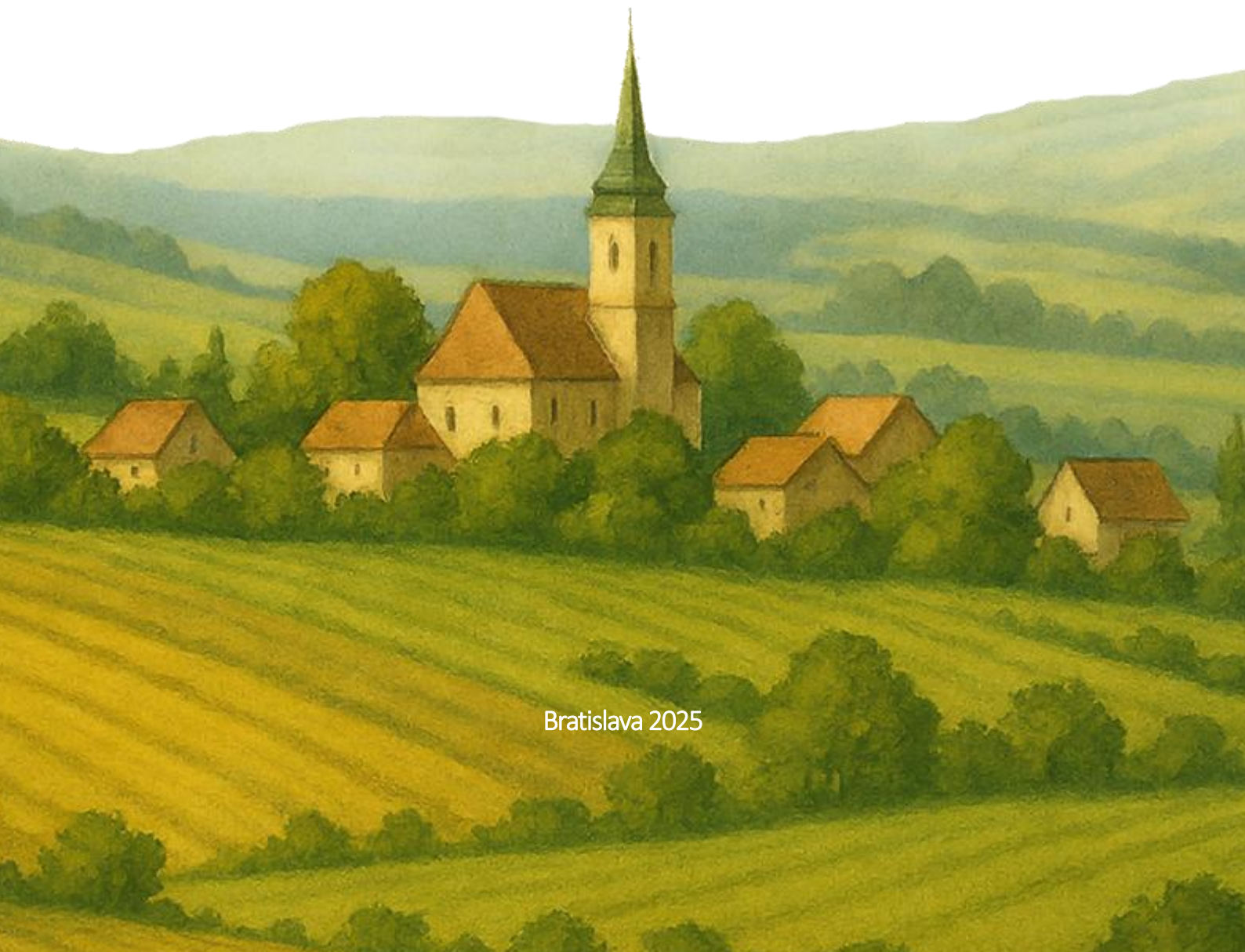




# Slovakia's contribution to the development of landscape ecology

Petra Gašparovičová, Ľuboš Halada et al.



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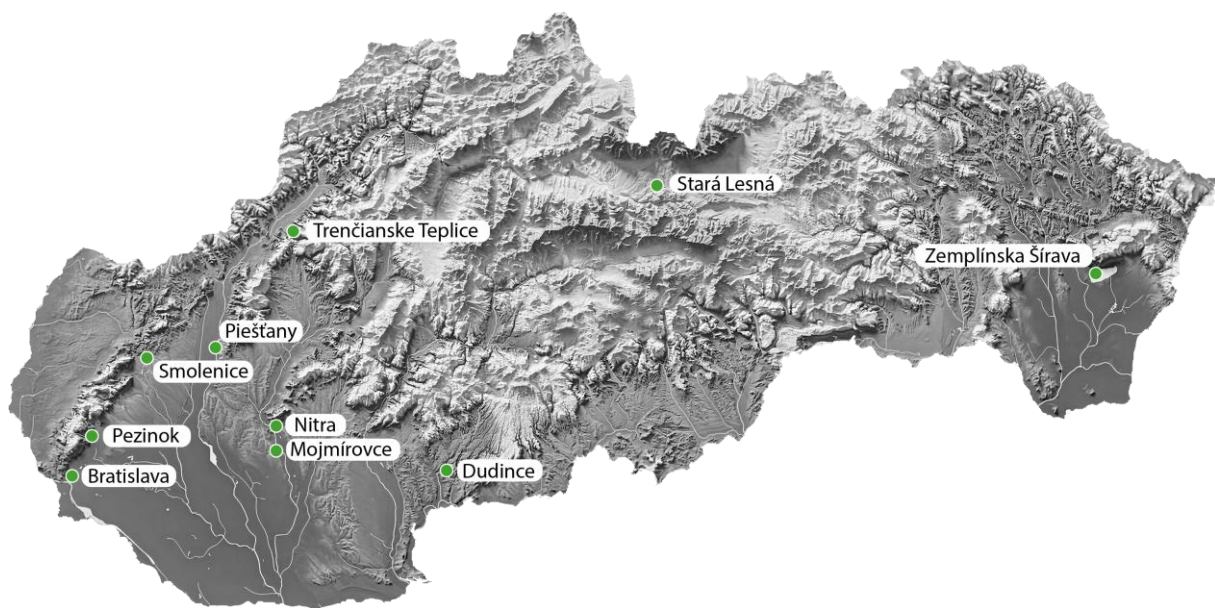
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# Introduction

This document represents an updated version of the publication Kozová et Hrnčiarová (eds., 2011), originally prepared by the Slovak Association for Landscape Ecology (IALE-SK). It aims to provide a broader view of the development of landscape ecology in Slovakia and the country's contribution to international cooperation and IALE activities. The document also includes a detailed overview of international symposia in landscape ecology organized in Slovakia, as well as information about key institutions and academic activities in Slovakia. A special section is devoted to Prof.

Milan Ružička, who played a key role in the foundation and development of landscape ecology in former Czechoslovakia and had a significant impact on the aforementioned activities. The publication also features a Photo Review, showcasing historic photographs from past symposia and their distinguished participants. We believe this publication will serve as a valuable resource, offering a comprehensive insight into the Slovak contribution to the international landscape ecology community and the founding and development of IALE.



*Map of Slovakia showing the locations where International Symposia on Problems of Landscape Ecological Research have been held in the past*

# The Beginning: From Symposia to IALE

The idea of establishing an international organisation dedicated to communication and cooperation in the field of landscape ecology was first conceived through long-term international collaboration, particularly between scientists from Eastern and Western Europe. One of the most important platforms for such collaboration emerged through the series of International Symposia on the Problems of Landscape Ecological Research, initiated in former Czechoslovakia by Professor Milan Ružička and his team from the Slovak Academy of Sciences. These symposia have been held regularly since 1967 and have continued in the Slovak Republic since 1993. Altogether, 19 symposia have been organised, each contributing significantly to the development of landscape ecological science and international cooperation.

The inspiration for establishing an international association dedicated to landscape ecology stemmed from a Slovak proposal presented in the conclusions of the 1st International Symposium (Bratislava–Východná, September 4–9, 1967), which was later further developed among Dutch landscape ecologists during the late 1970s. At that time, the Netherlands already had a strong tradition of international collaboration in the field, mainly with Western Europe and North America. However, the decisive influence came from Dutch participation in scientific meetings in Eastern Europe, particularly in the German Democratic Republic, Czechoslovakia, Poland, and the Soviet Union (notably Siberia).

Professor Ružička and his colleagues maintained close contacts with institutes in Germany, France, and the Netherlands, as well as with institutions in other parts of Eastern and Southern Europe. These international connections were crucial for building trust and establishing mutual understanding across the

political and cultural divides of the Cold War era. It soon became clear that there was enormous potential for advancing both the scientific and practical dimensions of landscape ecology by fostering cooperation between researchers, planners, and managers from East and West.

The idea gained momentum and took more concrete form at the International Congress "Perspectives in Landscape Ecology" held in Veldhoven, the Netherlands, in April 1981. During this congress, a group of Dutch ecologists proposed the foundation of a new international association, to be officially established the following year. It was agreed that the founding would take place during the 6th International Symposium on the Problems of Landscape Ecological Research, held in Piešťany, Czechoslovakia, October 25–30, 1982, in honour of the strong Czechoslovak contributions to international cooperation in this field.

During the founding event in Piešťany, I.S. Zonneveld became the first President of the International Association for Landscape Ecology (IALE). He wrote in 1983, "IALE was conceived in Veldhoven, The Netherlands, in 1981, and born in Bratislava, in 1982". Professor Milan Ružička was elected as the first Vice-President of IALE, a position he held for two full terms, from 1982 to 1991. His leadership and vision were instrumental in shaping the organisation during its formative years.

In 1984, at the first IALE seminar in Roskilde, Denmark, the IALE Executive Committee approved the establishment of the Eastern European Region of IALE, a move initiated by Slovak scientists and chaired by Ružička. Between 1984 and 1990, the international symposia held in Czechoslovakia became part of IALE's official activities, coordinated by the



Secretariat of the Eastern European Region. These symposia played a vital role in promoting exchange of experience and knowledge between Eastern Europe and other regions of IALE, while also contributing to the scientific foundations of landscape ecology on an international scale.

Especially until 1989, these events served as a bridge between East and West, enabling the sharing of methodologies, perspectives, and practical experiences in landscape research and planning. They offered unique opportunities for networking at a time when geopolitical barriers often restricted direct scientific cooperation.

Over the decades, the Slovak-led symposia attracted many renowned international participants, including: P. Agger (Denmark), G. W. Arnold (Australia), T. Bartkowski (Poland), O. Bastian (Germany), W. Bleuten (Netherlands), J. Brandt (Denmark), L. Breuste (Germany/Austria), A. Buček (Czech Republic), B. Bunce (UK), P. Czorba (Hungary), P. Daget (France), J. Demek (Czech Republic), X. Duning (China), R. T. T. Forman (USA), G. Haase (Germany), M. Godron (France), F. B. Golley (USA), J. L. Guillermin

(France), H. Gulinck (Belgium), A. Hynek (Czech Republic), R. H. G. Jongman (Netherlands), J. Kondracki (Poland), O. Kontturi (Finland), P. Kovář (Czech Republic), W. Kwarda (Austria), S. M. ten Houte de Lange (Netherlands), Z. Lipský (Czech Republic), Ü. Mander (Estonia), H. Marinov (Bulgaria), G. Merriam (Canada), M. R. Moss (Canada), N. Nakagoshi (Japan), Z. Naveh (Israel), V. S. Preobraženskij (Russia), A. Richling (Poland), M. Ružička (Slovak Republic), F. Saris (Netherlands), M. Seger (Austria), J. Schmithüsen (Germany), K. F. Schreiber (Germany), V. A. Snytko (Russia), J. Solon (Poland), J. F. Thorne (USA), M. G. Turner (USA), T. Wrbka (Austria), D. van der Zee (Netherlands), I. S. Zonneveld (Netherlands), W. Zsilincsar (Austria), F. Žigrai (Austria) and others.

The tradition of the International Symposia on Problems of Landscape Ecological Research remains strong. To date, 19 symposia have been held, and the series continues to offer a unique forum for scientific exchange, fostering both academic collaboration and practical applications in landscape planning and management.



*Participants of the 1979 symposium on landscape ecology gathered during a social evening*

# International Symposia on Problems of Landscape Ecological Research

**The 1<sup>st</sup> International symposium**, held in September 1967 (Bratislava and Východná, High Tatra Mountains), focused on **“Theoretical problems of biological landscape research”**. The symposium was organised by the newly established Institute of Landscape Biology SAS.

Objectives of the symposium were oriented to:

1. Necessity of international cooperation to solve the problems of landscape biological research
2. Biological and ecological landscape research content and aim
3. Problems of practical application for land use.

The Symposium was concluded with the following priorities and recommendations:

- To begin intensive cooperation on the international level, e.g., to use the model established by the 1<sup>st</sup> International Symposium to organise future meetings, and to focus upon specific problems.
- To shape the new interdisciplinary research on the boundary of many scientific branches (to establish a journal of international scope with an international editorial board).
- To consider the possibility of establishing an international scientific organisation which would have the task to concentrate information about landscape-ecological research, to arrange their exchange, and to support future cooperation.

All three indicated recommendations were successful. In 1982, IALE was established at the 6th International Symposium in Piešťany. In 1982, *Ekológia* (Bratislava), a journal for ecological problems of the biosphere, was established. In 1987, the international journal *Landscape Ecology* was first published.



*Professor Milan Ružička, performing the traditional Slovak dance “odzemok” during a social evening during the first symposium on landscape ecological research in 1967.*

**The 2<sup>nd</sup> International symposium** took place in September 1970 (Smolenice) and was aimed at the **“Application of landscape ecology in practice”**. The symposium was organised by the Institute of Landscape Biology SAS. Objectives of the symposium were oriented to:

1. Function of forest and water in the region
2. Biological/ecological planning
3. Agriculture and exploitation of cultivated soil

Symposium participants fully accepted the final recommendations of the 1<sup>st</sup> symposium and considered them as valid for the development of landscape ecology. In addition, it was emphasized that the problems discussed at the symposium comply with the goals and efforts of many international organisations (UNESCO, FAO, IUCN, IFLA, EHO, IBP, INTECOL, etc.). The participants having contacts with these organisations promised to strive for close collaboration. Symposium participants agreed upon the recommendations relating to

- Problems of applying landscape ecology in the practice and

- Scientific-organisational problems of consolidating and supporting international collaboration.

**The 3<sup>rd</sup> International symposium** was held in November 1973 (Smolenice) with main topic: the “Content and object of the complex landscape research in the protection and formation of human environment”. The symposium was organised by the Institute of Landscape Biology SAS. Objectives of the symposium were oriented to:

1. Theoretical and methodical problems in the complex landscape research.
2. Concepts and terminology
3. System approach and mathematical methods
4. The role of specialised scientific branches
5. Some selected problems of the research and application of results in the specialised scientific branches in the protection and formation of the human environment.

The Symposium was concluded with the following recommendations:

- To intensify the initiated cooperation
- To attempt the unification of the terminology
- To concentrate the care on the environmental problems
- The necessity to establish an international landscape ecological journal.

**The 4<sup>th</sup> International symposium** “Ecological data for optimum landscape utilisation (November 1976, Smolenice) was aimed at the preparation and elaboration of the ecological document for optimal utilisation of the landscape. The symposium was organised by the Institute of Experimental Biology and Ecology, SAS. Objectives of the symposium were oriented to:

1. Data and inputs for complex landscape ecological research
2. Methods for data provision and its synthesis

3. The content and methods of landscape ecological proposals in comparison of application results

Symposium participants agreed upon the recommendations relating:

- To pay attention especially to the changes and flows in the landscape
- To continue with the confrontation among the landscape ecological proposals and possibilities of their application in practice.

**The topic of the 5<sup>th</sup> International Symposium** was “Ecological stability, resistance, diversity, potentiality, productivity and equilibrium of landscape” and it was held in November 1979 (Stará Lesná, High Tatras Mts.). The symposium was organised by the Institute of Experimental Biology and Ecology, SAS. The symposium was organised by the Institute of Experimental Biology and Ecology, SAS. Objectives of the symposium were oriented to:

1. Theoretical questions of ecological stability, resistance, diversity, and equilibrium in the landscape
2. Methodologies of study of ecological stability, resistance, diversity, and equilibrium in landscape
3. Biological productivity and the cycle of elements in the landscape
4. Ecological potentiality of landscape
5. Ecological optimisation of landscape utilisation

The Symposium participants recommended:

- To stress the system approach in landscape ecological research
- To indicate the necessity to increase the education of young scientists in landscape ecology
- The involvement in complex landscape ecological research of specialised institutions was affirmative appreciated
- In the final recommendation, the Czechoslovak endeavour to enhance international cooperation was formulated in the requirement to find an adequate

organisational form for supporting landscape ecological research.



*Participants of the 1979 symposium*

**The First International Congress “Perspectives in Landscape Ecology”, held in Veldhoven (April 1981), recommended that in the frame of the 6<sup>th</sup> International Symposium (to be held in Czechoslovakia in 1982), IALE should be established.**

A team of Dutch landscape ecologists undertook the formulation of requirements and submitted more concrete designs at the first international congress. The first working principles for the foundation of the International Association for Landscape Ecology (IALE) were accepted in the presence of 300 participants from 24 countries (including Slovak participants - Milan Ružička, together with L.Miklos, presented a paper “Methodology of ecological landscape evaluation for optimal development of territory”).

The Preparatory Committee, consisting of members of the Dutch Society of Landscape Ecologists, was initiated. At the congress, the participants recommended that the foundation of IALE be carried out at the 6<sup>th</sup> International Symposium on problems of ecological research of landscape (held in former Czechoslovakia in 1982). The proposal was based on the fact that the international symposia organised by the Slovak Academy of Sciences have been a base for this cooperation, and the participants of the congress wished to regard the tradition in this way.

**The 6<sup>th</sup> International Symposium** in October 1982 (October 25 – 30, Piešťany) was focused on the **“Ecosystem approach to the (agricultural) landscape”**. The symposium was organised by the Institute of Experimental Biology and Ecology, SAS.

One of the most important tasks resulting from the recommendations of the 5<sup>th</sup> International symposium, held in November 1979 (Stará Lesná, High Tatras Mts., Slovakia) and consultations of the International Congress on Landscape Ecology in April 1981 (Veldhoven, the Netherlands) was to develop and support ecosystem approach to the landscape and at the same time to devote special attention to the agricultural land. Objectives of the symposium were oriented to:

1. Ecosystem approaches to the landscape
2. Ecosystem aspects of agricultural landscape formation and use (theoretical and methodological questions; agricultural landscape planning and development;
3. Stability and diversity from the landscape ecology aspect
4. Selected concepts and terms in the sphere of landscape ecology

The symposium-based discussion opened within the objectives (topical panels). The establishment of IALE as one of the crucial points was also placed on the agenda of the Symposium.

During the Piešťany symposium, a draft of statutes was discussed and finalised by a multinational working group. The Joint Working Group for the preparation of IALE prepared the final version of the statutes of the new organisation on October 26, 1982. On October 29, 1982, in the morning, discussion participants from Austria, Canada, Denmark, the Federal Republic of Germany, France, the Netherlands, Nigeria, Portugal, Thailand, and the USA adopted the statutes of IALE. The participants from Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, and the Soviet Union participated as observers since their official cooperation had to



be discussed first with representatives of their respective academies of sciences.

The fact that the establishment of IALE took place in former Czechoslovakia was an honour to the Czechoslovak science and research, which laid the foundations for the development of international cooperation in this area. The former socialist countries conducted ecological landscape research within the framework of the Common Mutual Economic Aid (CMEA) scientific and technical cooperation on the problem of protection of Ecosystems (Biogeocenoses) and Landscape, thus contributing to the solution of the question concerning the formation and protection of the environment. Co-operation between IALE and INTECOL was also discussed.

During the symposium, nominations of the members of the Executive Committee and the election of a preliminary Executive Committee were realised. The symposium participants expressed the wish to nominate Milan Ružička, one of the “spiritual fathers” of IALE, as a vice-president of IALE. Due to organisational circumstances, Milan Ružička was able to accept his nomination as vice president of IALE at the beginning of 1984.

At the same time, the organisers of the symposium – the Institute of Experimental Biology and Ecology SAS – were entitled to prepare a proposal of the Statutes of the Region and the connections with the General Secretariat of IALE.



*Key leaders of landscape ecological schools (left to right): G. Haase (Germany), V. Preobraženskij (Russia), M. Ružička (Slovakia) and L. Mičian (Slovakia)*



*Colleagues from Poland (left to right): Professor A. Richling and Professor T. Bartowski*



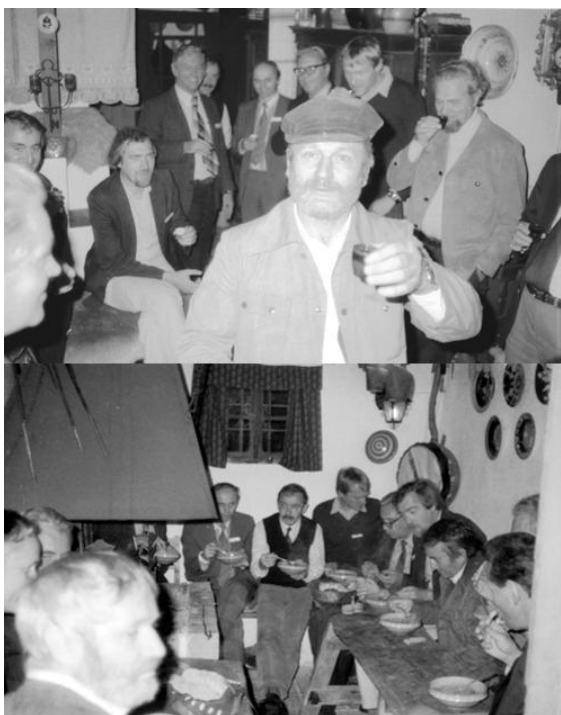
*Evening party (left to right): L. Miklós, M. Ružička*



*Ružička's band performing with S. M. ten Houte de Lange (far right) during the 1982 symposium*



*S. M. ten Houte de Lange, M. Ružička, J. Brandt (left to right)*



*Gathering of symposium participants at Professor Milan Ružička's cottage near Piešťany, reflecting the informal and hospitable atmosphere that fostered scientific and personal connections.*

**The Eastern European Region of IALE was established at the First IALE seminar held in Roskilde.**

On October 15<sup>th</sup>, 1984, the First IALE seminar was held in Roskilde. Milan Ružička, together with L. Miklós, presented a plenary paper: Methodology of synthesis in landscape ecological planning (LANDEP). At the First IALE seminar, the Executive Committee of IALE approved the establishment of the Eastern European region of IALE (EER IALE), with its regional secretariat located in former Czechoslovakia. The Executive Committee consisted of:

Chairman: M. Ružička (former Czechoslovakia)

Vice-chairman: T. Bartkowski (Poland)

Vice-president: G. Haase (former German Democratic Republic)

Vice-chairman: T. D. Alexandrova (former Soviet Union)

Secretary: M. Kozová (former Czechoslovakia)

Deputy Secretary: T. Hrnčiarová (former Czechoslovakia)

Treasurer: P. Nováček (former Czechoslovakia)

Dozens of renowned landscape ecologists from all over the Eastern European region have signed up to be members of this organization. The aims of the regional secretariat were:

- To coordinate the IALE activities within the member countries
- To ensure contact with the international IALE Secretariat
- To publish the IALE Bulletin extended by a separate column with regional information.

**The 7<sup>th</sup> International Symposium** was aimed at the “**Topical problems of landscape ecological research and planning**” (held in October 1985 in Pezinok). Symposium was organised by the Institute of Experimental Biology and Ecology SAS and the Secretariat of the Eastern European Region of IALE. Objectives of the symposium were oriented to:

1. Synthesis and comparison of methods usable in landscape-ecological planning
2. Comprehensive evaluation of the landscape
3. Special evaluation of the landscape
4. Ecological monitoring of the landscape.

The second meeting of the IALE General Assembly was held during the symposium, and a new working group within IALE focused on landscape ecological planning was initiated (chairman: L. Miklós, secretary: M. Kozová).

During the symposium, favourable conditions for the preparation of further cooperation within the Eastern European Region IALE (EER IALE) were created. A survey of the participation of the countries of the Region was made – Bulgaria, German Democratic Republic, Hungary, Poland, Soviet Union, and Czechoslovakia were interested in membership of the Region. The Secretariat of the Region was in contact with representatives of the EER IALE member countries. During 1985-1988, they discussed the prerequisites of the region as well as the IALE rules and the state of the creation of national sections – associations. In

1985, the Polish Section of IALE was established. The Preliminary Council of the EER IALE and the Executive Committee were approved for the period from 1988 to 1991.

**The 8<sup>th</sup> International Symposium** “Spatial and functional relationships in landscape ecology” was held in October 1988 (Zemplínska Šírava). Symposium was organised by the Institute of Experimental Biology and Ecology of the SAS and the Secretariat of the Eastern European Region of IALE. The main objectives of the symposium were as follows:

1. Spatial relationships in landscape ecology (present problems on landscape-ecological research; spatial flows of energy, matter, and organisms in the landscape; spatial structure of landscapes)
2. Functions of biotic components in landscape (formation of territorial system of ecological stability; evaluation of spatial, qualitative, and dynamic characteristics of biotic landscape components; conservation of nature, natural resources, and ecological monitoring).

Within the framework of the symposium, a professional field trip through the Eastern Slovakian Lowland was organised, and the main research results of the Bioproject and the target-oriented project „Ecological Optimisation of the Eastern Slovakian Lowland utilisation“ were presented.

A short meeting between the old and the new Committee was held on October 2<sup>nd</sup>, 1988, in Zemplínska Šírava. A session of the new Executive Committee of IALE was held on October 3<sup>rd</sup>, 1988, as well as the General Assembly of IALE. The “Temporary Council” of IALE has been established as the chief managing unit, which should control the work of the Executive Committee. A session of the representatives of the Eastern European Region of IALE was held; within the framework of this session, a temporary council of the region has been established.

At the session, a proposal for the establishment of a new working group of IALE „Landscape-

Ecological Planning“ was also initiated. The establishment of the working group should meet the following targets:

- To stimulate the effort of the landscape ecologists, planners, and managers in this field, to support better personal contacts
- To create the basis for applying the methods of landscape ecological planning developed by one country on the territory of another one, to eventually develop common methods, ecological studies, or projects
- To organise regular meetings of the working group within the framework of international symposia (e.g., within the framework of the International Symposia on Problems of Landscape Ecological Research held in Czechoslovakia every three years), and eventually within the framework of other international seminars or regional meetings.



*D. Bartlett, M. R. Moos, O. Konturi (left to right)*



*G. Merriam, I. S. Zonneveld, S. M. ten Houte de Lange (left to right)*



*The symposium saw an exchange not only of ideas and experiences, but also of bow tie and tie – a playful exchange between Professor Ružička and a Dutch colleague*



*F. B. Golley, I. Daubner, M. Ružička, R. Mati, I. S. Zonneveld (left to right)*



*M. G. Turner*



*First row (left to right): J. Arnold, P. Golley, M. G. Turner, D. Bartlett, H. Ružičková, J. Húsenicová  
Second row: F. B. Golley, B. Rovný*



*Evening party*



*Participants of post-symposium excursion*



**The 9<sup>th</sup> International Symposium** “Theory and practice in landscape ecology” was held in October 1991 (Dudince). The symposium was organised by the newly re-established Institute of Landscape Ecology SAS in cooperation with the Secretariat of the Eastern European Region of IALE (which concluded as a reason a new political and social chance for its activities) and the Commission for Environment of the Slovak Republic. Symposium objectives were as follows:

1. Basic philosophical and theoretical principles of landscape ecology
2. Application methods of research results in landscape ecology
3. Wetland aquatic landscape and water management
4. Anthropogenic changes and ecology of urbanised landscape
5. Soil factors and soil erosion

Participants agreed on these principal recommendations:

- To concentrate on the long-term experimental research in the field stations situated in different types of landscapes
- To modernise the methods of laboratory and field research.

**The 10<sup>th</sup> International Symposium** (November 1994, Smolenice) had as a main topic “Present State and New Trends in Landscape Ecology”. The symposium was organised by the Institute of Landscape Ecology SAS. The objectives of the symposium were oriented to

1. Theory and Methodology of Landscape Ecology
2. Application in Landscape Ecology
3. Education in Landscape Ecology and Environment
4. Environmental Philosophy and Policy
5. 30 years of Landscape Ecology in Slovakia

The symposium programme reflected new trends and conclusions arising from the Earth Summit in Rio de Janeiro. In this context, it is

also important to highlight that in 1992, the Executive Committee of IALE expressed its gratitude to Ladislav Miklós (Slovakia) for his contribution to incorporating landscape ecological approaches into Agenda 21. He was actively involved in the international preparatory process for the Earth Summit in Rio. Ladislav Miklós played a key role in formulating the IALE statement, which was drafted at the Montecatini meeting in Tuscany - personally driving from Bratislava to Montecatini to contribute to and inspire this initiative.

**The 11<sup>th</sup> International Symposium** held in November 1997 (Nitra) was focused on the “System approach to the landscape research”. Within the symposium, the IALE conference “Landscape system analysis in environmental management” was organised.

The symposium was organised by the Institute of Landscape Ecology SAS together with the Faculty of Natural Sciences Comenius University in Bratislava, the Austrian Institute for Eastern and South-Eastern Europe, Department in Bratislava, and the Faculty of Natural Sciences Constantine the Philosopher University in Nitra

The symposium had these main themes:

1. Geosystem and ecosystem research in landscape ecology
2. Macro- and microstructure of landscape
3. Landscape patterns and processes in the changing environment
4. The present-day approaches and trends in teaching of landscape ecology

Scientific part (paper sessions and poster sessions) of the IALE Conference of the Working Group “Landscape System Analysis and Environmental Management” (chairman: Professor A. Richling, Poland) was presented as the 5<sup>th</sup> theme of the symposium. The topics of the IALE conference were devoted to the following problems:



1. Methodology and techniques of landscape systems analysis and their application in environmental management
2. Landscape development and evolution from a historical perspective and its relevance to understanding current conditions
3. The significance of ideas of landscape stability, integrity, and health, particularly in regions of rapid socio-economic change
4. Landscape analysis as a critical basis for identifying zones of environmental stress/hazards
5. The importance of the perception and aesthetic value of landscape and the significance of these people's approaches to, and their understanding of, landscape

In the framework of the conference, the business meeting of the working group IALE "Landscape System Analysis and Environmental Management" was held. Following the meeting discussion and subsequent proposals, along with the respective agreements, changes were made to the working group's structure. Alongside the existing work teams focused on activities related to the group's main subjects of interest, several additional teams emerged.

**The 12<sup>th</sup> International Symposium**, with the main topic "Protected areas and landscape ecological research," was held in November 2000 (Stará Lesná – High Tatra Mts.). The symposium was organised by the Institute of Landscape Ecology SAS together with the Faculty of Natural Sciences, Comenius University in Bratislava, the Austrian Institute for Eastern and South-Eastern Europe, Department in Bratislava, and the Slovak Committee for the UNESCO Program Man and the Biosphere (MaB). Objectives of the symposium were oriented to:

1. Theoretical problems in landscape ecology
2. Biosphere reserves – subject of ecological and environmental education

3. Development of landscape structure and its changes
4. Biodiversity problems in landscape ecology
5. Natural resources exploitation and its sustainable development
6. Socio-economic problems in protected areas
7. Ecological and environmental problems in protected areas

The meeting of the working group of IALE "Landscape Analysis in Environmental Management" was held during the symposium. Slovak landscape ecologists discussed with Polish and Czech colleagues about the appropriate form of this regional organization, and the first preparatory meeting of the Slovak IALE chapter was held.

The Slovak landscape ecologists decided, on the occasion of the 20<sup>th</sup> anniversary of IALE's establishment, to organise a conference in the same place where IALE was established in 1982 and compiled an evaluation of new trends in landscape ecology in the Slovak Republic and the Czech Republic.

**The conference "The New Trends in Landscape Ecology"** was held on the 20<sup>th</sup> anniversary of the "birth of IALE on October 24-26, 2002, in Piešťany. It was actually the occasion to declare the Slovak regional branch office. Special supplement of Ecology (Bratislava) was published, representing the contribution of Slovak and Czech Landscape Ecologists to the 6<sup>th</sup> World Congress of IALE (Darwin, Australia, July 2003).

The conference was organised by the Slovak Ecological Association of the SAS in co-operation with the Faculty of Natural Sciences Comenius University in Bratislava, the Faculty of Natural Sciences, Constantine the Philosopher University in Nitra, the Institute of Landscape Ecology SAS, the Faculty of Ecology and Environmental Sciences, technical University in Zvolen and the Austrian Institute of East and Southeast European Studies Vienna, Branch Bratislava.

**The 13<sup>th</sup> International Symposium** with the main topic: “**Landscape Ecology – an International Integrating Tool in Environmental Issues**” was held in September 2003 in Mojmirovce. The symposium had these objectives:

1. New Experience and Trends in Landscape Ecology and Environmentalistics
2. Application of new knowledge in landscape ecology and environmental science in practice
3. Integration programmes of EU members and accession countries
4. Environmental education and training

A final preparatory meeting of the Slovak chapter of the IALE foundation was held during the symposium. Special Supplement of Ecology (Bratislava), published in 2003, representing the contribution of Slovak and Czech landscape ecologists to the 6th World Congress of IALE (Darwin, Australia, July 2003) was distributed at the end of 2003.



*M. Ružička, L. Miklós (left to right)*



*Evening party*



*N. Nakagoshi, M. Ružička, T. Hrnčiarová, O. Bastian, W. Kvarda, W. Zsilincsar (left to right)*

**On January 15, 2004, the Slovak chapter of IALE (Slovak Association for Landscape Ecology IALE-SK)** has been founded or has been (re)founded. The IALE-SK has more than 100 members, and has organised many working sections and activities (more information can be found in the next chapter).

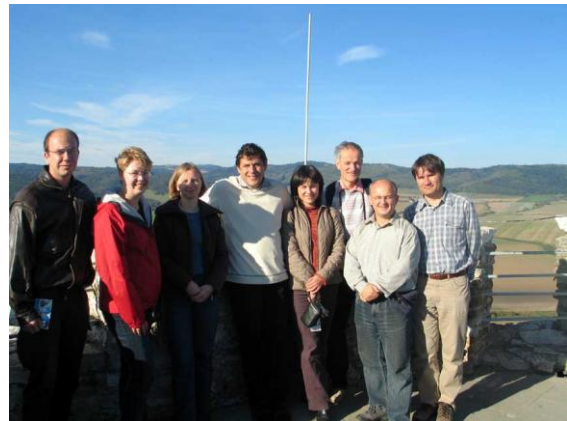
**The 14<sup>th</sup> International Symposium** with the main topic: “**Implementation of Landscape Ecology in the New and Changing Conditions**” was held in October 2006 (Stará Lesná, High Tatra Mts). The Symposium was organised by the Institute of Landscape Ecology, Slovak Academy of Sciences, in cooperation with the newly established Slovak Association for Landscape Ecology (IALE-SK), and with the Department of Ecology and Environmentalistics, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra. The symposium created a forum for landscape ecologists and representatives of related scientific disciplines for the exchange of their knowledge and experiences on these related objectives:

1. Past and current landscapes – changes and links
2. Simulation of the future in landscape ecology (scenarios, modelling)
3. Landscape in changing socio-economic conditions
4. Processes in landscape ecology

5. Shifting paradigms and concepts in landscape ecology
6. Landscape management and sustainable development
7. Other aspects of landscape ecology.

Interdisciplinary aspects focused on management problems and implementation in environmental policy were the main themes of many of the papers. The results of several international, mainly EU-funded projects, were presented, and were based on up-to-date methods and on the newest technical approaches. On the first evening of the symposium, the European IALE meeting was organised. Bob Bunce, president of IALE, provided information on preparations for a European IALE chapter. A European IALE (or IALE Europe) could work as an officially accepted partner at the European level in relation to bodies such as the European Council and the European Community. The participants discussed the positive and effective role of the proposed organisation, which could act as an “umbrella” for landscape ecology activities of the national, supranational, and cross-national European regional chapters.

Jürgen Breuste from the German IALE chapter presented the initial ideas about the European Congress of IALE 2009, which will be organised by the German, Swiss, and Slovakian IALE chapters. Proposed time and venue of the congress: July 2009, Salzburg, at the Natural Science Faculty. A course on landscape ecology for young scientists will be held in Bratislava (Slovakia) before the congress. The European Congress of IALE 2009 will be thematically oriented to the European Landscapes in Transformation – Challenges for Landscape Management.



*Participants of the 14<sup>th</sup> Symposium*

**The 15<sup>th</sup> International Symposium: “LANDSCAPE – Theory and Practice”** was held from 29 September to 2 October 2009 in Bratislava, organized by the Institute of Landscape Ecology of the Slovak Academy of Sciences, the Slovak chapter of the International Association for Landscape Ecology (IALE-SK), and the Department of Landscape Ecology, Faculty of Natural Sciences, Comenius University in Bratislava.

The symposium was attended by 106 participants from 9 countries: Austria, the Czech Republic, Hungary, Japan, Poland, Russia, Serbia, Switzerland, and Slovakia.

The topics of the IALE conference were devoted to the following problems:

1. Landscape Ecology in the Period of the 15 International Symposia (1967 – 2009)
2. Integrated Landscape Management
3. Ecological Networks, Landscape Diversity and Biodiversity
4. Ecosystem Functions in the Context of Landscape
5. Man in the Landscape



6. Environmental Communication
7. Monitoring at the Landscape Level



*Lecture room*



*Traditional folk ensemble performing at the symposium's social evening in Bratislava.*



*Speech by Ladislav Petruš*

**The 16<sup>th</sup> International Symposium** on Problems of Landscape Ecological Research, with the main topic of "**Landscape Ecology: From Theory to Practice**," was held from September 24-27, 2012, at the Congress Centre of the Slovak Academy of Sciences in Smolenice. A collaboration of institutions organized the symposium: The Institute of Landscape Ecology of the Slovak Academy of Sciences, Constantine the Philosopher University in Nitra, The Landscape Europe Network, The Slovak Association for

Landscape Ecology, and The European Academy of Sciences and Arts.

The principal aim of the symposium's debates was to identify the problems and causes related to the transfer of landscape ecological knowledge from the theoretical to the applied sphere. These challenges represent a significant opportunity for the development of the empirical, methodological, theoretical, didactic, and applied aspects of landscape ecology.

The symposium's program was structured around five key topics:

1. Theoretical issues of landscape ecology: Current concepts and trends
2. Methods in landscape research
3. Landscape and ecosystem services: Concepts and applications
4. Landscape governance and management
5. Environmental awareness and education in landscape ecology

The symposium attracted a diverse group of 58 participants from 10 countries: Austria, Bosnia and Herzegovina, the Czech Republic, Hungary, Italy, Poland, Russia, Serbia, the Slovak Republic, and the Netherlands.

**The 17<sup>th</sup> International Symposium on Landscape and Landscape Ecology**, held in Nitra, Slovakia, from May 27-29, 2015, titled Landscape and Landscape Ecology, aimed to discuss the integration of ecological principles into landscape management practices. It focused on the relationship between spatial patterns and ecological processes within landscapes, the influence of human activity, and the application of these concepts in natural resource management.

The main topics discussed were:

1. Theoretical issues of landscape ecology: current concepts and trends
2. Methods in landscape research
3. Ecosystem services and ecosystem accounting
4. Landscape governance and management



*Z. Izakovičová, J. Oszlányi, L. Zelenický, L. Vozár, M. Ružička, F. Kienast*



*Participants of the 17th International Symposium*



*Cultural program*

**The 18<sup>th</sup> International Symposium** on Problems of Landscape Ecological Research, titled "**Landscape diversity and biodiversity**," was held from **April 23–27, 2019**, at the Congress Centre of the Slovak Academy of Sciences in Smolenice, Slovakia. The event was organized by The Institute of Landscape Ecology, Slovak Academy of Sciences, Constantine the Philosopher University in Nitra, and The Slovak Ecological Society by the Slovak Academy of Sciences.

The main topics of the symposium were:

1. Landscape structure changes and land-use – its influence on biodiversity.
2. Landscape protection and biodiversity conservation (national legislation, international conventions, implementation, etc.).
3. Changes of historical structures in the landscape.
4. Urbanization and settlements development – their impacts on the landscape.



*Participants in front of Smolenice Castle*



*A traditional brass ensemble performing during the cultural program of the symposium.*

**The 19<sup>th</sup> International Landscape Ecological Symposium: Landscape and Society in the context of globalization** was held from **May 17–19, 2023**, in the town of **Trenčianske Teplice**. The event was organized by the Institute of Landscape Ecology of the Slovak Academy of Sciences (ÚKE SAV). The inaugural symposium brought together roughly 50 experts from six countries; this year's event welcomed 86 professionals from eight nations. The symposium aimed to evaluate globalization's impact on landscapes, their components, and ongoing processes, as well as



the resulting socioeconomic consequences. Objectives of the symposium were oriented to:

1. Globalisation and its driving forces within the landscape context
2. Innovative approaches in landscape-ecological research
3. Ecosystem services and ecosystem accounting
4. Participative and interdisciplinary landscape research
5. Practical implementation of landscape-ecological research



*Symposium session in the lecture room.*



*Participants enjoying the social dinner with a welcome speech by J. Oszlányi*



*Informal networking during a coffee break at the 2023 Symposium.*

Participants engaged in discussions about theoretical and methodological approaches for evaluating global megatrends and their real-world applications. The exchange of knowledge was particularly significant regarding the adverse effects of globalization on ecosystems and their services. Key topics included ecosystem accounting and the MAES process, in which all EU countries are required to participate. Attendees concluded that while the scientific community is well-prepared to solve many globalization-related problems, the primary challenge lies in applying this knowledge in practice. Tradition for symposia is continuing and up to now 19 international symposia on this problem have been realised (Table 1).

Table 1: Overview about International Symposia on Problems of Landscape Ecological Research organised by Slovak Academy of Sciences from 1967 to 2023

International symposia	Term, venue, and the main organising institutions	Objectives	Number of participants and participating countries
<b>1<sup>st</sup> Symposium</b> <b>Theoretical problems of biological landscape research</b>	<i>September 4-9, 1967, Bratislava and Východná, High Tatras Mts.</i> Institute of Landscape Biology SAS	The necessity of international cooperation to solve the problems of landscape biological research.	<b>42</b> participants coming from 6 countries: Czechoslovakia, France, FRG, GDR, Hungary, Poland,

International symposia	Term, venue, and the main organising institutions	Objectives	Number of participants and participating countries
		The biological and ecological landscape research content and aim. The problems of practical application for land use.	
<b>2<sup>nd</sup> Symposium</b> <b>Application of landscape ecology in practice</b>	<i>September 21-24, 1970, Smolenice</i> Institute of Landscape Biology SAS	Function of forest and water in the region Biological/ecological planning Agriculture and exploitation of cultivated soil	<b>86</b> participants coming from 11 European countries: Belgium, Bulgaria, Czechoslovakia, France, FRG, GDR, Hungary, the Netherlands, Poland, the Soviet Union, Sweden
<b>3<sup>rd</sup> Symposium</b> <b>“Content and object of the complex landscape research in the point of view of protection and formation of the environment”</b>	<i>November 28 - December 1, 1973, Smolenice</i> Institute of Landscape Biology SAS	Theoretical and methodological problems in the complex landscape research. Concepts and terminology System approach and mathematical methods The role of specialised scientific branches Some selected problems of the research and application of results in the specialised scientific branches in the protection and formation of the human environment	<b>86</b> participants coming from 14 countries: Austria, Belgium, Bulgaria, Czechoslovakia, France, FRG, GDR, Hungary, the Netherlands, Poland, Romania, the Soviet Union, Sweden, Yugoslavia
<b>4<sup>th</sup> Symposium</b> <b>Ecological data for optimum landscape utilisation</b>	<i>November 22-26, 1976, Smolenice</i> Institute of Experimental Biology and Ecology SAS	Data and inputs for complex landscape ecological research Methods for data providing and its synthesis The content and methods of landscape ecological proposals in comparison with application results	<b>62 participants</b> coming from 9 countries: Belgium, Bulgaria, Czechoslovakia, France, FRG, GDR, Hungary, the Netherlands, the Soviet Union
<b>5<sup>th</sup> Symposium</b> <b>Ecological stability, resistance, diversity, potentiality, productivity, and equilibrium of the landscape</b>	<i>November 19-23, 1979, Stará Lesná, High Tatras Mts.</i> Institute of Experimental Biology and Ecology SAS	Theoretical questions of ecological stability, resistance, diversity, and equilibrium in the landscape Methodologies of study of ecological stability, resistance, diversity, and equilibrium in landscape Biological productivity and the cycle of elements in the landscape Ecological potentiality of the landscape Ecological optimisation of landscape utilisation	<b>114</b> participants coming from 17 countries: Austria, Bulgaria, Canada, Czechoslovakia, Cuba, Denmark, FRG, GDR, Hungary, the Netherlands, Poland, Portugal, Romania, Soviet Union, Thailand, USA, Yugoslavia

International symposia	Term, venue, and the main organising institutions	Objectives	Number of participants and participating countries
<b>6<sup>th</sup> Symposium</b> <b>Ecosystem approach to the (agricultural) landscape</b>	<i>October 25-30, 1982, Piešťany</i> Institute of Experimental Biology and Ecology SAS	Ecosystem approaches to the landscape Ecosystem aspects of agricultural landscape formation and use Stability and diversity from the landscape ecology aspect	<b>122 participants</b> coming from 16 countries: Austria, Bulgaria, Canada, Czechoslovakia, Denmark, France, FRG, GDR, Hungary, the Netherlands, Nigeria, Poland, Portugal, Soviet Union, Thailand, USA
<b>7<sup>th</sup> Symposium</b> <b>topical problems of landscape ecological research and planning</b>	<i>October 21-26, 1985, Pezinok</i> Institute of Experimental Biology and Ecology of the SAS and the Secretariat of the Eastern European Region of IALE	Synthesis and comparison of methods usable in landscape-ecological planning Comprehensive evaluation of the landscape Special evaluation of the landscape Ecological monitoring of the landscape	<b>135 participants</b> coming from 13 countries: Bulgaria, Czechoslovakia, Finland; FRG; GDR, Hungary; the Netherlands; Poland; Portugal; Thailand; Soviet Union; Sweden, Yugoslavia
<b>8<sup>th</sup> Symposium</b> <b>Spatial and functional relationships in landscape ecology</b>	<i>October 3-7, 1988, Zemplínska Šírava</i> Institute of Experimental Biology and Ecology of the SAS and The Secretary of the Eastern European Region of IALE	Spatial relationships in landscape ecology (present problems of landscape-ecological research, spatial flows of energy, matter, and organisms in the landscape, spatial structure of the landscape) Function of biotic components in landscape (formation of a territorial system of ecological stability, conservation of nature, natural resources, and ecological monitoring)	<b>148 participants</b> coming from 18 countries: Australia, Austria, Belgium, Bulgaria, Canada, China, Czechoslovakia, Denmark, Finland, FRG, GDR, Great Britain, Hungary, the Netherlands, Poland, Sweden, Soviet Union, USA
<b>9<sup>th</sup> Symposium</b> <b>Theory and practice in landscape ecology</b>	<i>October 14-19, 1991, Dudince</i> Institute of Landscape Ecology SAS; The Secretary of the East European Region of IALE; Commission for the Environment of the Slovak Republic	Basic philosophical and theoretical principles of landscape ecology Application methods of research results in landscape ecology Wetland aquatic landscape and water management Anthropogenic changes and ecology of urbanised landscape Soil factors and soil erosion	<b>70 participants</b> coming from 9 countries: Austria, Finland, Germany, East Germany, Hungary, the Netherlands, Poland, Venezuela, Czechoslovakia
<b>10<sup>th</sup> Symposium</b> <b>Present state and new trends in landscape ecology</b>	<i>November 21-24, 1994, Smolenice</i> Institute of Landscape Ecology SAS	Theory and Methodology of Landscape Ecology Application in Landscape Ecology Education in Landscape Ecology and Environment	<b>92 participants</b> coming from 13 countries: Austria, Belarus, the Czech Republic, Denmark, Finland, FRG, Great Britain, Hungary, the Netherlands, Poland,

International symposia	Term, venue, and the main organising institutions	Objectives	Number of participants and participating countries
		Environmental Philosophy and Policy 30 years of Landscape Ecology in Slovakia	Russia, the Slovak Republic, Venezuela
<b>11<sup>th</sup> Symposium System approaches to landscape research</b>	<i>November 12-16, 1997, Nitra</i> Institute of Landscape Ecology SAS in cooperation with: Faculty of Natural Sciences, Comenius University in Bratislava; Austrian Institute for Eastern and South-Eastern Europe, Department in Bratislava; Faculty of Natural Sciences, Constantine the Philosopher University in Nitra.	Geosystem and ecosystem research in landscape ecology Macro- and microstructure of the landscape Landscape patterns and processes in the changing environment The present-day approaches and trends in teaching landscape ecology	<b>70 participants</b> coming from 11 countries: Austria, Belarus, Belgium, China, Czech Republic, Germany, Japan, Poland, Russia, Slovak Republic, Ukraine
<b>12<sup>th</sup> Symposium Protected areas and landscape ecological research</b>	<i>November 7-11, 2000, Stará Lesná – High Tatras Mts.</i> Institute of Landscape Ecology SAS in cooperation with: Faculty of Natural Sciences, Comenius University in Bratislava; Austrian Institute for Eastern and South-Eastern Europe, Department in Bratislava; Slovak Committee for the UNESCO Program Man and the Biosphere (MaB).	Theoretical problems in landscape ecology Biosphere reserves – subject of ecological and environmental education Development of landscape structure and its changes Biodiversity problems in landscape ecology Natural resources exploitation and its sustainable development Socio-economic problems in protected areas Ecological and environmental problems in protected areas	<b>75 participants</b> coming from 8 countries: Austria, Czech Republic, Great Britain, Greece, Hungary, Poland, Russia, Slovakia
<b>13<sup>th</sup> Symposium Landscape ecology – an international integrating tool in environmental issues</b>	<i>September 30 – October 3, 2003, Mojmirovce</i> Institute of Landscape Ecology SAS in cooperation with: Ministry of the Environment of the Slovak Republic; Faculty of Natural Sciences, Comenius University in Bratislava, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra;	New Experience and Trends in Landscape Ecology and Environmentalistics Application of new knowledge in landscape ecology and environmental science in practice Integration programmes of EU members and accession countries Environmental education and training	<b>110 participants</b> coming from 10 countries: Austria, Belarus, Czech Republic, FRG, Hungary, Japan, Lithuania, Poland, Russia, Slovak Republic

International symposia	Term, venue, and the main organising institutions	Objectives	Number of participants and participating countries
	Austrian Institute for Eastern and South-Eastern Europe, Department in Bratislava; and others		
<b>14<sup>th</sup> Symposium Implementation of landscape ecology in the new and changing conditions</b>	<b><i>October 4-7, 2006, Stará Lesná, High Tatras Mts.</i></b> Institute of Landscape Ecology SAS, Slovak Association for Landscape Ecology (IALE-SK), and Department of Ecology and Environmentalistics, Faculty of Natural Sciences, Constantine the Philosopher University in Nitra	Past and current landscapes – changes and links Simulation of the future in landscape ecology (scenarios, modelling) Landscape in changing socio-economic conditions Processes in landscape ecology Shifting paradigms and concepts in landscape ecology Landscape management and sustainable development	<b>128 participants</b> coming from 11 countries: Austria, Czech Republic, FRG, Great Britain, Hungary, Latvia, Lithuania, the Netherlands, Poland, Slovak Republic, Turkey
<b>15<sup>th</sup> Symposium LANDSCAPE – Theory and Practice</b>	<b>29 September – 2 October 2009, Bratislava</b> (Institute of Landscape Ecology SAS, International Association for Landscape Ecology IALE-SK, Department of Landscape Ecology, Faculty of Natural Sciences, Comenius University, Bratislava, Department of Ecology and Environmentalistics, Faculty of Natural Sciences, Constantine the Philosopher University, Nitra, Institute of Garden and Landscape Architecture, Faculty of Architecture, SUT, Bratislava)	1. Landscape Ecology in the Period of the 15 International Symposia (1967 – 2009) 2. Integrated Landscape Management 3. Ecological Networks, Landscape Diversity and Biodiversity 4. Ecosystem Functions in the Context of Landscape 5. Man in the Landscape 6. Environmental Communication 7. Monitoring at the Landscape Level	<b>106 participants</b> came from 9 countries: Austria, the Czech Republic, Hungary, Japan, Poland, Russia, Serbia, Switzerland, and Slovakia.
<b>16<sup>th</sup> Symposium Landscape and Landscape Ecology</b>	<b>24-27 September 2012, Congress Centre Smolenice, SAS</b> (Institute of Landscape Ecology SAS, Constantine the Philosopher University in Nitra, Landscape Europe Network, Slovak Association for Landscape Ecology, European Academy of Sciences and Arts)	1. Theoretical issues of landscape ecology: current concepts and trends 2. Methods in landscape research 3. Landscape and ecosystem services: concepts and applications 4. Landscape governance and management	<b>58 participants</b> came from 10 countries: Austria, Bosnia and Herzegovina, Czech Republic, Hungary, Italy, Poland, Russia, Serbia, Slovak Republic, and the Netherlands.



International symposia	Term, venue, and the main organising institutions	Objectives	Number of participants and participating countries
		5. Environmental awareness and education in landscape ecology	
<b>17<sup>th</sup> Symposium Landscape Ecology: From Theory to Practice</b>	<b>27-29 May 2015, Constantine the Philosopher University in Nitra</b> (Institute of Landscape Ecology of the Slovak Academy of Sciences, Faculty of Natural Sciences, CPU in Nitra – Department of Ecology and Environmental Sciences, Slovak Ecological Society by SAS)	1. Theoretical issues of landscape ecology: current concepts and trends 2. Methods in landscape research 3. Landscape and ecosystem services: concepts and applications 4. Landscape governance and management 5. Environmental awareness and education in landscape ecology	<b>128 participants</b> came from 21 countries: Austria, Belgium, Bulgaria, the Czech Republic, Estonia, Germany, Hungary, India, Lithuania, the Netherlands, Poland, Portugal, the Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Switzerland, the U.S.A., Ukraine, and the United Kingdom.
<b>18<sup>th</sup> Symposium Landscape diversity and biodiversity</b>	<b>23 – 27 April, 2019 Congress Centre Smolenice SAS, Slovakia</b> (Institute of Landscape Ecology, Slovak Academy of Sciences Constantine the Philosopher University in Nitra Slovak Ecological Society by the Slovak Academy of Sciences)	1. Landscape structure changes and land-use - influence on biodiversity 2. Landscape protection and biodiversity conservation (national legislation, international conventions, implementation, etc.) 3. Changes of historical structures in the landscape 4. Urbanization and settlements development - impacts on the landscape	<b>92 participants</b> came from 11 countries: Slovakia, Austria, Russia, Georgia, Japan, Czech Republic, Poland, Croatia, Hungary, France, Germany
<b>19<sup>th</sup> Symposium Landscape and Society in the context of globalization</b>	<b>17. – 19. May, 2023 Trenčianske Teplice</b>	1. Globalisation and its driving forces within the landscape context 2. Innovative approaches in landscape-ecological research 3. Ecosystem services and ecosystem accounting 4. Participative and interdisciplinary landscape research 5. Practical implementation of landscape-ecological research	<b>86 participants</b> came from 8 countries: Austria, Germany, Japan, Hungary, Poland, the Czech Republic, Slovenia, and the Slovak Republic.

# The Role of Professor Milan Ružička

## **Professor Milan Ružička - the Nestor of the Slovak Landscape Ecology**



Prof. RNDr. Milan Ružička, DrSc., Dr.h.c. (1929–2024) was an important internationally recognized top-level scientist and university teacher in the area of landscape ecology and environmental sciences. He was a pioneer in the field of landscape ecology, not only in Slovakia but also in Europe.

As a young, ambitious scientist, in the years 1951–1953, he participated in the preparation and founding of the Slovak Academy of Sciences (SAS) and several biological research institutions. In 1962, he founded the Department of Biology and Landscape Design within the Biological Institute of the SAS. In 1965, it became the Institute of Landscape Biology of the SAS, and Milan Ružička was its

director (from 1965 to 1974). In this institute, he fully applied his organizational talent. The Institute was one of the first interdisciplinary scientific institutes not only in the former Czechoslovakia but also in Europe. At this workplace, he laid the foundations for the development of a new scientific field—landscape ecology - throughout the former Czechoslovakia. In 1974, when the institute was merged into the Institute of Experimental Biology and Ecology of the SAS, it had a 100-member team. After the Velvet Revolution in 1990, he renewed the Institute under the title Institute of Landscape Ecology of the SAS and directed it until 1996. From 1997 to 2002, he led the branch of this institute in Nitra. He was a founder and head (from 1994 to 2003) of the Department of Ecology and Environmental Science in the Constantine Philosopher University in Nitra. The department is part of a joint workplace with the Institute of Landscape Ecology, branch in Nitra.

He began applying the theoretical knowledge of biology he had obtained to solve environmental problems. He elaborated the theoretical-methodical bases of landscape ecology. His major success was the elaboration of the methods of landscape planning, resulting in the methodology of landscape planning known as the methodology LANDEP in co-authorship with Professor L. Miklós. It became an internationally accepted methodology of landscape–ecological planning, received in the Committee of Experts of the Council of Europe, in the documents of the Conference of the United Nations organisations on the Environment in Rio de Janeiro (1992). It was included in AGENDA 21 as one of the proposed methodologies for integrated protection of natural resources and successfully applied in many countries all over the world.

From his extensive scientific-organizational work, we may mention, for example, the coordination of the nationwide program "Ecological Principles of Landscape Use", in which all significant Czechoslovak academic and departmental research institutions dealing with this issue were involved during 1971–1990. From 1981 to 1985, he served as the guarantor for the target project of basic research no. 614 "Ecological Optimization of the Use of the Eastern Slovak Lowland", which, from 1986, was extended to all lowlands of Slovakia. In 1991–1993, he was an aide to the Minister –

chairman of the Slovak Committee of the Environment of the Slovak Republic, member of the Committee of the Environment by the Government of the Slovak Republic, and Committee of Experts by the Council of the Slovak National Committee for Environmental problems. For ten years (1995–2005), he was chairman of the Committee for Ecological and Environmental Education at the Universities of the Slovak Republic by the Ministry of Education and the Ministry of the Environment of the Slovak Republic.

He was the author or co-author of 20 books, more than 270 original scientific papers, 160 special articles, 220 special reports and information, 30 final reports, 50 scientific-popular articles, and more than 100 reviews of publications. At scientific events, international or domestic, he presented 380 papers and granted more than 100 interviews for broadcast and television.

Besides scientific-organizational work, he actively participated in the development of the international co-operation in landscape ecology. Since 1967, he has organised regularly triennial international symposia devoted to the problems of landscape ecology research. Up to now, there have been 19 international symposia. The first symposia significantly supported the foundation as well as the activities of the International Association for Landscape Ecology (IALE). In 1982, during the 6th International Symposium, the IALE was founded, and Milan Ružička became its vice-president. He held this position for two terms (from 1983 to 1991).

Milan Ružička participated in the International Congress "Perspectives in Landscape Ecology" held in Veldhoven (April 1981, the Netherlands), during which more concrete proposals were put forward for the formation of IALE. In co-authorship with L. Miklós, he presented the lecture: "Methodology of ecological landscape evaluation for optimal development of territory." He also participated in other significant international events organized (or co-organized) by IALE, such as:

The First IALE seminar was held in Roskilde (October 1984). Milan Ružička, together with L. Miklós, presented a paper: Methodology of synthesis in landscape ecological planning (LANDEP)

The Fourth International Congress of Ecology (INTECOL, Syracuse, USA, August 1986), during which a meeting of IALE was organized, and Milan Ružička presented a paper: Basic premises in landscape ecological planning

The Second International IALE seminar "Connectivity in Landscape Ecology", Münster (Germany, July 1987) - Milan Ružička, together with H. Ružičková, presented a paper Landscape structure and landscape ecological research

World Congress IALE 1995 in Toulouse (France). Milan Ružička prepared a paper: "Contribution of Slovak landscape ecology to IALE" and "Landscape ecological planning for sustainable landscape use" (he did not attend the congress in person)

Prof. Ružička was the chairman of the Eastern European Region of IALE from 1985 to 1989, based in Bratislava. Dozens of renowned landscape ecologists from the entire Eastern European region registered as members of this organization. From 2000 to 2003, he actively participated in the foundation of the Slovak Association for Landscape Ecology (IALE-SK), of which he had been an honorary member since 2004, and to which he significantly contributed.

Among other activities of international cooperation, we should mention the establishment of a coordination centre for scientific and technical cooperation of member states of the CMEA and Yugoslavia for the problem III "Protection of Ecosystems and Landscape", which fulfilled its tasks from 1972 to 1990. From 1977 to 1982, he was a member of the Czechoslovak National Committee for the International Biological Program (IBP). In 1991–1995, he was a member of the "Countryside, Wildlife and Landscape" group of the Council of Europe (Strasbourg), and in 1992–1997, he was the leader of the Corine Biotopes project (PHARE Programme).

He was the initiator of the foundation of the Committee for the Formation of the Environment by the Presidium of the SAS. He operated in the Chairmanship of the National Committee of the International Biological Programme, UNESCO Man and Biosphere. He was the initiator of the establishment of the Slovak Ecological Society (SEKOS) as well as its first chairman. He was the founder of several

scientific journals and editions, including Biology (Biológia), Biological Papers (Biologické práce), Acta geobiologica, ECOOP (Ecological Cooperation), Ekológia (Bratislava), founded in 1982, and Životné prostredie (Environment), also founded in 1982. He was the editor-in-chief of most of these journals for many years. He was a member of the editorial boards of foreign periodicals such as Environmental Pollution, Urban Ecology, and also participated in founding the journal Landscape Ecology.

His pedagogical activities were also very important. He paid special attention to the education of young scientists in landscape ecology and the environment. He played a significant role in establishing and developing the departments of ecological and environmental focus at various universities. However, he entirely dedicated himself to teaching, especially after 1990, during a period when new ecologically and environmentally oriented faculties or programs were created. Milan Ružička considered the establishment of departments of landscape ecology at various universities, especially the establishment of the Faculty of Ecology (today the Faculty of Ecology and Environmental Sciences) at the Technical University in Zvolen, to be a significant milestone. Prof. Ružička led the Department of Applied Ecology in 1993–1994 and was appointed the first professor of landscape ecology in Slovakia at this university. This was merely the confirmation of what he had rightfully deserved for many years—recognition of his excellent scientific and pedagogical achievements in landscape ecology.

Many honours (more than 40) were conferred upon him for his scientific, scientific-organisational, and pedagogical activities. In 1994, he was awarded the Gold Plaque of the SAS as the highest scientific award in Slovakia. In 1999, Milan Ružička was awarded the Distinguished Service Award. He became an honorary member of IALE for his exceptional contribution to the development of IALE as an organization and to the development of landscape ecology as a science. In 1999, he received the Award of the Minister of the Environment of the Slovak Republic for his contribution to environmental care. In 2004, he was awarded the St. Gorazd Medal by the Ministry of Education for lifetime achievement

in ecology and environmental sciences, and the state decoration of the Slovak Republic, the Order of Ľudovít Štúr, 2nd class, for exceptional merit in the field of environmental protection and creation.

Milan Ružička was the founder of the Slovak landscape ecology school; he created an unforgettable milestone in Slovak scientific and pedagogical work. He was a pioneer in the assertion of landscape-ecological thinking, education, and research.

Milan Ružička was a scientist and teacher radiating natural authority and enthusiasm for his work. The landscape-ecological tasks he undertook were always oriented in a complex way, requiring a broad interdisciplinary team and a systemic approach. Team members had to learn to respect one another and understand their role in the solution team. They were united by the motivation to achieve a common goal, were equal partners in solving the task, and after completing the task, they were united by shared project results. They even had a nickname – "Ružičkovci" ("Ružička's people"), a term that colleagues from related workplaces used. It clearly expressed that Ružičkovci represented a distinct scientific landscape-ecological school.

Milan Ružička mentored several dozen top young researchers who actively work in this field and continue to develop this school. He was able to creatively motivate his students and younger colleagues so that they were ready to seek new paths and scientific approaches. Today, Milan Ružička's students are professors and associate professors and have trained their own students, PhD candidates, and young scientists.

We are glad we had the honour to be near him and to have had the opportunity to collaborate with him on various projects, tasks, and in the organisation of scientific events, as well as in educating young people.

The results of Prof. Ružička's activity are evident in many forms – in the institutions he founded and led, journals, publications, and events - but especially in the people he raised, educated, or influenced: his workers, co-workers, and students. His thoughts and ideas continue to live on in them



*IALE Award presented to Professor Milan Ružička*



*Professor M. Ružička enjoying a performance*



*Professor Milan Ružička's 85th birthday*



# International Association for Landscape Ecology and its European Chapter

The International Association for Landscape Ecology (IALE) aims to develop landscape ecology as a scientific basis for analysis, planning, and management of the world's landscapes. IALE promotes international cooperation and interdisciplinary synergy within the research field through scientific, scholarly, educational, and communication activities. IALE encourages landscape ecologists to transcend the boundaries of individual scientific disciplines and collaborate, building theory and expanding knowledge of landscape patterns and processes. They were also encouraged to develop integrative tools and make them applicable to real landscape management situations, and to apply these tools to problem-solving. IALE provides the infrastructure for a worldwide organization of landscape ecologists, serving as a discussion platform and stimulating interaction across the disciplines. To achieve its aims, IALE has appointed an executive committee and maintains a website, as well as the IALE Bulletin, which has been published since 1983. IALE chapters (regional and national) are the backbone of IALE. Herein, regional and local contacts and information are exchanged, and national action plans are coordinated. Currently, there are three regional chapters in Africa, Europe, and North America. In addition, IALE has national chapters, established in Argentina, Australia (currently inactive), Brazil, Chile, China, Czech Republic, Denmark, France (currently has an informal status), Germany, India, Iran, Italy, Japan, Poland, Portugal, Romania, Russia, Spain, Turkey (has no official IALE chapter status), Ukraine, and the United Kingdom.

Since 1987, IALE has collaborated closely with publishers to produce the Landscape Ecology journal, which has been under Springer's management since 2004 and transitioned to open access in 2023. The association also collaborates with Cambridge University Press for the Cambridge Studies in Landscape Ecology series. Additionally, IALE organizes

regional conferences and world congresses every four years, with the next event scheduled for 2025 in Slovakia.

An important IALE activity within the European framework, initiated by Prof. J. Brandt and Prof. M. Antrop, was the preparatory process for establishing the European Association for Landscape Ecology. The European Association for Landscape Ecology (IALE-Europe) was founded on 13 July 2009, during the European IALE Conference in Salzburg, Austria.

IALE-Europe aims to coordinate the common interests of landscape ecologists at a European level. It does not replace existing national chapters. IALE-Europe supports both active national chapters and individual European members in advancing landscape ecological theory, methods, practice, and education. It also fosters the establishment of new national, sub-national, or cross-national chapters. These new chapters address landscape ecological challenges specific to European landscapes.

The organization promotes collaboration with IALE-International to strengthen research, education, and practice. It recognizes the diversity of landscapes and perspectives worldwide. IALE-Europe engages with society and decision-makers to increase understanding of the complex natural and cultural interactions that shape European landscapes. It highlights the integrative value of landscape ecology and encourages a systemic research approach.

Slovak landscape ecologists have actively engaged in IALE. Prof. Milan Ružička was the first vice-president from 1982 to 1991, and Prof. Mária Kozová served as vice-president from 2005 to 2009. In 2005, J. Oszlányi represented the Slovak region on the IALE Council. Two Slovak ecologists received service awards: Prof. Milan Ružička in 1999 and Prof. László Miklós in 2007. From 2009 to 2011, László Miklós was president and Mária Kozová a member of IALE-Europe.

# Slovak Association for Landscape Ecology

Significant activities and events in the area of landscape ecology, which took place in Slovakia after 1990, and the interest of the landscape-ecological community resulted in the creation of a favourable platform for the establishment of the **Slovak Association for Landscape Ecology (IALE-SK)**. New landscape ecology work centres were established, the status of landscape ecology studies at universities became more consolidated, and the role of landscape ecology in addressing environmental care and practice tasks was strengthened. In 2001-2002, concrete steps relating to the foundation of IALE-SK were undertaken, and in June 2003, a draft proposal of the new organization's statutes was officially registered. IALE-SK started its activities on January 12, 2004, when the first plenary meeting electing the chairman and other members of the Executive Committee took place. In April 2011, IALE-SK had 65 members. Later, the activity of IALE-SK gradually decreased and it became inactive.

IALE-SK was a national organization of the International Association for Landscape Ecology (IALE) for the Slovak Republic. It was a civic association in which scientific, professional, pedagogic, and creative workers and managers who were primarily engaged in the areas of landscape ecology, geoecology, ecology, environmental sciences, applied ecology, geography, ecosozology, landscape architecture, landscape engineering, and landscape and land use planning are voluntarily associated. Likewise, experts from other fields, who were interested in landscape ecology, might be members of the Association; all of them share the common mission to promote the advancement of landscape ecology and related scientific disciplines and to improve the landscape conservation, planning, and management.

IALE-SK aimed to participate in IALE activities, to support the advancement of landscape ecology in the Slovak Republic, and to promote its application in the context of environmental care. IALE-SK focused on interdisciplinary and transdisciplinary research with a view to contributing to the enhancement

of the quality of landscape protection, planning, creation, and management, as well as to broaden the spectrum of educational and publishing activities in the area of landscape ecology and related sciences.

IALE-SK members could carry out their activities in an organized way within the Expert Sections. These activities had to be performed in agreement with the mission and objectives of the Association. The work of IALE-SK members was organized in the frame of seven expert sections: (1) International cooperation in landscape ecology; (2) Theory and methods in landscape ecology; (3) Research and evaluation of natural hazards; (4) Mapping of landscape and vegetation structure; (5) Legislative aspects of protection, planning, and management of landscape; (6) Education and training of landscape ecology; (7) Applied landscape ecology; (Young landscape ecologists).

Primary forms of IALE-SK activities were:

- Organization of conferences and seminars relating to landscape ecology issues;
- Participation in the activities of IALE, with emphasis on activities within Europe;
- Cooperation of IALE-SK with other IALE regional chapters (e.g., Czech, Polish and German chapters);
- Cooperation with Slovak public authorities in preparation of policies, strategies, programmes, legislation, and educational activities relating to landscape protection, planning, formation, and management;
- Publishing activities and editorial work (e.g. monographs, conference proceedings, seminars and symposia, special monothematic issues of journals, etc.);
- Projects, expert activities, and cooperation with partner non-governmental organizations, especially in the area of implementation of the European Landscape Convention.

Since 2003, IALE-SK has very actively participated in preparing the National Programme for Implementation of the European Landscape Convention (ELC) and in elaborating methodologies of its partial assignments. The ELC adopted in Florence in

2000, with effect from 2004, stresses landscape values and the need to pay attention to the 'everyday' landscape people live in. The Convention sets measures for landscape protection, management, and planning in the whole of Europe to reach sustainable development and balanced, harmonic relations between social needs, economic activity, and the environment. In Slovakia, the Convention has been coordinated by the Ministry of the Environment of the SR in cooperation with other ministries. By signing the Convention, Slovakia (2005) has acknowledged, together with other countries, that landscape is a basis of European identity and at the same time a common space for the creation of local cultures. Therefore, the Slovak Republic appreciates the creation of supportive international networks and sees, in cooperation with other Council of Europe member states, an opportunity for joining the efforts for the fulfilment of individual obligations of the Convention. Protection, management, and planning of Slovakia's diverse landscape are a challenge that requires the support of all involved experts.

Five years of experience implementing this important Convention have shown that, at present, better landscape maintenance requires legislative changes as well as the launch of strong financial tools to realize all the proposed projects in all landscape types. To elaborate on such a complex landscape, the Strategy was a challenge for Slovakia. Therefore, the representatives of IALE-SK were members of the Intergovernmental Committee for the ELC implementation in Slovakia.

#### **7th Meeting of the Council of Europe of the Workshops for the Implementation of the**

#### **European Landscape Convention Landscape in Planning Policies and Governance: towards Integrated Spatial Management, Piešťany, Slovakia, 2008**

The Slovak Republic became a member of the Council of Europe in 1993. On the occasion of the Slovak Chairmanship of the Committee of Ministers of the Council of Europe and based on the resolution of the Slovak Government, the Ministry of the Environment of the Slovak Republic together with the partners: the Council of Europe, Slovak Environmental Agency, Slovak Association for Landscape Ecology IALE-SK, Trnava Self-Governing Region and the town Piešťany organised an accompanying event 7th Meeting of the Council of the Europe of the Workshops for the Implementation of the European Landscape Convention (ELC). The meeting focused on two key issues: the growing pressure on the landscape and its use, and the need for an adequate response in terms of appropriate space management. The central theme of the meeting "Landscape in Planning Policies and Governance: towards Integrated Spatial Management" resonates throughout Europe as well as throughout its very heart - Slovakia. The meeting's attention was focused on the complexity of challenges in spatial planning and management that Europe is currently facing. It will face an even broader challenge on an even wider scale in the next decade. The emphasis was on the practical problems relating to the integration of landscape issues into spatial management in different sectors. There was a general agreement that integrative spatial planning is the primary vehicle for the implementation of the ELC in the Member States.

# Important Landscape Ecological Institutions in Slovakia

## **The Institute of Landscape Ecology of the Slovak Academy of Sciences (ILE SAS)**

The Institute of Landscape Ecology of the Slovak Academy of Sciences (ILE SAS) is an interdisciplinary research institution for basic and applied landscape-ecological research. ILE SAS was established in 1990 and it is the direct successor of the Institute of Landscape Biology SAS (1965-1974 and the Department of Landscape Ecology of the Institute of Experimental Biology and Ecology SAS (1975-1990). Its first director was Professor Milan Ružička until 1996; at present, the director is RNDr. Ľuboš Halada, CSc., is the director. The Institute currently has 57 employees and 11 PhD students. ILE SAS is composed of three research departments: The Department of Ecosystem Analysis, the Department of Landscape Ecological Synthesis, both based in Bratislava, and the Department of Biodiversity of Ecosystems and Landscape in Nitra. ILE SAS is the mother institute for Methodology of Landscape Ecological Planning (LANDEP), which was implemented as the methodology for an integrated approach to management of natural resources in Agenda 21 (UNCED in Rio de Janeiro, 1992).

### Institute activities are divided into several areas:

- Science: basic landscape-ecological research and development of research methods
- Application of the results of basic research into practice: development of methods for the transfer of scientific knowledge in decision-making and planning processes
- Expertise activities: surveys, technical studies, and assessment reports on the environment
- Editorial activities: Publishing of journals Ecology (Bratislava), Životné prostredie (Environment; stopped in 2021), Ekologické štúdie (Ecological Studies – in cooperation with Slovak Ecological Society), as well as scientific and professional monographs. The landscape atlases for Slovakia (Hrnčiarová et Abaffi (eds.) and for the Czech Republic (Hrnčiarová et al., 2009) belong to the most essential publications edited by ILE SAS staff.
- Education and training: External training center for doctoral studies in Environmental Science programmes. Cooperation with universities in the education activities, and also collaboration with primary and grammar schools in the field of environmental education.

The main research topics of ILE SAS are:

- Landscape structure, functions, and processes
- Landscape-ecological significance and ecological carrying capacity of the landscape
- Integrated landscape management
- Ecologically optimal, long-term sustainable use of the landscape and ecosystem services
- Environmental aspects of agricultural landscape
- Global changes: land use changes, climate change, chemical pollution, pressures on biodiversity, biological invasions
- Long-term ecological research
- Use of Remote Sensing in landscape-ecological research

The basic research is carried out primarily through projects. In international projects, the priority is put on projects of the EU Framework Programme (currently Horizon Europe). ILE SAS is developing international cooperation also within the COST, Biodiversa+, and Agroecology programmes

- ILE SAS is a Center of excellence for the protection and use of landscapes and for biodiversity. It is also a member of the international research network of excellence for long-term research of biodiversity, ecosystems, and environmental awareness - ALTER-Net.
- ILE SAS is providing services to the European Commission and the European Environment Agency in the field of nature protection, the most important project was the European Topic Centre on Biological Diversity (2001-2022).

- ILE SAS is an accredited workplace of the Central Consultancy Register of the European Commission.

Inclusion of LANDEP methodologies developed by ILE SAS into Agenda 21, Chapter 10 of the Rio Summit, can be considered as a significant international recognition of ILE SAS. These methodologies are one of the recommended methods for integrated

protection and use of natural resources. Many methodologies developed by ILE SAS were included in legislative provisions as binding landscape documentation for spatial development, like the Territorial System of Ecological Stability (ÚSES), the Landscape-ecological plan, EIA, SEA, etc. More information about ILE SAS can be found on the website: <https://www.uke.sav.sk/>




*Institute of Landscape Ecology and SAV buildings*

### Other Important Landscape Ecological Institutions in Slovakia



In addition to the Institute of Landscape Ecology of the Slovak Academy of Sciences, which has played a central role in shaping landscape ecology in Slovakia, numerous other institutions contribute to research, education, and practical applications in this field. These include university departments offering academic training in ecology, environmental sciences, geography, and landscape planning;




research institutes addressing key ecological and geographical processes; professional societies supporting collaboration; and state agencies providing environmental monitoring and data. Together, they form a strong network that advances science, informs policy, and promotes sustainable landscape management. An overview of these institutions is provided in Table 2.

Table 2: Overview of key institutions in Slovakia involved in landscape ecology, including universities, research institutes, professional societies, state institutions.

Universities	
 <div> UNIVERZITA  KONŠTANTÍNA  FILOZOFA  VNITRE </div>	<div> <b>Department of Ecology and Environmental Science, Faculty of Natural Sciences and Informatics, Constantine the Philosopher University in Nitra</b> </div> <div> Working in partnership with the Institute of Landscape Ecology of the Slovak Academy of Sciences, it serves as a joint interdisciplinary scientific and educational center. The scientific and creative activities of the institution are focused on the following areas: <ul style="list-style-type: none"> <li>- Natural resource management and ecosystem services</li> <li>- Environmental threats and risk factors in the landscape</li> <li>- Biodiversity conservation</li> <li>- Landscape care and sustainable development</li> </ul> </div>



	<ul style="list-style-type: none"> <li>- Geographic information systems and remote sensing</li> <li>- Environmental education, training, and awareness</li> </ul> <p>The department offers all three levels of higher education (Bachelor's, Master's, and PhD).</p> <p>See link: <a href="https://gis.fpvai.ukf.sk/">https://gis.fpvai.ukf.sk/</a></p>
	<p><b>Department of Geography, Geoinformatics and Regional Development, Faculty of Natural Sciences and Informatics, Constantine the Philosopher University in Nitra</b></p> <p>The department guarantees a study program called Teacher Training of Geography in Combination and Geography in Regional Development within the bachelor's and master's degree programs. The department focuses on the following priority areas of research: physical geography and geocology, human geography, regional and applied geography and regional development, environmental geography, geography didactics, geoinformatics, and landscape ecology. The department also cooperates with social practice.</p> <p>See link: <a href="https://www.kggr.fpvai.ukf.sk/">https://www.kggr.fpvai.ukf.sk/</a></p>
	<p><b>Department of Environmental Ecology and Landscape Management, Faculty of Natural Sciences, Comenius University Bratislava</b></p> <p>In January 2021, the Department of Environmental Ecology and the Department of Landscape Ecology merged to form the Department of Environmental Ecology and Landscape Management. Its curriculum covers topics such as landscape ecology, environmental and landscape planning, environmental impact assessment, protected area management, ecotourism, biomonitoring, habitat mapping, climate change impacts, and public participation in environmental protection. In 2023, the Art&amp;Sci branch was established at the department, within the framework of which there is an effort to develop trends in the interpretation of scientific research through the tools of art. The department has many years of experience in educating doctoral and postdoctoral students. In addition to Slovak study programs (bachelor, master, PhD), the department also offers an accredited bachelor's degree study program in English - Environmental Studies.</p> <p>The department's staff is dedicated to the following research topics:</p> <ul style="list-style-type: none"> <li>- Nature and landscape protection</li> <li>- Landscape planning and management</li> <li>- Impacts of climate change on the landscape</li> <li>- Environmental risk assessment</li> <li>- Art and Science</li> </ul> <p>See link: <a href="https://fns.uniba.sk/en/kem/">https://fns.uniba.sk/en/kem/</a>; <a href="mailto:kke@uniba.sk">kke@uniba.sk</a>  <a href="mailto:prif.kke@uniba.sk">prif.kke@uniba.sk</a></p>
	<p><b>Department of Physical Geography and Geoinformatics, Faculty of Natural Sciences, Comenius University Bratislava</b></p> <p>In January 2021, the new Department of Physical Geography and Geoinformatics arose by merging two former departments: Department of Physical Geography and Geocology and Department of Cartography, Geoinformatics and Remote Sensing</p>





 <p>FACULTY OF NATURAL SCIENCES Comenius University Bratislava</p>	<p>Recent research activity of the Department is focused on:</p> <ul style="list-style-type: none"> <li>- Morphotectonic development of the Western Carpathians</li> <li>- Paleoecological analyses of Holocene landscape evolution</li> <li>- Geomorphometric analyses – first of all, the development of methods of land surface segmentation</li> <li>- Selected aspects of recent climate change</li> <li>- Runoff geomorphic processes</li> <li>- Geoecological analyses for precision farming</li> <li>- Land Cover structure and changes analysis</li> </ul> <p>See link: <a href="https://fyzgis.fns.uniba.sk/">https://fyzgis.fns.uniba.sk/</a></p>
	<p><b>Department of Biology and Environmental Studies Faculty of Natural Sciences, Matej Bel University, Banská Bystrica</b></p> <p>The department offers Bachelor's (Bc.) and Master's (MSc.) degrees to graduates of a full-time program in both the Teaching of Academic Subjects and the Environmental Biology study program, as well as PhD. full-time form of study and distance form of study in the study program of Environmental Biology.</p> <p>See link: <a href="https://www.fpv.umb.sk/">https://www.fpv.umb.sk/</a></p>
	<p><b>Faculty of Ecology and Environmental Sciences, Technical University in Zvolen</b></p> <p>The Faculty trains experts in ecology and environmental sciences for roles in public administration, environmental institutions, private enterprises, research, and NGOs. Graduates are equipped to work in areas such as nature and landscape conservation, environmental monitoring, waste management, and eco-consulting.</p> <p><b>The Department of Applied Ecology</b> holds, from the scientific point of view, a key position at the Faculty of Ecology and Environmental Sciences of the Technical University in Zvolen. In the educational process, the department provides teaching primarily within the study program of Ecology and Land Use in both the bachelor's degree and master's degree study programs. The research activity focuses on the complex issues of landscape ecology and its ecosystem in Slovakia.</p> <p><b>The Department of Biology and General Ecology</b> participates in the training of specialists in the field of ecology and biodiversity conservation, providing instruction in disciplines from the biological, ecological, and applied ecosozological sciences.</p> <p><b>The Department of Environmental Engineering</b> ensures and guarantees teaching in the field of Environmental Engineering in two study programs: Environmental Engineering, Forensics, and Criminalistics. The department focuses on environmental quality monitoring, production technology assessment, waste management, and evaluation of ecotoxicological properties in the context of energy and radioecology. The department also applies forensic sciences to environmental investigation and evidence gathering in cooperation.</p> <p><b>The Department of Landscape Planning and Design</b> focuses on organizing landscape structure and optimizing land use. It addresses practical tasks in landscape design and landscape-related issues arising from practice.</p>



	<p><b>The UNESCO Department for Ecological Awareness and Sustainable Development</b> covers teaching in the field of environmental management and landscape planning. See link: <a href="https://fee.tuzvo.sk/">https://fee.tuzvo.sk/</a></p>
	<p><b>Faculty of Horticulture and Landscape Engineering, Slovak University of Agriculture, Nitra</b></p> <p>The faculty guarantees education in accredited study programs at all three levels of education. The academic training is focused on education of professionals specialized in horticultural production, fruit propagation, viticulture and winemaking, vegetable and floriculture, garden, urban and landscape design, public landscape architectural design, specialized and recreational open spaces, revitalization of historical parks and villages, principles of establishment and maintenance of different types of greenery, theory and practices of landscaping, soil protection, water and air quality control, and waste management. See link: <a href="https://www.fzki.uniag.sk/">https://www.fzki.uniag.sk/</a></p>
	<p><b>Department Of Environmental Engineering, The Faculty of Civil Engineering of the Technical University in Košice</b></p> <p>The Department focuses on the environmental, social and economic sustainability of civil and civil engineering structures throughout their life cycle. The department teaches subjects on the interaction between buildings and the environment, ecological stability restoration, biodiversity promotion, water structures design, environmental risk assessment, life cycle assessment, and building sustainability certification. It participates in all study programmes at the Faculty of Civil Engineering TUKE and serves as a doctoral training centre in construction technology, management, and building design. Its research focuses on climate change mitigation, water conservation, low-carbon technologies, life cycle analysis of construction products and buildings, indoor environmental quality, and the application of green and blue infrastructure in urban areas. See link: <a href="https://svf.tuke.sk/wps/portal/svf">https://svf.tuke.sk/wps/portal/svf</a></p>
	<p><b>The Department of Highway and Environmental Engineering, University of Žilina</b></p> <p>The Department focuses on the design, construction, diagnosis, and maintenance of highways, roads, and urban roads. The basis of the work is the harmonization of the advantages of transport and minimizing its negative consequences. Focus is placed on computer modeling, traffic simulations and analyses, environmental assessment, the application of innovative materials in construction, and the use of modern diagnostic methods. See link: <a href="https://svf.uniza.sk/kcei/sk/">https://svf.uniza.sk/kcei/sk/</a></p>
	<p><b>Department of Ecology, Faculty of Humanities and Natural Sciences, University of Prešov</b></p> <p>The Department supports the active involvement of students, from their bachelor's studies, to scientific research, as well as</p>

	<p>their participation in various study stays abroad, internships, and expeditions to exotic countries.</p> <p>Department offers to enrol in the following study programs:</p> <ul style="list-style-type: none"> <li>- Ecology and Environmental Studies (Bc, Msc.)</li> <li>- Environmental Ecology (PhD)</li> </ul> <p>See link: <a href="https://www.unipo.sk/fakulta-humanitnych-prirodných-vied/katedry/ekologia/">https://www.unipo.sk/fakulta-humanitnych-prirodných-vied/katedry/ekologia/</a></p>
	<p><b>Institute of Geography, Faculty of Science, Pavol Jozef Šafárik University in Košice</b></p> <p>The Institute of Geography has a tradition of more than 20 years and focuses on teaching and research in the field of geography, geoinformatics, and remote sensing. At present, the Institute of Geography provides Bachelor, Master, and Doctoral study programmes. One of the main pillars of the Institute of Geography is research activity. Research at the Institute of Geography has three basic directions: Physical Geography, Human and Regional Geography, Geoinformatics and Remote Sensing.</p> <p>See link: <a href="https://www.uge.science.upjs.sk/">https://www.uge.science.upjs.sk/</a></p>
	<p><b>Department of Geography and Geology, The Faculty of Natural Sciences of Matej Bel University in Banská Bystrica</b></p> <p>Teaching and research staff at the Department are focused on the preparation of qualified teaching professionals in the following study programs: Geography Teaching - in combination with other subjects (Bachelor and Master degrees), Geography and Landscape Ecology (Bachelor), and Applied Geology (Bachelor and Master degrees). The study program in Geography and Landscape Ecology is aimed at assessing the state of the country in the past and present, to specify the transformations and to propose solutions regarding the protection of the landscape and nature. Students are able to record any observed changes using GIS.</p> <p>See link: <a href="https://www.fpv.umb.sk/kontakty/">https://www.fpv.umb.sk/kontakty/</a></p>
	<p><b>Department of Geography, Faculty of Humanities and Natural Sciences, University of Prešov</b></p> <p>The Department of Geography is a comprehensive scientific, research, and educational institution that has been training geography teachers, as well as specialists, analysts, and territorial managers.</p> <p>It offers the following study programmes:</p> <ul style="list-style-type: none"> <li>- Geography and Applied Geoinformatics in the field of Earth Sciences at the bachelor's, master's, and postgraduate levels (Bc., Mgr., RNDr.).</li> <li>- Teacher Training in Geography in combination with other subjects in the field of Teacher Training and Pedagogical Sciences at the bachelor's and master's levels (Bc., Mgr., PaedDr.).</li> <li>- Regional Geography and Regional Development in the field of Earth Sciences at the doctoral level (PhD.).</li> </ul> <p>See link: <a href="https://www.unipo.sk/fakulta-humanitnych-prirodných-vied/katedry/geografia/">https://www.unipo.sk/fakulta-humanitnych-prirodných-vied/katedry/geografia/</a></p>
	<p><b>Department of Geography, Faculty of Education, Catholic University in Ružomberok</b></p>

	<p>The Department of Geography provides a study program in Geography Teaching in combination with the Bachelor's and Master's degrees.</p> <p>See link: <a href="https://www.ku.sk/fakulty-katolickej-univerzity/pedagogicka-fakulta/katedry/katedra-geografie/">https://www.ku.sk/fakulty-katolickej-univerzity/pedagogicka-fakulta/katedry/katedra-geografie/</a></p>
	<p><b>Institute of Geography, Faculty of Science, Pavol Jozef Šafárik University in Košice</b></p> <p>The Institute of Geography has a tradition of more than 20 years and focuses on teaching and research in the field of geography, geoinformatics, and remote sensing. At present, the Institute of Geography provides Bachelor, Master, and Doctoral study programmes. One of the main pillars of the Institute of Geography is research activity. Research at the Institute of Geography has three basic directions: Physical Geography, Human and Regional Geography, Geoinformatics and Remote Sensing.</p> <p>See link: <a href="https://www.uge.science.upjs.sk/">https://www.uge.science.upjs.sk/</a></p>
<p><b>Slovak Academy of Sciences</b></p>	
	<p><b>The Institute of Geography, Slovak Academy of Sciences, Bratislava</b></p> <p>The Institute's integrated approach connects natural and socio-economic research, providing valuable insights for science, policy, and practice in geography. The Institute of Geography, Slovak Academy of Sciences, Bratislava</p> <p>The Institute of Geography is a scientific centre of the Slovak Academy of Sciences conducting research in multiple branches of geographical sciences, with a primary focus on the territory of Slovakia. Its mission is to study spatial structures and linkages between natural and socio-economic systems through basic and applied research. Research in physical geography addresses the structure, dynamics, and human-induced transformation of landscapes, relief forms, and their functions, with special emphasis on natural hazards. Human and regional geography focuses on spatial and temporal aspects of economic, socio-cultural, and environmental processes, quality of life, and sustainable local and regional development. Geoinformatics applies GIS and remote sensing to analyse landscape systems at various hierarchical levels, producing maps and databases for use at national, regional, and local scales.</p> <p>The Institute's integrated approach connects natural and socio-economic research, providing valuable insights for science, policy, and practice in geography.</p> <p>See link: <a href="https://geography.sav.sk/">https://geography.sav.sk/</a></p>
	<p><b>Institute of Forest Ecology SAV, v. v. i.</b></p> <p>The institute focuses on basic and applied research in forest ecology. The institute's research programme features research on changes, processes, and stressors important for the stability, structure, production, and protection of forest ecosystems.</p> <p>See link: <a href="https://www.ife.sk/">https://www.ife.sk/</a></p>
	<p><b>Slovak Ecological Society (SEKOS)</b></p> <p>The Slovak Ecological Society (SEKOS) is a professional organization within the Slovak Academy of Sciences,</p>



	<p>established to promote the development of ecology in Slovakia. It brings together scientists, educators, and practitioners, organizes seminars and symposia, supports ecological education, and publishes professional materials (Sekos Bulletin, Ecological Studies Monograph Series). The Society operates through thematic sections and working groups and awards distinctions, including a prize for a young scientist. See link: <a href="http://www.sekos.sav.sk/">http://www.sekos.sav.sk/</a></p>
	<p><b>Slovak Geographic Society</b> The Slovak Geographical Society at the Slovak Academy of Sciences is a voluntary, selective association of scientific and professional experts in the field of geography and its related disciplines. At present, there are nine geography workplaces (8 university departments and one research institute) representing the base of the Slovak geography in the six centres (Bratislava, Prešov, Banská Bystrica, Nitra, Košice, and Ružomberok). Nowadays, the Slovak Geographic Society has 300 geographers. It has six regional branches (Bratislava, the West Slovakian, the Central Slovakian, the East Slovakian, the North Slovakian, and Košice) and five specialised committees (geographical thought, applied geography, geographic education, travel-expeditionary, young geographers, and students of geography). See link: <a href="http://www.sgs.sav.sk/">http://www.sgs.sav.sk/</a></p>
<b>State institutions</b>	
	<p><b>SHMÚ</b> The Slovak Hydrometeorological Institute (SHMU) is a state-subsidised organisation under the Ministry of Environment, providing hydrological and meteorological services in Slovakia and internationally. Established on 1 January 1969, it continues the work of institutions active since the mid-19th century. Its activities include monitoring air and water quantity and quality, collecting and archiving related data, interpreting atmospheric and hydrological developments, and issuing forecasts and warnings for the public. See link: <a href="https://www.shmu.sk/">https://www.shmu.sk/</a></p>
	<p><b>The Ministry of the Environment (MŽP SR)</b> The Ministry of the Environment is the central state administrative authority and supreme inspection authority in environmental affairs:</p> <ul style="list-style-type: none"> <li>a) nature and landscape protection</li> <li>b) waste management</li> <li>c) protection of water resources and the quality of groundwater and surface water</li> <li>d) fisheries and forestry in national parks</li> <li>e) environmental impact assessment of activities and their consequences</li> <li>f) air protection</li> <li>g) geological works</li> <li>h) genetically modified organisms</li> <li>i) national environmental policy</li> <li>j) unified information system on environment and area monitoring</li> </ul> <p>The Ministry of Environment operates <a href="https://www.enviportal.sk/">https://www.enviportal.sk/</a>, and the content manager and technical operator of it is the Slovak Environmental Agency.</p>

	<p>Enviroportal is a basic platform for publishing outputs of information systems. It provides authorized and verified information on the environment in Slovakia, offering users uniform access to information in the environmental field.</p> <p><a href="https://www.minzp.sk/">https://www.minzp.sk/</a></p>
	<p><b>The Slovak Environment Agency (SEA)</b></p> <p>The Slovak Environment Agency (SEA) is a professional organization of the Ministry of the Environment within the Slovak Republic (MoE SR) with a national scope, focusing on environmental care and landscape development in accordance with the principles of sustainable development. SEA fulfills its mission through 5 professional sections.</p> <p><a href="https://www.sazp.sk/">https://www.sazp.sk/</a></p>
	<p><b>The State Nature Conservancy of the Slovak Republic</b></p> <p>The State Nature Conservancy of the Slovak Republic is an expert public institution that works to protect nature and landscapes throughout Slovakia. Established by the Ministry of Environment, it operates as a non-profit organization primarily funded by the state budget.</p> <p>It primary ensures: a) care for specially protected parts of nature and landscape, b) monitoring the status and changes of natural ecosystems under changing ecological conditions, c) the performance of the nature guard, d) performs the function of a breeding and rehabilitation station, and addresses issues concerning handicapped, deceased, accidentally captured, injured, or killed protected animals, e) maintains a registry of protected animals and protected plants, f) performs the function of the Scientific Authority for the Slovak Republic for CITES, g) issues opinions on accidental logging and submits proposals, h) develops management programs for protected areas, i) ensures the marking of specially protected parts of nature and landscape, j) conducts research on specially protected parts of nature and landscape, k) performs guiding activities in protected areas, l) performs activities related to ensuring the favourable status of specially protected parts of nature and landscape, m) operates the state list of specially protected parts of nature and landscape, n) manages caves and land in protected areas and their buffer zones, o) prepares expert opinions in the field of nature protection, p) conducts cultural-educational, promotional, and publishing activities in the field of nature and landscape protection, r) participates in international cooperation and in the implementation of international projects, programs, and conventions in the field of nature protection.</p> <p><a href="https://www.sopsr.sk/">https://www.sopsr.sk/</a></p>

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