation for choosing this research topic is represented by the vulnerability of the Giulești-Sârbi area and by the lack of studies on flood vulnerability in the area.
The authors applied a set of questionnaires locally, the main results being presented in the paper. The core objectives of the study refer to the fine spatialization (at the street level) of the vulnerability of floods and their resulting impact. It will also compare the vulnerability of floods after two key periods: before the construction of the dam and present, respectively 1980 and 2020 for the comparison and evolution of terrain changes. The problem was also analyzed by the vulnerability association with slope, land use and geology characteristics. According to the authors' analyses, the Giulești-Sârbi neighborhood is still susceptible to floods. The most affected streets are those in the SE of the neighborhood and punctually to the NW. On the other hand, the application of the questionnaire shows that the southernmost street (Răsadnisei Street) did not register problems as often as the current hazard maps from the rowater source for which the highest vulnerable was expected to show. The areas indicating problems

according to the questionnaires and to maps belonging to Romanian Waters National Administration largely coincide with the results of the vulnerability maps realised in this paper. The main solution that can reduce the effect of flood vulnerable is the modernization of the sewage system.

ESTIMAREA PREJUDICIILOR CAUZATE DE ÎNGHEȚURILE TARDIVE DE PRIMĂVARĂ ASUPRA SECTORULUI AGRICOL AL REPUBLICII MOLDOVA

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În grupa fenomenelor meteo-climatice nefavorabile pentru sectorul agricol, *îngheţurile* tardive de primăvară ocupă un loc primordial. În a doua parte a primăverii, ele pot căpăta aspect de risc climatic prin faptul că pot surprinde culturile, legumele şi zarzavaturile, pomii fructiferi şi viţa-de-vie (predominant soiurile timpurii) în primele faze de dezvoltare, provocând uneori degerături destul de grave, care pot afecta întreaga recoltă. Au de suferit îndeosebi caişii, piersicii, prunii, vişinii, cireşii, mărul şi nucul. Primăvara pentru culturile agricole un pericol mare îl prezintă îngheţurile, care se semnalează după trecerea stabilă a temperaturii medii zilnice a aerului prin 10°C în direcţia creşterii ei (16–23 aprilie). Cea mai tardivă dată a îngheţurilor în aer în raioanele de nord şi centrale ale republicii s-a semnalat pe 21-24 mai (a. 1980), iar în sudul republicii pe parcursul perioadei 1-10 mai (a. 1990). Estimarea prejudiciilor cauzate de înghețurile tardive de primăvară asupra sectorului agricol al Republicii Moldova a fost efectuată în baza analizei informației statistice din arhiva Serviciului Hidrometeorologic de Stat (SHS) și a Inspectoratului General pentru Situații de Urgență (IGSU) pentru perioada de studiu (1997-2018). Înghețurile tardive de primăvară din perioada 1997-2018 au fost intensive și frecvente, cauzând prejudicii seminificative sectorului agricol și populației republicii, constituind 435 mil. lei. Frecvența anuală a înghețurilor menționate cu prejudicii semnificative a variat în perioada menționată de la 0 până la 13 cazuri. Astfel, numărul maximal de înghețuri tardive de primăvară a fost înregistrat în anul 2017, constituind 13 cazuri, după care urmează anii 1999 și 2017 cu câte 5 înghețuri, anul 2016 - 4 înghețuri, anul 2001, 2004, 2007 cu câte 2 înghețuri tardive de primăvară. În anii ceilalți ani înghețurile au lipsit sau munărul de cazuri a fost de unu. După valoarea prejudiciilor cauzate de înghețurile tardive de primăvară asupra sectorului

agricol al republicii pe primul loc se plasează anul 2002, când aceste înghețuri în intervalul 3-4 mai au afectat tot teritoriul republicii, cauzând prejudicii în valoare de circa 190 mil. lei. În anul 2017 valoarea prejudiciilor a constituit circa 90 mil. lei, iar în anii 1999 și 2016 valoarea prejudiilor cauzate de înghețurile tardive de primavera au constituit circa 70 mil. lei pentru fiecare an în parte. Manifestarea spațio-temporală a înghețurilor tardive de primăvară cu prejudicii semnificative în perioada de studiu a fost neuniformă și a afectat mai frecvent anumite regiuni din teritoriul Republicii Moldova. Astfel, în profil administrativ-teritorial cele mai afectate raioane de către aceste înghețuri au fost – Ocnița și Briceni după care a urmat Soroca, Ungheni, Rîșcani și mun. Chișinău. Metodele utilizate pentru diminuarea consecințelor și combaterea înghețurilor trebuie să contribuie la reducerea răcirilor radiative, distrugerea stratului de inversiune termică de la sol, omogenizarea temperaturii aerului în stratul microclimatic şi în consecinţă, menţinerea temperaturii aerului şi pe suprafaţa solului mai mare de 0°C.

Notă: Lucrarea dată a fost efectuată în cadrul proiectului 20.80009.7007.08, Modelarea spaţio-temporală a factorilor abiotici de mediu pentru estimarea stabilităţii ecologice a peisajelor.

PLASTIC PARTICLE INGESTION BY WILD FRESHWATER FISH: A CRITICAL REVIEW

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Since 1950, industrialization and population growth has led to an expansion in the use of plastics to keep goods safe. Unfortunately, a substantial fraction of plastics ends up in the aquatic environment in the form of waste, that amount to a global problem. Plastic particles can be classified, according to their size, into macro plastics (> 25 mm), meso plastics (between 5 and 25 mm), microplastics (<5 mm), and nano plastics (≤ 0.1 μm). Microplastics can enter river waters from primary and secondary sources, directly by wastewater discharges or derived from the decomposition of larger plastics from various sources. Fish ingest

microplastics in the aquatic environment generally in the form of fibres and sheets. According to recent studies, exposure, feeding behaviour, position in the food chain and the developmental stage of fish are amongst the factors associated with microplastics ingestion. Monitoring the plastic in the stomach contents of fish provides ecological information concerning microplastic pollution and the negative impact on their health.

PREJUDICIILOR ECONOMICE DETERMINATE DE IMPACTUL PLOILOR TORENŢIALE ÎN REPUBLICA MOLDOVA

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Analiza estimării prejudiciilor economice determinate de impactul ploilor torenţiale din semestrul cald al anului a fost efectuată în profil administrativ-teritorial doar pentru perioada 1997-2018, fapt legat de prezenţa acestor date în arhiva Inspectoratului General pentru Situații de Urgență. În această perioadă pe teritoriul republicii prejudiciul total a constituit 5 258 mil. lei. Frecvenţa ploilor torenţiale din semestrul cald al anului cu prejudicii semnificative înregistrate în perioada de studiu s-a manifestat în profil administrativ-teritorial foarte neuniform şi a variat de la 2 cazuri în raioanele Glodeni și Basarabeasca, până la 41 de cazuri în raionul Soroca. Conform datelor statistice analizate privind prejudiciile cauzate de ploile torenţiale în profil administrativ-teritorial (1997-2018), s-a constatat că cele mai mari valori au fost înregistrate în UTA Găgăuzia şi raionul Taraclia, unde aceste prejudicii au constituit, respectiv 1092 mil. lei și 1007 mil. lei. Prejudicii cu valori medii cuprinse în limitele 218 - 129 mil. lei, cauzate de ploile torenţiale în profil administrativ-teritorial (1997-2018), au fost înregistrate în raioanele: Călăraşi, Nisporeni, Orhei, Ungheni, Cahul, Cantemir, Căuşeni, Rîșcani, Fălești, Briceni și Edineț. În celelalte raioane prejudiciile cauzate de ploile torenţiale în semestrul cald al anului au fost mai mici. În rezultatul analizei variaţiei spaţio-temporale a valorii prejudiciilor cauzate de ploile torenţiale pentru perioada 1997-2018, putem constata că valoarea prejudiciilor variază semnificativ de la o lună la alta, atât la nivel de republică, cât şi pentru fiecare raion administrativ-teritorial în parte, fiind determinată de variaţia parametrilor principali a ploilor torenţiale. Cele mai mari valori ale prejudiciilor materiale cauzate de ploile torenţiale pe teritoriul republicii se înregistrează în luna iulie și constituie 3 060 mil. lei, urmată de lunile iunie și mai cu prejudicii de 1197 mil. lei și respectiv 668 mil. lei. Asfel,

teritoriile cu grad sporit de expunere la risc includ UTA Găgăuzia (1092 mil. lei) şi raionul Taraclia (1007 mil. lei). Teritoriile cu grad mediu de expunere la risc (cu prejudicii între 124 și 218 mil. lei) includ predominant raioanele de vest ale republicii – Călăraşi, Nisporeni, Orhei, Ungheni, Cahul, Cantemir, Căuşeni, Rîșcani, Fălești, Briceni și Edineț. Teritoriile cu grad redus de expunere la risc (cu prejudicii între 50 și 124 mil. lei) au fost înregistrate în raioanele Donduşeni, Soroca, Drochia, Floreşti, Sîngerei, Șoldănești, Teleneşti, Criuleni şi mun. Chişinău și Ștefan Vodă. Teritoriile cu grad foarte redus de expunere la risc (cu prejudicii mai mici de 50 mil. lei) au fost înregistrate în raioanele Glodeni, Rezina, Dubăşari, Străşeni, Ialoveni, Anenii Noi, Leova, Cimişlia, Ocnița, Basarabeasca și mun. Bălți. Valoarea prejudiciilor cauzate de ploile torenţiale depinde atât de parametrii principali a acestor ploi, dar şi de influenţa altor factori – gradul de umezire al solului până la ploaie, înclinația pantei, structura şi textura solului, prezența sau lipsa covorului vegetal. De asemenea, aceste prejudicii mai depind de momentul din an şi faza de dezvoltare a culturilor de câmp.

Notă: Lucrarea dată a fost efectuată în cadrul proiectului 20.80009.7007.08, Modelarea spaţio-temporală a factorilor abiotici de mediu pentru estimarea stabilităţii ecologice a peisajelor.

MEDICAL WASTE - A NEW ENVIRONMENTAL PROBLEM

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One of the new problems of modern human society are medical waste. The category of waste from medical activity includes all types of waste, which may or may not pose a risk to the individual, society or the environment. The amount of waste generated by medical activities is closely related to the pattern of consumption, but also to the type of production of materials used. Also, the large number of products entering the medical market is another challenge for the state or private institutions involved. The EU Waste Framework Directive recommends a management hierarchy: prevention, reuse, recycling, recovery and disposal. The problem is not "what to do", but "how to do it", because

lately the 15,000 tons per year are frequently exceeded. All human activities produce waste, which can prove to be more or less dangerous. Inadequate medical waste management can contribute to climate change and air pollution. The appearance of medical waste exposes the population to infectious risks, thus being dangerous both for humans and for the environment.

TRACE ELEMENT CONCENTRATIONS IN FEATHERS OF EUROPEAN BLACKBIRDS (*TURDUS MERULA*)

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Previous studies primarily focused on concentrations and the negative impact of noxious substances in polluted areas, while pollutants in urban sites have been a recent endeavour. Although emissions of toxic substances in cities have been on a downward trend due to their legislative regulation, they can bioaccumulate inside ecological food chains and create chronic exposure that can alter survival behaviour in common urban bird species. Scientists from Portugal, Italy, France, Poland, and Spain used the European blackbirds (*Turdus merula*) as bioindicators of organochlorine compounds (polychlorinated biphenyls and dichlorodiphenyldichloroethylene) and heavy metals (cadmium, chromium, cobalt, copper, lead, nickel) in urban areas. Suitable habitat and food abundance lead the urban population of blackbirds not to migrate and get exposed to pollutants for lengthier time intervals. Controversial correlations between trace element concentrations in tissues and feathers have been established, leading to a prevalence of non-lethal sampling of feathers in studies. Recorded urban toxic substances values from feather samples are comparable with those from low to moderately polluted areas.

ESTIMAREA PREJUDICIILOR CAUZATE DE GRINDINĂ SECTORULUI AGRICOL AL REPUBLICII MOLDOVA

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În Republica Moldova grindina în general se semnalează în perioada caldă a anului (aprilie – octombrie) şi de obicei însoţeşte aversele, furtunile cu oraje, ceea ce intensifică şi mai mult dauna produsă de ea.
Conform datelor statistice, în Republica Moldova anual cca 260 mii ha de terenuri agricole sunt afectate de grindină. În unii ani pe teritoriul raioanelor centrale ale republicii grindina poate afecta până la 25% din toate terenurile agricole. Estimarea prejudiciilor cauzate sectorului agricol al Republicii Moldova de către căderile intensive de grindină, a fost efectuată în baza procesării, analizei și interpretării grafice a informației statistice din arhivele Serviciului Hidrometeorologic de Stat (SHS); Inspectoratului General pentru Situaţii de Urgență (IGSU) și Biroului Naţional de Statistică (BNS) pentru perioada 1997-2020. Căderile intensive de grindină din perioada 1997-2020 au fost intensive și frecvente, cauzând prejudicii seminificative sectorului agricol al republicii, constituind peste 900 mil. lei md. Conform datelor analizate s-a constatat că în această perioadă de timp pe teritoriul republicii au avut loc peste 300 de cazuri de căderi intensive de grindină cu prejudicii semnificative, care au fost înregistrate de către IGSU. Frecvența anuală a căderilor intensive de grindină cu prejudicii semnificative a variat în perioada menționată de la 0 până la 37 de cazuri. Numărul maximal a fost înregistrat în anul 2012 cu 37de cazuri, după care urmează anii 2013 și 2014 cu 33 și respectiv 31 de cazuri. În continuare urmează anii 2011 și 2008 cu 24 și respectiv 21 de cazuri. În anii 2001, 2003 și 2004 numărul de căderi intensive de grindină a constituit câte 16 cazuri pentru fiecare an menționat, iar în ceilalți ani din perioada de studiu – numărul de căderi intensive de grindină a variat de la 0 până la 14 cazuri. După valoarea prejudiciilor cauzate sectorului agricol al republicii de către căderile intensive de grindină, pe primul loc se plasează anul 2012 cu circa 213 mil. lei, urmat de anul 2013 cu prejudicii în valoare de 178 mil. lei. În anul 2014 valoarea prejudiciilor a constituit circa 83 mil. lei, iar în anii 2007 și 2008 – câte 43 mil. lei pentru fiecare an în parte. În restul anilor din perioada 1997 – 2020 prejudiciul cauzat de căderile intensive de grindină a variat de la 0 până la 35 mil. lei. Manifestarea spațio-temporală a căderilor intensive de grindină, cu prejudicii semnificative în perioada de studiu, a fost neuniformă și a afectat mai frecvent anumite regiuni din

teritoriul Republicii Moldova. Astfel, în profil administrativ-teritorial cele mai afectate raioane de către acest fenomen au fost – Rîșcani, Dondușeni, Soroca, Briceni, Cahul, Edineț, Florești, Criuleni și Anenii Noi. În cele mai multe ţări, afectate de grindină, pentru combaterea ei se utilizează măsuri şi mijloace cu caracter pasiv, care sunt ecologice şi constau în: delimitarea ariilor afectate de acest fenomen şi cultivarea lor cu plante rezistente la grindină; acoperirea plantaţiilor agricole preţioase cu plasă antigrindină (pomii fructiferi, viţa de vie etc.); asigurarea terenurilor agricole împotriva pericolului căderilor de grindină.

Notă: Lucrarea dată a fost efectuată în cadrul proiectului Studii genetico-moleculare și biotehnologice ale florii-soarelui în contextul asigurării managementului durabil al ecosistemelor agricole, 20.80009.5107.01.

THE PREQUALIFICATION OF PUBLIC SPACES: A CHALLENGE FOR SUSTAINABLE URBAN PLANNING

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The growth of the city and its rhythms, urban reorganization and the transformation of spaces, the change in their uses, the evolution of the daily practices of the social groups that make and live in the city, ask of the issues and interests of the prequalification of public spaces in terms of their symbolic, aesthetic and functional value. Democratic spaces, public areas, places of meeting and passage, they support the rhythms of daily life and reflect the district or territory in which they are located. Today, new policies seek to restore these spaces to pedestrians and the population. The stakes are high. It is a question of recreating meaning, restoring coherence and legibility to the sometimes-scattered territory, and remedying the consequences of a disfigured city and its corollary.

By prequalification, we mean a process of intervention on the space, an intervention which can be either long-term or the action of punctual and ephemeral gestures.

In the case of the Constantine city project, "Modernization Plan of the Constantine Metropolis" (PMMC), this new development strategy is essentially based on a program of action focused on the rehabilitation and upgrading of central urban spaces, and the residential proximity of the central districts, as well as the realization of emblematic projects of

international level that would change the image of the city and bring it into the era of modernity.
These interventions not only transform the way people look at the place, diverting its primary functions, but also create new uses for living spaces.
This revaluation of public spaces is in line with John Ruskin's critical reflection on urban planning and modern architecture in the 19th century, according to which their qualitative and aesthetic poverty is a reflection of a society which, oriented towards economic concerns, has forgotten the vital function played by its urban facilities. Today, developers, urban planners, artists and landscape architects have replaced the architect of yesteryear and the challenges of these prequalifications are located at two levels of urban space: on the one hand, at the scale of the agglomeration, to allow accessibility to the major facilities and central places through the networks and, on the other hand, at the level of the neighbourhood, to allow a re-appropriation of these spaces.

ASSESSMENT OF THE ECOLOGICAL SITUATION OF THE REGION FOR THE NEEDS AND PROSPECTS OF CROSS-BORDER TOURISM (ON THE EXAMPLE OF CHERNIVTSI REGION)

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Cross-border tourism is highly dependent on the state of the environment, so for its successful operation it is necessary to stimulate measures to preserve and protect the natural environment. The proposed research addresses the issues of ecological assessment of land resources and soils, nature reserves, forests, water resources and air. These factors, in our opinion, have the most significant impact on the development of cross-border tourism in the region. Over the last 5 years, traces of two types of pesticides have been found in soil samples from agricultural lands in the oblast, but no maximum concentration limits (maximum permissible concentrations) have been exceeded. 80.12% of agricultural lands of the region belong to the zone of clean lands and 19.88% - to the zone of increased radiation control. Such indicators of soil condition have a positive effect on the development of cross-border tourism. At the end of 2019, 331 objects of the nature reserve fund with a total area of 103 thousand hectares, which is 12% of the territory of the region, were under protection on the territory of the region. However, the share of nature reserves in the total area of the region does not fully meet international

standards. Excessive plowing of the soil, forestry, littering of objects with industrial and domestic emissions make it difficult to ensure the territorial unity of areas with natural landscapes, and the disorganization of tourist routes hinders the development of cross-border tourism. The forest cover of the region is 31.2%. Forest harvesting causes significant damage to nature - pollution of mountain rivers and streams and soil erosion on mountain slopes. This is due to the fact that in the region, timber is harvested by continuous felling using tracked vehicles. The largest share (92.9%) of harvested wood by species composition of stands is occupied by beech, spruce, oak and other conifers. Negative impact on the condition of forests causes the loss of forest plantations, which is caused by forest diseases and the impact of adverse weather conditions. Degradation of forest resources in the region has a negative impact on the formation and development of cross-border tourism. However, it should be noted that the region annually implements a set of measures for the reproduction, care and protection of forests. The region has significant reserves of water resources, which together with the transit runoff are about 10 km3. The water supply of the region per 1 km2 and per 1 inhabitant is 2 times and 1.5 times higher than in Ukraine as a whole (4th place). The largest rivers flowing in its territory are the Dniester, Prut, Siret, Cheremosh. Despite the fact that the region has significant water resources, the water problem remains relevant. This is primarily due to the pollution of water bodies with wastewater, depletion of groundwater aquifers, irrational consumption of fresh water. Wastewater treatment plants in the region are still inefficient, as most of them are morally and physically obsolete, biological treatment is out of order, and the construction of new treatment plants has been stopped due to lack of funds. The indicator of the ecological condition of water resources of the region has a negative impact on the formation and development of cross-border tourism. The main source of air pollution in the Chernivtsi region is the exhaust gases of vehicles, whose emissions reach 83.5% of total emissions. In 2019, the average monthly concentrations of the following substances exceeded the MPC: hydrogen chloride, formaldehyde, hydrogen fluoride, benzo (a) pyrene, phenols. The ecological situation in the region remains difficult and requires further effective and purposeful environmental activities for the active formation and development of tourism.

TERRITORIAL PLANNING OF TRANSPORT NETWORK WITH LANDSLIDE SUSCEPTIBILITY MAPPING. CASE STUDY: TIMIȘ-CERNA CORRIDOR, ROMANIA

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The high risk associated with landslide events has determined many government and research institutions across the globe to take interest in the optimization of landslide prediction models. The majority of current landslide susceptibility research papers deal with performance evaluation of different statistical methods, emphasizing comparison of prediction accuracy. Geomorphologic susceptibility analysis is a primary step in the research for planning and designing potentially better alternatives to current transportation routes, as well as for the development of urban and territorial planning studies. Therefore, there is a scientific requirement to research the possibilities that landslide susceptibility mapping could present for the design and management operations related to road and railway transport corridors, both on regional and local scale. The study area is centered along the southern section of the Orient-East Mediterranean Corridor, a segment of the European-wide TEN-T transportation network.

Landslide susceptibility mapping requires locating relevant phenomena, as well as determining the appropriate parameters for prediction modeling. For the current analysis, we have chosen 12 relevant parameters: lithology, distance to faults, slope angle, aspect and curvature, hypsometry, landform categories (based on TPI-method), vegetation cover (NDVI-based), soil texture and hydrological parameters (rainfall, stream power index and topographic wetness index). Thematic datasets were acquired from a variety of data sources and resampled to a 30 m spatial resolution, in order to facilitate complex overlay analysis in GIS. The prediction methodology was based on the frequency ratio model, which requires statistical validation of datasets in conjuncture with the spatial distribution of landslide events. The results of frequency ratio analysis were used to compute prediction ratios for each parameter, which served as weights for mapping landslide susceptible areas.

Results indicate that 25% of the study area is characterized by an average risk, 17% of terrains feature high susceptibility and only 7% of the corridor is classified with very high geomorphologic risk. The prediction model achieved a success rate of 59.4% and could be improved by increasing the number of landslide-related events used for training and

validating the model. In order to demonstrate the applicability of landslide susceptibility mapping for design decisions related to the transport network, we conducted GIS overlay analysis on a regional scale. We noticed that railway routes are the most conservative from a planning perspective, featuring low correlation to landslide-susceptible areas. The road infrastructure features a strong inversely proportional correlation between speed limits and terrains vulnerable to landslide processes. Extending overlay analysis on the level of territorial administrative units (TAUs) allowed us to identify vulnerable administrative units, considering the length of road and railway sections located on landslide-prone terrains.
Similar results to the ones presented in this paper could be detailed in territorial planning documents, either at regional or local scale. The methodology could also present applicability for preliminary studies on high-speed motorway or railway design and, provided it is detailed for vulnerable sectors, it could result in the proposal of optimal prevention measures for landslide-induced risk.

EFFICIENCY OF USING INNOVATIVE MATERIALS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT AT THE LEVEL OF THE CONSTRUCTION SECTOR

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In order to ensure the preservation of the environment, it is increasingly necessary to capitalize on waste from industrial activity. In this meaning, there is currently research at national and international level on the possibility of capitalizing on agricultural waste in the field of construction, respectively obtaining new materials, also called eco-materials, which can replace traditional materials. The reuse and recycling of waste ensure not only the reduction of the impact on the environment due to their recovery but also the possibility of a cost efficiency compared to the use of traditional materials. Waste recovery is a priority component in the context of sustainable development, aiming to create the conditions for ensuring the well-being of countries and their citizens, raising living standards, reducing social inequalities or implementing global measures to manage natural resources.
In this context, our studies focused on determining the economic efficiency of innovative materials, obtained by reuse of some types of

vegetal waste, and, for this, it was necessary to perform a comparative cost analysis. The acquisition costs related to innovative, environmentally friendly materials and those traditionally used in construction were taken into account, as well as the costs during their use, respectively the maintenance and repair costs. The obtained data show us that the advantages of using eco-materials are not only from the perspective of environmental protection, the advantages obtained being also economic. Thus, the use of waste materials from renewable sources results in reduced costs during use compared to conventional materials.
Summarizing the presented aspects, it results that, by using ecological materials in the construction materials industry, the capitalization of industrial waste is ensured, with significant impact in reducing the negative effects on the built environment, materialized both by reducing of waste amounts and substituting the production of traditional construction materials. From the point of view of the level of recycling and reuse of bio-waste and materials used in industry, Romania is at levels below the European and regional level, being necessary measures to increase the level of recycling and reintegration of waste into the economic circuit.

IMPACTUL COLORANŢILOR ORGANICI ASUPRA SOLURILOR DIN ARIILE URBANE ŞI PERIURBANE

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Problema poluării cu coloranţi organici a solurilor în general, în particular a solurilor din ariile urbane, este relativ puţin abordată în literatura de specialitate. Aspectele referitoare la distribuţia şi dinamica coloranţilor organici în soluri, mecanismele de interacţiune cu componentele chimico-mineralogice ale solurilor sau efectele pe care coloranţii organici le au asupra proprietăţilor solurilor nu sunt încă bine cunoscute. Studiile noastre au abordat problematica poluării cu coloranţi organici a solurilor din ariile urbane într-un context ceva mai larg, referitor la dinamica pedopeisajelor ariilor urbane şi periurbane din Regiunea de Nord-Est a

României. Prezenta lucrare a avut două obiective principale: (i) studiul efectelor coloranţilor organici asupra proprietăţilor solurilor şi asupra echilibrelor chimico-mineralogice din solurile poluate cu coloranţi organici; (ii) stabilitatea coloranţilor organici în condiţiile fizico-chimice ale solurilor din ariile urbane. Studiile noastre experimentale au vizat efectele a patru coloranţi organici comuni (metiloranj, roşu de Congo, albastru de metilen şi albastru de brom-fenol) asupra proprietăţilor pedogeochimice ale unui tehnosol urbic (din zona urbană a municipiului Iaşi) pe durata a 6 luni. Deşi rezultatele obţinute sunt foarte interesante, dat fiind numărul extrem de redus de date de comparaţie, considerăm că atât rezultatele experimentale proprii, cât şi interpretărilor realizate în baza lor, ca „date preliminare" pentru studiile detaliate ulterioare.

DOES THE ONLINE EDUCATION ENSURE THE EFFECTIVENESS OF TEACHING AND EVALUATION OF GEOGRAPHY?

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Online education developed greatly during the Covid 19. Pandemic. Although there were online learning and teaching resources before 2020, they were not sufficiently tested or used. In modern geography, students must develop their skills, knowledge, be motivated and involved in geographic inquiry.

Our objectives are related to the research question of this study, namely how students perceive this new form of evaluation, online evaluation, and whether they have certain preferences related to the tools used in online assessment. (Google Forms and Wordwall). Data on students' perceptions regarding these online assessment tools was collected through an online questionnaire on a sample of 85 fifth graders (10, 11 years old). The analysis methods were word cloud analysis and multivariate statistical analysis.

The results obtained showed that students are open to online assessment through new methods. Moreover, this type of assessment offers them a simpler alternative to learn, with them better understanding or easily remembering the taught lesson. The appearance of the two user-friendly interface platforms or the easy to use mode is an important variable perceived by students, as they can induce in students the joy of participating in an online competition. There are also negative aspects reported by them, especially related to concerns regarding the internet connection or to time given being too short.
Online evaluation remains an alternative during this period. The usefulness of these tools is not to be neglected at all, given that the target group has been continuing online education for more than a year and the teaching-learning process must adapt to the current context.

EVALUATION OF THE ECOLOGICAL AND GEOCHEMICAL CONDITION OF GEOSYSTEMS OF SUBREGIONS OF NORTHERN BUKOVYNA

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The study assessed the ecological and geochemical state of geosystems of the subregions of Northern Bukovyna: Prut-Dniester, Prut-Siret, and Bukovynian Carpathians.
In the Prut-Dniester interfluve, the ecological condition of rural geosystems can be assessed as moderately favorable and low-favorable (in certain areas of the Dniester valley, where groundwater hardness exceeds standards, as well as in plakor agroecosystems, which are geochemically contaminated through the surplus of chemical fertilizers in the soil).
Bukovynian Subcarpathians, in the middle part of Northern Bukovyna, are distinguished by favorable ecological conditions for both human life and rural tourism. The predominance of the leaching soil water regime of geosystems (sufficient rainfall) and notable wooded areas contributed to the sanitation of these landscapes from various artificial pollutions. In addition, there are favorable conditions for the formation of high-quality groundwater (drinking water), which should be taken into account (as an important factor) in the medical and geographical evaluation of the territory.
The Carpathian subregion is the most distinct and unusual in terms of geoecological evaluation. There is a more complex set of natural

conditions (vertical differentiation of landscape complexes). Fluvial terrace landscape complexes (with a chain or mosaic-scattered settlements) have highly favorable ecological and geochemical conditions. This subregion is the most optimal regarding the recreational and tourist trend. Among the geoecological factors of its development, it is worth noting the high quality of groundwater (drinking water), which, despite the excess precipitation, is sufficiently saturated with biologically essential macro- and micronutrients and have mostly medium hardness (Ca + Mg) and mineralization. All this is facilitated by water migration processes, the solubility of rock complexes, biomass decomposition etc.

WETLANDS AND ZOOTECHNICAL ACTIVITIES: TWO ASPECTS OF THE CLIMATE CHANGE PHENOMENON IN "ȚARA DORNELOR"

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This paper analyzes two important issues in adapting to the phenomenon of climate change: the preservation of wetlands, namely the peatlands in the Dornelor Depression and the management of livestock activities specific to the mountain areas, which are also the main source of greenhouse gas emissions.

To protect the people and the environment from the harmful effects of greenhouse gas emissions, is very important their collaboration and interaction, which not only contributes to the conservation of nature but also reduces the vulnerability of people to climate change and improves their livelihood. The conservation of biodiversity is often interpreted as a marginal issue only relating to the protection of endangered species, and the essential role of nature in combating climate change is often neglected.

Tara Dornelor, also called the Dornelor Depression, develops along the Dorna River to the North and Neagra Șarului River to the South, and to the East it narrows down along the Bistrița Aurie River to the Zugrenilor Gorges.

Here are a series of peatlands, with a regime of protected natural areas, integrated in the Natura 2000 European Ecological Network: ROSCI0247 Tinovul Mare Poiana Stampei (which is also a RAMSAR site), ROSCI0245 Tinovul de la Românești, ROSCI 0249 Tinovul Șaru Dornei.

Also, at Poiana Stampei, there is a peat exploitation of 49.6 ha and, in its vicinity, a regenerated area from an old peat exploitation of approximately 22 ha. The peatlands play an important role in carbon storage.
The European Parliament resolution of 14 March 2019 on climate change (an European long-term, strategic vision for a prosperous, modern, competitive and climate neutral economy in accordance with the Paris Agreement (2019/2582(RSP)) emphasizes the fact that agriculture, and specifically livestock related activities, will remain a long-term source of GHG emissions until 2050. The economic activities in this area are mainly based on breeding and grazing sheep and cattle, along with forestry activities.
The present study evaluates the GHG emissions from the livestock activity from the communes where the wetlands are located (Poiana Stampei, Coșna, Șaru Dornei) and performs a comparative analysis of their absorption capacity.

CARACTERUL EXTREM AL TEMPERATURII MINIME DIN MUNICIPIUL BRAȘOV

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Municipiul Brașov este situate în cadrul Depresiunii cu același nume, fiind cel mai mare oraș din Carpații Românești. Acesta este amplasat într-un areal de interferență climatică estică și vestică, configurația reliefului imprimând un caracter local bine definit, mai ales în sezonul rece al anului, când adesea se înregistrează extreme termice.
Obiectivul principal al acestui studiu este reprezentat de o analiză în detaliu a temperaturii minime a aerului și evidențierea caracterului extrem al acestui element meteorologic, prin analiza unor indici ai extremelor și schimbărilor climatice (ETCCDI), omologați de către Organizația Meteorologică Mondială (OMM).
În realizarea studiului, s-au utilizat datele climatice de la stația meteorologică Brașov-Ghimbav (pentru perioada 1980-2015), din cadrul Administrației Naționale de Meteorologie. Ulterior, s-au calculat următorii indici de referință: FD - numărul de zile de îngheț, CFD - numărul maxim de zile consecutive de îngheț, CSDI - numărul total al intervalelor cu valuri de frig, TN10p și frecvența acestora - numărul de zile în care temperaturile minime zilnice sunt egale sau mai mici de 10

percentile, HDDn0 și HDDn10 și frecvența acestora - sumă grade zile încălzire cu temperatura minimă mai mică decât 0 grade, respectiv 10 grade Celsius.
Contextul sinoptic cel mai favorabil producerii unor valori termice extreme este prezența unui anticiclon, care implică adesea răciri radiative și inversiuni termice puternice. Pe acest fond se pot produce valorile termice extreme respective. În acest studiu s-au sintetizat câteva dintre aspectele cele mai caracteristice. Temperatura minimă absolută a aerului pentru perioada menționată a fost de -33,3ºC, înregistrată în data de 08 ianuarie 2015. Media temperaturilor minime a fost calculată la o valoare de 2,5ºC, deci o valoare pozitivă. Cel mai mare număr de zile consecutive de îngheț a fost de 82 (deci aproape trei luni, la începutul anului 1983), iar anii 1986 și 2002 s-au remarcat prin patru valuri de frig. Indicele HDDn0 a însumat toate valorile de temperatură mai mici de 0ºC (deci toate minimele negative), astfel încât s-a obținut în anul 1985 un total de 1318,9ºC, iar în anul 1993, o valoare cumulată de 1294,7ºC. În antiteză, minimele termice au fost mai blânde în anul 2014 (521ºC) sau în anul 1994 (557,9ºC).
Cu alte cuvinte, diferențele dintre acești ani relevă caracterul extrem al temperaturilor minime, dar și variabilitatea termică mare de la o lună la alta sau de la un an la altul. Acest lucru a fost confirmat și indicele HDDn10 prin care s-au obținut valori de 3504,4ºC (în anul 1985), sau 3412,1ºC (în anul 1993).
Importanța tuturor acestor indici este dată de rezultatele obținute și de cum pot fi acestea utilizate în practică, prin încălzirea sau răcirea locuințelor, astfel încât să se asigure confortul bioclimatic, dar și pentru a nu se pierde în mod inutil sau eronat energia distribuită. Cunoașterea particularităților temperaturii minime a aerului din municipiul Brașov reprezintă deci un instrument obiectiv de evaluare al managementului energiei termice în vederea asigurării confortului termic al populației.

FROM RESILIENCE PERFORMANCE TO RESILIENCE CAPACITY - SELECTING THE MOST RELEVANT RESILIENCE DRIVERS

Cristian INCALTARAU
Alexandru Ioan Cuza University of Iasi

The presentation resumes the selection of resilience drivers and how these were aggregated into the resilience capacity index.

ANALYSIS OF THE DROUGHT PHENOMENON ON ARABLE LANDS IN ROMANIA USING SATELLITE IMAGES

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The study brings an evaluation of the drought occurrence and severity over the arable lands of Romania using the images obtained from Terra satellite, Moderate Resolution Imaging Spectro-radiometer (MODIS) sensor.

Droughts are generally considered the most complex meteorological phenomena, given that a plethora of factors contribute to their onset, such as precipitation, soil characteristics, soil water reserve accessible to plants, soil and air humidity and air temperature or wind speed. Also, other factors that define the characteristics of the active surface, factors that define the physiological peculiarities of the plant or the anthropogenic influence on the environment have a high importance for the occurrence of this phenomenon.

The main objective of our study is to enlarge the knowledge on drought in Romania by giving a long-term (2001-2020) and comprehensive image on drought over arable lands as reflected by the vegetation conditions. In this regard, the Normal Difference Drought Index (NDDI) was investigated. This index was derived from Terra satellite, Moderate Resolution Imaging Spectro-Radiometer (MODIS) sensor. Also, the relationship between atmospheric precipitation amount and NDDI was analyzed, in order to understand how the vegetation, respond to this major atmospheric driver of drought occurrence.

The main results indicate, that the most affected regions are the Romanian Plain, especially the Central-Western area and the North-Eastern area. Also, the entire Southern Moldavian Plateau, the Western Plain, and the Western and North-Western part of the Dobrogea Plateau are affected.

Thus, according to this index, the driest year were 2003 with 16.0% of arable land affected by extreme drought and 15.0% affected by severe drought. On the contrary, the wettest year was 2014 with only 1.5% of arable land affected by extreme and severe drought. Regarding the multiannual average of the period 2001-2020, it can be seen that drought

is not a meteorological phenomenon that occurs steadily every year, therefore only 5.4% of arable land was affected by extreme and severe drought, while other 40.2% of it was affected by weak or moderate drought. The extent of arable land affected by drought even during the wettest years gives a clear image on the regions that are constantly under threat. Normally, if we discuss the occurrence of the desertification process in Romania, one should expect this phenomenon on these regions that are affected by drought even during wettest years.

REZILIENȚA AGRICULTURII ROMÂNESTI ÎN TIMPUL PANDEMIEI COVID-19 ȘI POSIBILE SOLUȚII PENTRU VIITOR

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Pandemia COVID-19 a afectat și activitatea sectorului agricol, la fel cum s-a întamplat cu întreaga economie mondială. Agricultura este un domeniu esențial, care trebuie protejat, pentru că asigură alimentele atât de necesare oamenilor si animalelor. Întregul flux agricol de producție a fost întrerupt, iar faptul că multe țări depindeau de importuri a dus la o criză și mai accentuată .O altă problemă existentă în urma pandemiei Covid a fost imposibilitatea desfășurării muncilor agricole din cauza numărului mic sau insuficient de muncitori . Seceta severă din anul agricol abia încheiat i-a împiedicat pe fermieri să își îndeplinească în mod constant contractele cu comercianții și, în unele locuri, a slăbit încrederea reciprocă în aceste parteneriate. Primul impact al condițiilor meteorologice nefavorabile a fost scăderea directă a producției în sectoarele vegetal și zootehnic, dar autoritățile s-au asigurat întotdeauna să răspundă cererii interne de consum uman și industrial fără a provoca lipsuri și presiuni pe piață pe termen lung. Se apreciază că marii producători vor găsi mai ușor resursele atât financiare, pe când cei mici trebuie să depună o serie de eforturi pentru a putea întreține atât întreaga cultură cât și pe ei înșiși. Astfel că scopul acestei cercetări este de a identifica cât de mult au avut de suferit agricultorii români de pe seama acestei pandemii și în ce măsură statul Român a contribuit ajutând agricultorii să treacă prin această criză. De asemenea, ne propunem să investigăm absorbția fondurilor europene destinate agriculturii și dezvoltării rurale.

TERRITORIAL STRUCTURE OF THE VALLEY AND THE YOUNG RIVER LANDSCAPE OF THE RIVER CHEREMOSH (FOOTHILLS AREA)

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The Cheremosh River - the right tributary of the Prut River - is part of the Danube basin and the Prut transboundary basin. At the same time, the foothills of Cheremosh are a typical object for Precarpathia. The study of the functioning of the modern flow-channel-floodplain system is closely connected with the territorial, landscape structure of the river valley. We have developed and applied to the object of study the method of identification of the territorial landscape structure. The basic regularities of functioning of the modern system flow -channel-floodplain are also revealed. Problems of anthropogenic impact on the young river landscape are analysed.

SOIL DEGRADATION ON LANDSLIDE SCARPS IN EASTERN ROMANIA

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In the North-East of Romania, landslides manifest themselves on large areas and create major problems for the agricultural sector and the region's economy. Scarp or detachment niche is considered the most dangerous part of the landslide body. It is found in the upper part of the slopes, as a result of the detachment of rock masses that collapse or slide on the slope. The main aim of this study is to propose some rehabilitation methods to diminish the negative effects of landslides. Our investigations were focused especially on the main scarps from the upper part of landslide. The studied sites are in the Central Moldavian and Suceava plateaus, characterized by the presence of extensive landslides areas. To highlight the influence of land use on the stability of landslides, areas from the natural reservation Ponoare Bosanci Secular Hayfields and

neighboring agricultural lands were studied. Following the comparison of the land and soil characteristics, some recommendations were done for the stabilization of the landslide scarps. The organic thatch layer of the soil ensures the protection of soil resources by reducing the intensity of the erosion process (i), preventing degradation of soil structure (ii), increasing soil permeability to water and air (iii), forming structural aggregates with high hydrostability (iv), deeper penetration of water through macropores resulting from the decomposition of plant roots (v), increasing the rate of water infiltration and thus storing a larger amount of water from torrential rainfall.

SEISMIC SYSTEMIC VULNERABILITY OF GALAȚI CITY AND VASLUI CITY. A COMPARATIVE ESTIMATION

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Seismic vulnerability is a multifaceted concept, and one of its dimensions is of systemic nature. The systemic vulnerability of an urban centre is related to the management of crisis situations, particularly by emergency services. Reducing the level of seismic systemic vulnerability of a specific location lies at the heart of seismic risk mitigation efforts.

This paper aims to estimate the seismic systemic vulnerability of two urban centres in Moldavia Region (Galați City and Vaslui City), by using specific indicators like the number of physicians/1000 inhabitants, the number of hospital beds/1000 inhabitants, the accessibility of medical and firefighter services to the urban areas with the highest potential to be negatively affected by a major earthquake. The accessibility of emergency services is analysed both at city level, and related to the residential buildings that were technically evaluated and were attributed specific seismic risk levels.

The comparative analysis shows that Galați City has a lower seismic systemic vulnerability than Vaslui City. The former urban centre has a more developed medical infrastructure and medical staff provision than the latter. Also, the emergency services in Galați City are more autonomous and have a higher accessibilty towards the urban areas that could register significant human loss and damages, should a 7 MW earthquake occur.

These results call for improvement of the medical infrastructure in both cities and for careful planning of the emergency interventions that follow

the manifestation of a powerful earthquake. The resulting maps may be used by local emergency services and authorities in order to improve seismic risk reduction strategies.

INNOVATIVE DOPAMINE FUNCTIONALIZED MAGNETIC NANOMATERIAL FOR HEAVY METALS REMOVAL FROM WASTEWATERS

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Nowadays, heavy metals pollution has become a worldwide problem, mainly because of their widespread in different environmental factors and toxicity and effects on living organisms. Researchers have been permanently trying to develop new eco-friendly materials to remove this type of contaminants from the environment. In this context, polymer-based magnetic nanostructures proved to be good candidates for wastewater treatment. Herein, we report the preparation, characterization and application of new core-shell magnetic nanostructures including magnetite as the inorganic core and poly (benzofuran-*co*-arylacetic acid) functionalized with dopamine as the organic shell. This novel nanomaterial was used for heavy metals adsorption from aqueous solutions and contaminated water samples collected from Roșia Montană Mining area, Romania. We used transmission electron microscopy (TEM), scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR), thermogravimetric analysis (TGA) and magnetization measurements (VSM) to investigate the nanostructures properties. Heavy metals concentrations were determined by Inductively Coupled Plasma - Optical Emission Spectrometry (ICP-OES). Equilibrium and kinetic studies were performed to characterize the metals adsorption mechanism. The high metal removal efficiencies obtained recommend the newly developed magnetic nanostructures for applications in wastewater treatment.

RESEARCH ON PEST RISK ANALYSIS APPLIED TO FOREST TREE SEEDLINGS IN CLIMATE CONDITIONS SPECIFIC TO NURSERIES IN TRANSYLVANIA

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The health and vitality of the global forest ecosystem are frequently affected by a number of potentially harmful elements, from phytopathogens (eg pests, viruses, fungi, bacteria). etc.), to elements of environmental disturbance (eg droughts, floods, fires, etc.) and, last but not least, environmental pollutants (Covrig et al., 2016), which can have negative influences on implementation of the general objectives of forest management (Agrios, 2001).

Pests and pathogens can become a significant problem, especially when they proliferate intensely, tending to become important risk factors for tree species specific to the forest habitat in which they appear.

It is worth mentioning that, in order to control the action of pests and pathogens, the excessive use of pesticides has the consequence of negative side effects on the environment.

Starting with the last half of the 20th century, the mentioned ones constituted the premises of a new concept, within the generous field of plant protection, namely the integrated fight against pests and diseases caused by pathogens, or, in other words, integrated pest management (Benson et al., 2001; Oroian, 2008; Sinclair and Lyon, 2005; IPPC Procedural Manual, 2011).

According to the IPPC Procedure Manual - International Plant Protection Convention, there are clear definitions of the function and scope of the Integrated pest management, but also specifications related to pest control measures, which can be protective, curative and eradicative (IPPC Procedure Manual, 2011). One of the most interesting approaches to the integrated pest control system is the use of risk analysis (Andersen et al., 2004; Parsa, 2009; IPPC Procedure Manual, 2011) a relatively recent option that offers a new perspective in disease and pest control.

The present study was conducted in the climatic conditions of Transylvania, and its purpose is to implement the risk analysis performed in accordance with the IPPC principles for the attack of the Phytophthora cactorum (Lebert & Cohn) Schröt on beech seedlings grown in nursery conditions, also in a specific climatic context.

Risk analysis of the attack of Phytophtora cactorum (Lebert & Cohn) Schröt on beech seedlings was carried out between April and September in three consecutive years (2015, 2016 and 2017) in accordance with the principles of IPPC, in three stages (IPPC Procedure Manual, 201 1): initiation, evaluation and management.
The experiments took place in a nursery where beech seedlings (Fagus sylvatica L) are grown, located in the Upper Niraj Basin, within the Sovata Forest District in Mures County. The host was represented by the European beech species - Fagus sylvatica L. - Eukaryota, Kingdom: Plantae, Order: Fagales, Family: Fagaceae, Genus: Fagus. The degree of attack was calculated according to the standardized method, depending on the frequency and intensity of the attack (Oroian, 2008). Climatic factors specific to the experimental site were taken into account.
The raw data were processed using STATISTICA v 8.0 for windows and IBM-SPPS (Berry et al., 2002).
The calculation methodology of the basic statistics was implemented, respectively descriptive statistics (mean, standard deviation, maximum and minimum values, vaulting and asymmetry) applied to the attack degrees of the studied pathogens, but also to the analyzed climatic factors that influence the action of the pathogen and the simple correlations between climatic factors (temperature, ºC; precipitation regime, mm) and the degree of attack. There were used analysis tools such as multivariate, respectively multiple regression and cluster analysis, in order to estimate the influence of climatic factors on the manifestation of the degree of attack of Phytophtora cactorum (Lebert & Cohn) Schröt.
Based on these, healthcare management decisions were formulated to minimize the effects of the disease on affected beech seedling.

TYPOLOGY OF VALUABLE NATURAL ELEMENTS FROM LANDSCAPE RESERVES IN THE PRUTE BASIN (REPUBLIC OF MOLDOVA)

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In the study of the 14 Landscape Reserves (PR) in the Prut basin, we tried to adjust these objects to international and regional classifications on landscape typology (aspects related to basic research), but also we wanted to highlight the landscape value of some natural elements (aspects related to applied research). The latter are important for the institutions / agencies that perform RP monitoring and management, and in the context of

Sustainable Development of the given region, they have a valuable tourist and cognitive potential, with morphological, geological, hydrological, biotic elements, etc., which require clear regulations on, both their conservation and their scientifically justified exploitation. Among the PR, those from the N-V region stand out more, from the Badenian reefs area, which have an appreciable aesthetic-recreational and cognitive value (Geological-paleontological complex from the Lopatnic river basin, RP La Castel, RP Fetești and others).

FORESTS WITH PROTECTION FUNCTIONS FROM THE MIDDLE BASIN OF ARIEȘ RIVER - COMPLEX MODEL OF MANAGING LONG-LASTING RESOURCES

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According to the site-mapping and management methodology, forests have a protection and production role. Even from the beginning of the last century, the problem of submitting them to a protection regime arise, especially in forests situated in hydrographic basins with a high risk of torrentiality, in fields under diverse forms of erosion and for those situated around communication routes.

The present study approaches aspects regarding emphasizing areas with a high risk of hazards and framing them properly in order to respond to scientific, socially and economic needs.

The investigations from this study are localized in forest from the middle basin of Aries river, from around Baia de Aries city. In order to reach the study's general objective, we have used information from forest management plans, based on GIS data, ortophotoplans, digital elevation models (DEM) as well as Corine Land Cover data regarding field covering (2018).

Based on the data from forest management plans, the total surface of forests from the studied area is of 17266.7ha, from which 11352.3ha represent forest with protection functions. Within them, the highest percentage (91%) is represented by forest that has soil and water protection functions. By using a specific methodology, we have generated thematic maps regarding hypsometry, field inclination, slope orientation and the distribution of field coverage.

The integrated analysis of data and information was emphasized by using these types of data for a hydrographic basin with a high rick of hazards.

It is important that the methodology regarding the analysis of fields located in areas with a high risk of hazards to be realized in a detailed manner by using all available resources. By emphasizing protection functions and applying conservation measures connected with protected objectives, the resources can be managed longtime, while the danger regarding hazards can be considerably limited

NON-STATE ACTORS AND URBAN ENVIRONMENTS IN CONFLICT - A CASE STUDY ON BAGHDAD DURING THE 2004-2009 INSURGENCY

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Compared to a classical conflict or an asymmetric war, an insurgency generally lacks in defining feasible and assumed political objectives that will justify the use of violence, maybe except for the main intention of expelling the invader's forces. In the case of the Iraqi insurgency, this lack of clear political objectives from the insurgents part leaded to a multi-phase spread of violence, involving a large amount of non-state actors, including terrorist groups such as Al-Qaeda in Iraq, ISI, Ansar al Sunna or JAM (Army of Mahdi). Our research investigates the potential link between the urban political vacuum and the competition for controlling the Baghdad's „espace-vecu" by non-state actors. We focus mainly on the decryption of the spatial strategies used by the insurgents in their violent marking of the every-day urban territories of Baghdad, using an empirical approach and spatial analysis tools. The quantitative methods we applied show that the urban environment becomes the stage where the sectarian confrontation, together with elusive insurgent urban tactics, reshape both the built-up space and (potentially) the urban routines of the civilian population. The data analysis available in our study emphasizes a strange situation. While the insurgent and non-state actors are quit reserved in openly confronting the coalition forces, the violence against civilians or opposite local forces is widespread. This underlines our main hypothesis, claiming that the long insurgent period (2004-2009) was just the time needed for the definition of political objectives within the Iraqi nexus of policy designers and combatants. When these objectives were fixed, a new stage of violence emerged - the Iraqi Civil War. Meanwhile, controlling the „espace-vecu" of the Baghdad residents, by military and guerrilla tactics, became the main way

to legitimate de facto the power of the non-state actors, in a competition for visibility by violence.

GREEN EQUITY IN INTERNATIONAL PLANNING DOCUMENTS

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În contextul creșterii accelerate a populației urbane Agenda Habitat III promovează incluzivitatea și are ca scop ca toți locuitorii, fără discriminare, să poată beneficia de orașe juste, sigure, sănătoase, accesibile, reziliente și sustenabile care să asigure o calitate ridicată a vieții. În prezent orașele se confuntă cu multiple probleme legate de spațiile verzi, cum ar fi asigurarea și distribuția neadecvată și neuniformă a spațiilor verzi publice, insuficiența lor în zone cu venituri reduse și cartiere informale, insecuritate, neglijarea nevoilor speciale ale grupurilor vulnerabile, lipsa aprecierii și recunoașterii nevoii și contribuției spațiului verde la urbanizarea sustenabilă, sănătatea populației, bunăstarea ei, simțul civic și mobilitate, lipsa spațiului pentru dezvoltarea lor sau costurile mari de mentenanță.
Studiul de față; a fost realizat pe baza unei analize a legislației în domeniu ce a constat într-o analiza cantitativă pe baza frecvenței unor cuvinte cheie (realizată prin analize de tip text minning cu ajutorul pachetului software open source R - pachetele pdfsearch și pdftools), precum și o analiză calitativă a documentelor. La nivel internațional au fost analizate 20 de documente emise de diverse organizații, printre care Organizația Monidală a sănătății și Națiunile Unite.bÎn ceea ce privește utilizarea conceptelor cheie în cadrul documentelor, rezultatele au arătat că cele mai utilizate sunt cuvintele echitate, inclusiv și copii.
Documentele internaționale prezintă în general abordări sociale (15 documente), doar jumătate dintre ele fac trimitere la elemente verzi ale infrastructurii și doar trei dintre documente prezintă legătura dintre spațiile verzi și anumite grupuri sociale. Analiza calitativă a documentelor a subliniat lipsa prevederilor referitoare la asigurarea echității și incluziunii în domeniul spațiilor verzi, dar și lipsa implicării grupurilor vulnerabile în procesul de luare a deciziilor în acestă direcție.

OFFSHORE WIND ENERGY RESOURCES IN ROMANIA. NATURAL POTENTIAL AND DEVELOPMENT PROSPECTS

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Offshore wind power is seen as a key component in achieving the European Green Deal's goal of zero greenhouse gas emissions by 2050. Europe has some of the most substantial offshore wind resources in the world. The Offshore Wind Strategy of the European Commission is projected to encourage a rapid increase of offshore wind on the continent, from the current 20 GW installed capacity to 450 GW by 2050. Offshore wind generation has a number of advantages over onshore wind and solar power, including higher full-load hours, longer operational hours, lower variability and, as a result, more predictability and reduced forecast errors, as well as reduced power requirements. The study assesses the natural and technical potential of Romania's offshore wind sector, finding an estimated total potential natural capacity of 94 GW, out of which 22 GW could be installed as fixed turbines.

The data analyzed in this paper shows that wind speed increases with distance from the shore, thus, wind speeds being higher in the deep-water sector's central part. A large portion of Romania's Exclusive Economic Zone contains deep water (more than 50 meters), which is better suited to floating platforms. The study identifies two potential clusters with the best conditions for a first phase of offshore wind development, based on fixed turbines, in water depths below 50 m at 40-60 km from the shore, an area that provides a good balance between wind resources and the costs of the required offshore network, given the ability to connect the output to the electrical power grid in the proximity of the Port of Constanța. The other area has slightly stronger wind resources, but the preexisting onshore power lines are further inland, and the connection grid should be expanded through the protected Danube Delta.

Romania must address a number of key issues in order to utilize its wind potential in the Black Sea, the most important of which is overcoming grid challenges. That's because in Dobrogea a large part of the country's power generation sources are already located (including Cernavodă; Power Plant), additional renewables are planned, thus almost doubling the installed capacity in an area with quite limited local energy demand. A separate issue is the offshore grid connections, that's because as project size and distance from shore increase, higher voltage lines are used to

minimize electrical losses. To avoid unnecessary spending and optimise offshore infrastructure costs, advanced coordinated planning would be required. The government should prepare, with close involvement of the relevant stakeholders, a national maritime spatial plan, as required under European directives. This government plan is very important for the state interests, lowering the risk of conflict between potential activities and other priorities: shipping, military zones, fishing, environmental and biodiversity impact, archaeological sites, as well as other facilities and economic activities.

A SPATIAL PERSPECTIVE UPON SUSTAINABILITY OF TOURISM DESTINATIONS IN ROMANIA DURING COVID-19 CRISIS

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A large number of questions are being raised about the effects of Covid-19 upon the tourism sector. While it has negatively impacted economic, healthcare and social systems, from the point of view of sustainability, there are studies demonstrating a strengthening upon the sustainability of environmental areas. Romania has been affected, as well, by the negative effects of COVID-19. The tourism sector has been the most sensitive to this crisis. Changes in behavior, mobility or consumption led to complex implications that are difficult to assess. Leisure and internal tourism have seen a strong decline, with a total loss of up to 53% of total arrivals and an economic loss of 33%. The present research aims to highlight how tourism destinations reacted to covid-19 crises and to establish if there is any relation between the degree of sustainability and reactivity of the territorial tourism system to Covid-19 crisis. The study takes into account changes in the number of arrivals and overnights for the 2019-2020 period in order to assess the impact of the crisis within the tourism system. Moreover, with the help of spatial statistics tools, territorial patterns are identified. The results are showing clear spatial patterns or regions where the impact was rather strong and territories where the impact was acceptable. By Taking into consideration these statistical observations, the present research aims to understand the characteristics of these territories and what made them resistant to pandemic conditions. Moreover, with the help of statistical data, the study aims to evaluate the degree of sustainability of each destination. The findings provide insight

in understanding which type of destinations are prone to be affected by crises and how these destinations reacted during the 2020 crisis.

SOCIO-SPATIAL IMPACT OF SLUM DWELLERS RELOCATION IN ALGIERS: A FLOW ANALYSIS USING QGIS

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Since 2014, we have witnessed an acceleration of the pace of massive relocation operations in Algerian cities, particularly in the capital, with the ambition of making the city of Algiers the first African capital without slums. This article presents an evaluation of the relocation operations carried out during the period from 2014 to 2016. The objective is to identify the socio-spatial impacts of massive relocation on the province of Algiers and the neighboring cities. For this purpose, we adopted a method based on the flow analysis of slum dwellers relocated with the data visualization technique, widely used in GIS. The results show that a large number of inhabitants were relocated in a relatively short time and that there was a random distribution of slum dwellers from the capital to communes within or outside its administrative boundaries. This had negative impacts on the socio-spatial transformations of Algiers.

WHAT IS THE PRICE OF CITIES' LIVABILITY?

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Lucrarea de față; pornește de la premisa că locația unui apartament este responsabilă în cea mai mare măsură de prețul său de vânzare. Având în vedere faptul că prețul pe metrul pătrat este diferit in funcție de orașul în care se situează, atunci acesta poate oferi detalii prețioase despre caracteristicile spațiului urban.
Pornind de la întrebarea "De ce un apartament în orașul X este mai valoros decât în orașul Y?", cu ajutorul tehnicilor GIS se vor identifica factorii care determină aceste diferențe de preț și se va afla de ce anume are nevoie un oraș pentru a fi considerat atractiv. De asemenea, în funcție

de cât de important este fiecare factor pentru fiecare oraș din România în parte, se va estima prețul real pe metrul pătrat.
Instrumentele de statistică spațială avansată din ArcGIS Desktop (Ordinary Least Squares, Geographic Weighted Regression) vor ajuta la crearea unor materiale cartografice care vor ajuta pe cei care le consultă să ia decizii informate și să afle care sunt orașele in care apartamentele sunt mai scumpe decât ar trebui și invers, dar și cele în care prețul reflectă aproape 100% atractivitatea reală.

BUILDING A MULTI-LEVEL STRATEGY ON THE DEVELOPMENT OF ECOTOURISM IN THE REPUBLIC OF MOLDOVA

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The present paper proposes action for the development of ecotourism in the Republic of Moldova by also identifying common points between the views of policy makers, private actors, and non-governmental organizations (NGOs) involved in the sector.
The natural and cultural heritage of the country, together with the areas relatively unaffected by the urbanisation have a great potential for carrying out ecotourism activities. To maximize and accelerate the development of ecotourism, a multilevel strategy was selected, being an approach meant to involve all the targeted actors. The development of this sector would meet the needs of both domestic and foreign tourists, especially from Europe.
In the first stage, a questionnaire was developed for different categories of actors, due to insufficient or obsolete data related to the studied subject. Following the analysis of the answers obtained from the conducted interviews, a strategy was created based on 3 axes of actions: strengthening the cooperation between the targeted actors, introducing new competitive products, and creating a new national brand.
These axes were developed following the need to inform the population about what ecotourism is, to strengthen public-private partnerships and to improve authentic and ecological services and products. The interviews provoked an awareness of the existing potential of the country towards developing its ecotourism sector, a campaign to promote domestic tourism was launched in May 2020 and in June 2020 an agreement was

signed to create an ecotourism route in the "Plaiul Fagului" Natural Reserve in the western part of the country.

MEASURES FOR SUSTAINABLE DEVELOPMENT OF ROAD INFRASTRUCTURE AND HOW TO REDUCE THE NEGATIVE IMPACT ON THE ENVIRONMENT

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As the global population grows and urbanization progresses, infrastructure challenges arise. The whole society must take immediate steps to improve the quality of life in the long run, thus ensuring a vibrant, healthy and ecological future. Stakeholders in the development of road projects must focus on a modern, efficient and sustainable infrastructure that is reliable, environmentally friendly, safe and intelligent. Thus, there is a need to find sustainable development solutions that meet the basic needs of quality of life, taking into account at the same time carbon dioxide emissions, noise pollution, energy and water consumption, environmental impact etc.

Inclusive and sustainable industrialization, together with innovation and infrastructure, can unleash dynamic and competitive economic forces that generate jobs and income. They play a key role in introducing and promoting new technologies, facilitating international trade and enabling the efficient use of resources. However, there is still a long way to go before the population can make the most of this potential.

Given the worrying increase in environmental impact due to human actions, it is essential to build sustainable civil engineering to ensure the social and economic development of countries. This becomes more and more important and there is a greater need to take care of the natural and built environment.

Road construction is linked to the need to provide solutions such as connectivity, trade or access to various services for population, seeking positive impacts for social development.

The introduction of new and advanced technologies with increased economic efficiency, in order to use resources rationally are solutions that ensure the sustainable development of construction, reduce lead times and maintenance and rehabilitation of roads, and also reduce environmental impact.

Efforts to save natural resources must be extended to energy savings. The handling of thousands of tons of construction materials is a process that

consumes significant amounts of energy for the road construction industry. However, significant savings can be made by focusing more on treating these materials in the field and in factories. Hot asphalt mixtures are the main components of road pavement. The development of high quality binders and mixtures for use at low temperatures results in substantial savings in energy and production costs.
Road infrastructure constructions are the types of engineering works undertaken for the development of countries' road infrastructure, which have the greatest impact on the environment, but their execution cannot be abandoned, so the problem is to know how to impact as little as possible, the realization of sustainable constructions by using materials with a longer lifespan and a lower need for maintenance.

FORME DE TURISM DURABIL - REZERVAȚIA BIOSFEREI DELTA DUNĂRII

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“Forme de turism durabil - Rezervația Biosferei Delta Dunării” este o lucrare în care îmi propun să evidențiez importanța formelor de turism și a turismului durabil, analizând relațiile dintre cadrul natural și antropic al Deltei Dunării. Turismul durabil reprezintă un scop, trebuie înțeles că orice tip de dezvoltare care include dezvoltarea turismului dă naștere la anumite schimbări fizico-geografice într-o zonă. Din punct de vedere economic turismul poate fi privit ca o cerere specifică de bunuri și servicii, stimulând astfel dezvoltarea altor sectoare de activitate (agricultura, industria, transporturi etc). Turismul durabil poate fi cel mai bine realizat printr-o planificare atentă, prin dezvoltare și conducerea corespunzătoare a sectorului turistic pe baza unor principii. Elaborarea lucrării prezintă aplicarea unor metode clasice, un prim pas constă în documentarea bibliografică vastă și amănunțită dar și culegerea datelor necesare înfăptuirii studiului dar și metode moderne, aplicarea unui chestionar cu privire la practicarea formelor și dezvoltarea turismului în Delta Dunării; materiale cartografice care reprezintă principala sursă de informații care a contribuit la realizarea hărților. Relieful este analizat din perspectiva calității sale de suport pentru infrastructura turistică, fiind un factor determinant în dispunerea și amplasarea infrastructurii de cazare și alimentație, și în amenajarea drumurilor și potecilor turistice. Delta Dunării constituie una din cele mai importante zone turistice ale României, prin originalitatea și varietatea resurselor turistice pe care le

deține. Atractivitatea turistică a Deltei Dunării este datorată următoarelor elemente ale cadrului natural și antropic (spectaculozitatea peisajelor în care se îmbină suprafețele acvatice, brațele Dunării, vegetația Deltei Dunării care este variată etc.). Obiectivul specific al lucrării vizează, pe de o parte, suportul natural al rezervației care prin biodiversitate și relief poate influența în sens restrictiv activitățile antropice, pe de altă parte, modul în care oameni intervin asupra mediului, dar și analiza perspectivelor de dezvoltare turistică a unor forme de turism durabil, care să minimizeze presiunea care se exercită asupra mediului.

ANALYSIS OF THE INTEGRATION OF THE OBJECTIVES ESTABLISHED BY THE NATIONAL STRATEGY FOR BIODIVERSITY CONSERVATION IN THE MANAGEMENT OF NATURA 2000 SITES IN BACĂU COUNTY

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Representing the primordial condition of the existence of human civilization, biodiversity ensures the support system of life and the development of socio-economic systems. Within natural and semi-natural ecosystems there are established intra and interspecific connections through which material, energy and information exchanges are achieved that ensure their productivity, adaptability and resilience.

Biodiversity is extremely important in supporting the life and development of socio-economic systems. Use of its components: non-renewable natural resources - fossil fuels, minerals and renewable natural resources - plant and animal species used as food, for energy production, extraction of substances used in the pharmaceutical or cosmetics industry offers a high economic value. At the same time, it has an important role in ensuring the services offered by ecological systems, such as the regulation of pedo-climatic conditions, water purification, diminishing the effects of natural disasters.

The national strategy for the conservation of biological diversity focuses on the general objectives of conservation and sustainable use of diversity, ensuring the integration of national policies at regional and global level. The Strategy established general directions of action, strategic objectives, sets of operational objectives and action plan.

In order to ensure special measures for protection and conservation "in situ" of natural heritage assets, a differentiated regime of protection,

conservation and use has been established, according to the following categories of protected natural areas: of national interest, designated on the basis of IUCN criteria; of Community interest or Natura 2000 site: sites of community importance (SCI), special conservation areas, Special Protection Areas (SPAs) , designated according to community obligations; of international interest.
The Natura 2000 network, created at European level, opposes the current trend of fragmentation of natural habitats and is based on the fact that the development of socio-economic systems can be done only on the basis of natural and semi-natural ecological systems. The sites of community importance proposed by Romania were selected based on the national assessment of their relative importance for each natural habitat and for each species of community importance. The management of protected natural areas must take into account the economic, social and cultural requirements, as well as the regional and local particularities of the area, but the objectives that led to the establishment of the protected natural area are most important consideration.
There are a number of 15 areas of community interest (Natura 2000 sites), of which 10 SCI and 5 SPAs located in Bacău County.
The paper's aim is to analyze the integration of the objectives of the National Strategy for Biodiversity Conservation in the management of Natura 2000 sites in Bacău County ROSCI0434 Siretul Mijlociu, ROSPA0072 Lunca Siretului Mijlociu and ROSPA0063 Lakes Buhuși - Bacău - Berești.

MALDIVES ATOLLS BETWEEN NATURAL STRESS AND ANTHROPOGENIC PRESSURE: A LOOK AT THE HEALTH OF CORAL REEFS IN THE CENTRAL PART OF THE ARCHIPELAGO

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With a significant participation in the biodiversity of the Planetary Ocean, atolls and coral reefs are recognized as a key link in food chains and the processes of maintaining the natural balance of marine life. Sheltering about 25% of the species that inhabit the planet's seas and oceans and representing, at some point in their lifetime, the point of origin or passage for about 80% of marine species, reefs and their status are crucial to the evolution of the ecosystem. The Planetary Ocean.

Affected by numerous episodes of bleaching in recent decades, the Maldives reefs also withstand high anthropogenic pressure being one of the most popular tourist destinations and a major attraction for recreational diving.
The observations in this note were made in the first half of May 2021, on the occasion of a diving trip in the central area of the archipelago. The findings focused on the health of corals in some of the best-known recreational diving spots on Kaafu / Male, North Aari and South Aari / Alif Alif and Alif Dhaal and Vaavu / Felidhu atolls.
After analyzing these own observations, corroborated by the results of recent studies on the subject and my own analyzes on Landsat 8 and Sentinel 2 satellite imagery, the conclusions that emerge reinforce the belief that reefs are in a steady decline and without urgent action, globally, changing the trend of climate change - in the sense of stopping global warming - and substantially reducing the pollution of the seas and oceans, they will disappear in a few decades.

ESTABLISHING A MODEL OF COOPERATION BASED ON THE SPECIFIC PRACTICES OF THE LOCAL COMMUNITIES AND THE MANAGEMENT BOARDS OF PROTECTED AREAS IN THE CĂLIMANI MOUNTAINS

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By legal definition according to the mountain law, mountain areas are considered underserved areas. The specific geomorphologic and climatic conditions in the Călimani Mountains are, together with the lack of accessibility to decent infrastructure, social services and opportunity, the main reasons for a severe population decline. However, the area has a considerable social and economic potential owing to its rich biodiversity, confirmed through the existence of several natural protected areas such as ROSPA0133 Călimani Mountains, the natural areas of community importance ROSCI0019 Călimani - Gurghiu and ROSCI0051 Cușma. These areas include, partially or totally, two surfaces legally assigned for the protection of natural ecosystems, ecological structures and for the preservation of the specific natural processes valuable for both education and leisure purposes: the National Park Călimani and the Natural Park Upper Mures Gorge. Human settlements developed at the foot of the

Călimani Mountains have as primary economic activities forestry, agriculture, animal husbandry and the exploitation of mineral resources. The present paper sets out to analyse the ways in which the natural protected areas' management boards can cooperate with local communities, as a necessary step towards the social and economic development of the rural populations of this mountain area. A harmonious community life can thus be achieved, having as primary objectives the repopulation of the area, preservation of the cultural patrimony and raising the standard of living. The existence of natural protected areas should be seen not as a restraint, but rather as an opportunity to be ceased. Topics such as bioeconomy, sustainable development and sustainable use of natural resources and ecosystem services will be analysed. Existing problems will be identified and viable solutions will be proposed.

ANALIZA TENDINŢELOR DE EVOLUŢIE A EXTREMELOR PLUVIOMETRICE ÎN REGIUNILE AGRICOLE OLTENIA ȘI MUNTENIA

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Studiul se concentrează asupra regiunilor agricole Oltenia şi Muntenia, care deţin un potenţial agro-climatic important în ciuda deficitului pluviometric pronunţat şi magnitudinii procesului de încălzire observat în ultimele decenii, cu precădere în timpul sezonului activ de vegetație al culturilor agricole (aprilie-octombrie), în special în lunile de vară și are ca obiectiv principal analiza tendințelor de evoluție a extremelor pluviometrice prin intermediul a șapte indicatori climatici pe parte de excedent şi deficit de apă din precipitaţii cu relevanță pentru agricultură, respectiv numărul maxim de zile consecutive cu și fără precipitații; suma cantităților de precipitații din zile umede; numărul de zile cu precipitații abundente cu cantități de precipitații zilnice mai mari de 10 mm, 20 mm și 30 mm și cantitatea maximă de precipitații în 24 ore, care au la bază identificarea de evidenţe de depăşire ale unor praguri cu relevanţă statistico-climatică, derivate atât din valori prag fixe sau absolute recunoscute în practica meteorologică sau climatologică, dar şi din valorile asociate percentilelor extreme (inferioare sau superioare) definite în raport cu climatologia locală. Lucrarea utilizează date climatice zilnice gridate de precipitaţii atmosferice din cadrul bazei de date ROCADA pentru o perioadă de 53 ani (1961-2013), iar analizele de tendinţă au fost realizate pe de o parte, atât la nivel local prin selectarea punctelor de grid

cele mai apropiate staţiilor meteorologice din regiunea de studiu, cât şi la nivel regional, prin medierea aritmetică a pantelor estimate ale tendinţelor locale. În cadrul studiului, evaluarea semnificaţiei statistice a tendinţei de evoluţie a regimului pluviometric s-a realizat prin utilizarea testului non-parametric Mann-Kendall, aceasta fiind estimată în raport cu pragul semnificaţie de cel puţin 10% (p-value<0.1).

THE SPATIAL FEATURES OF RESILIENCE. A REGIONAL AND NATIONAL SCALE PERSPECTIVE

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Open University of the Netherlands (OU), Heerlen, The Netherlands

The presentation will highlight the main theoretical ideas related to the spatial component of resilience. The emphasis will be on the national and regional scale as key interest territorial levels of political decision in UE.

LEAST DYNAMIC AREAS FROM LULC PERSPECTIVE, A BIODIVERSITY RESERVOIR? CASE STUDY: THE NORTHEN PART OF PUTNA-VRANCEA NATURAL PARK

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The present study highlights the evolution of the land use type between 1895-2005, from the northen part of Putna-Vrancea natural park. Cartographic and historical materials were used for the analysis of land use changes (map 1: 50.000 from 1895 and map 1: 25.000 from 1970), as well as orthophotoplans from 2005. After extracting information from the three distinct types of mapping materials, it was observed that in the 110 years analyzed, the forest area inside the park registered a continuous increase with 10% (from 70% in 1895 to 79.6% in 1970, and to 81.1% in

2005). The degree of occupancy of the built surfaces is in a continuous increase from 0.28% in 1895, reaching 0.74% in 2005. By extending the built surfaces, both the tendency of fragmentation of the natural habitats and the decrease of wildlife corridors.

RESILIENCE ATLAS: CASE STUDY - EUROPEAN SUMMER HEAT WAVE 2003

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The presented paper is a case study of the capacity and performance of EU regions that confronted the major Heat Wave from 2003. It is an integrative approach that takes into consideration the drivers of resilience to environmental shocks. The outcomes can contribute to a more comprehensive vision of EU adaptation to the future growing pressures induced by climate change.

THE IMPACT OF ORCHARD MANAGEMENT ON THE LANDSCAPE OF FALTICENI PLATEAU. CASE STUDY: FALTICENI ORCHARD

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The orchards represent an efficient variant of land use in hilly areas, as they can be located in areas with a slope from 3-6% to 15-20% in situations where the slopes are uniform or agro technical works are performed. Although in the study area fruit growing is an activity recognized as traditional, important areas planted with fruit trees, which have a scientific basis appeared after 1960, during the communist regime, when, on steeper slopes, they were performed agro technical works. Many of the orchards built in the 1980s are found in the period 2005-2012 as being degraded or even removed. On the slopes on which terraces were built and the orchards were removed, there are forms of degradation specific to the slopes (landslides). Both cartographic materials and satellite images have been helpful in tracking the dynamism of orchards

from 1960 untill now, and finally, as a result of the evolution of orchard types (the emergence of superintensive orchards) there is a more pronounced tendency to place orchards. in areas with lower slopes and leaving old sites, thus generating a predisposition to landslides.

ENVIRONMENTAL ASSESSMENT OF ALGERIAN RURAL BUILDING MATERIALS

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The objective of this research is to study the environmental impacts of a rural building located in Algeria, in different phases of the building types, namely: the base case, conventional and the bio climatic optimizations. In order to know the distribution of the impacts, the environmental gain linked to the optimization of the basic case and the difference between the two optimized cases "conventional and bioclimatic. This part is realized with the help of ELODIE software.
An energetic analysis was performed to compare the two optimized techniques to reduce the energy requirement, the results of this study gave almost identical values. For this reason, we opted for an environmental analysis.

RESILIENCE PERFORMANCE OF EU ECONOMY. NATIONAL VS REGIONAL SCALE

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Economic resilience is the capacity of multidimensional transformation of an economic system - firms, labor and financial institutions - to absorb shocks, adapt or/and transform into a more performant development pattern. Resilience analysis is necessary for the adoption of evidence-based policies, especially in the case of the economic governance of the European Union. Using an index-based method, we propose an assessment of the resilience performance of the European Union economy in the context of the 2008-2009 economic crisis, integrating 4 economic systems, with several indicators identified for each of the systems as sensitive to resilience reflection: macroeconomic resilience, firms' resilience, financial-banking system's resilience and labor market resilience. The cuurent presentation focuses on the macroeconomic

dimension of resilience, assessed on the basis of 11 indicators selected as the most sensitive in the context of the crisis, in order to highlight both resistance and recovery, the two different stages of resilience. The analysis was performed at national and NUTS2 level, facilitating the clustering of the analyzed systems into 4 major categories, depending on the resilience performance: Resistant and recovered; Resistant and unrecovered; Non-resistant and recovered; Non-resistant and unrecovered. Although the results reflect the same center-periphery model specific to the European economy, the differences identified are relatively small, both between countries and between regions.

CHALLANGES IN MAPPING RESILIENCE PERFORMANCE AND CAPACITY

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It is a brief presentation of the actual stage of the Resilience Atlas emphasizing the main concept, the structure and the relation between different chapters. The work that was already accomplished will be presented in order to obtain feedback from the other participants. The outcomes will be analysed from the viewpoint of actual issues/challenges and the solutions to solve them.

RESILIENCE CAPACITY AND PERFORMANCE IN THE EUROPEAN CONTEXT. DEMOCRATIC DIMENSION

Loredana Maria SIMIONOV

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Over the last decade the EU has been hit by various shocks (economic crisis, migrant crisis, Ukraine crisis, etc) so that it is no wonder that the European policy-makers have started to increasingly instrumentalise the need to achieve resilience. The focus on the concept of resilience has inevitably "contaminated" the EU agenda and has gradually captured all the salient issues within EU's development policy and agenda. The proliferation of policy and academic papers was particularly noticeable in EU's Foreign Affairs and Security Policy (FASP) (Tocci, 2019).

While the literature has started to look in the last few years at both the emergence of geopolitics in the world order as well as the rise of resilience in the approaches of international actors, (Juncos, 2016; Wagner and Anholt, 2016), little attention has been allotted to exploring the dynamic between the two concepts. As geopolitics in the EU are bound to the western model of democracy and the liberal world order, the current paper aims at exploring the conceptualisation of democracy resilience in the EU. In this regard, the paper conceptualises a resilient democracy as a democratic system that is resilient in the face of crisis and change (that could be both of internal or geopolitical - of external origin). Above all, resilience refers to specific properties and characteristics of a social-political system to cope, survive and recover from complex challenges and crisis (shocks) that could lead to a systemic failure. The main findings point out that democracy resilience emerges as the outcome of inclusive, accountable governance institutions and processes that can effectively shocks at national and local levels.

INDIVIDUAL AND SOCIAL RESILIENCE IN EU. A NATIONAL AND REGIONAL SCALE APPROACH

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The presentation will analyze the influence of some individual and social indicators on the regional resilience at EU level. The most important result is the lower resistance of Mediterranean area (Italy, Spain, Greece). Also, the lower recovery individual index for central and northern countries might be explained by the higher resistance values. The social dimension highlights a different resilience map of the European Union. Contrary to individual resilience, which was calculated using indicators that were more easily influenced by the economic dimension (happiness, life satisfaction), social resilience was computed using indicators that rely and reflect social connexions between individuals (count on hep, recommend the place to live) as well as social protection (public expenditure on health, social benefits) Therefore, it is not suprising at all to notice countries such as Italy, Estonia, Denmark, or the Netherelands among the performers.

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