

Discussion Paper

Landscape-Ecological Plan as the Basic Tool for Sustainable Land Use



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Abstract: Man and his activities significantly affect the landscape, its structure, components, etc. Human activities in the landscape are not always in harmony with its resources and potential. This non-compliance is the foundation of the emergence of environmental problems. Landscape plan is an essential tool of sustainable land use because that it regulates socio-economic development with natural, human, cultural and historical potential of landscape. Decision-making process of the landscape-ecological optimal utilisation of the territory in the landscape plan is based on matching the offer, which is represented by the resources in the region, and demand which is represented by the community needs of growth and development. The discrepancy between offer and demand (not respecting the properties of landscape resources) is the determining factor of formation not only environmental but also human problems. The main goal of the paper is to present a new methodical procedure for creation of the landscape-ecological plan in the Slovak Republic. and its application on the local level Křižovany nad Dudváhom.

Key words: landscape-ecological plan; sustainable land use; urban plan; landscape-ecological regulative

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1. Introduction

Many European countries have faced substantial socio-economic changes in the recent period, which are also reflected in the environmental area. Political regimes changed in some European countries from the central socialist planning policy to the market-driven economy; markets opened and establish contacts not only in the European but also the world context. Accession of new member states to the European Union has increased the rate of advancing world globalization.

These structural changes had also negative impact on land use and land cover. There are Significant pressures of investors, developers and various lobbyist groups on land use exist and are driven by various motifs such as the construction of technology parks, logistic centres or development of recreational activities. Technical elements are often inappropriately located in the

landscape and the trend is increasing in the majority of the European countries. Migration of population – partly migration of the rural population to the urban area in search of more work opportunities or contrariwise, immigration of urban population into rural area preferring the better environment – will also find reflection in the change of landscape use.

There has also been a major change in the structure of agriculture like abandoned agricultural land and different structure of crops, decreased rate of agricultural production, increasing pressure on occupation of agricultural land and other natural resources due to the aggressive promotion of certain investment projects, but also increasing of pressure on natural resources connected with implementation of environmental measurements, etc. The negative impact of abandoned fields manifests in the diminishing

landscape biodiversity, desertification of land, decrease of native plant and animal species, increasing mono-cultures in plant production increase of synantropic species, high yielding cattle in livestock production, falling ground water levels and increasing load on the regional water regime, heavier pollution impact on ecological systems, as well as the progressive soil compaction, erosion, salinisation etc. (Vos, Meekes 1999; Miklós, Izakovičová 2007; Wiggering et al. 2007). Changes in landscape structure and substantial antropization are the principal causes of climate change, which beside of the changes in natural ecosystems and biodiversity causes more intensive natural risks and hazards as floods, droughts etc. The base for elimination of these problems is the implementation of sustainable land use management.

The basic objective of the paper is to present the landscape-ecological plan as the basic tool for sustainable land use in the everyday practice. The paper presents the methodology for compilation of the landscape-ecological plan and its application in urban planning in Slovakia.

2. Theoretical and methodical background

Land use is determined on one side by attributes of natural components, which represent a specific offer for landscape use by a human. On the other side, land use is determined by requirements, demands, capacities and overall possibilities of land use by a society. The requirements, demands as well as the overall possibilities change in the course of time (change of human conditions, change of priorities, change of ownership, change in technologies etc.). What was once a luxurious commodity became an essential one. The change in the demands and requirements of the human society cyclically appears in changed forms and intensity of landscape use. On the other side, the changes can be caused by the repercussion of the natural environment against a specific land use, if it becomes unsustainable, e.g. improper land use can cause or potentially accelerate the natural risks and hazards, which take part in the change of landscape structure and land use. Often changes within the society that potentially affect landscape are much faster and variable in

comparison with the sustained natural process of landscape development.

The difference in meaning of the two basic terms – land use and land cover (Ořaheľ, Feranec 1997), is that while the map of land cover represent objects of Earth's surface via their physiognomic attributes, the map of land use represents the same objects via functional attributes. Land use and land cover are interconnected. Land cover is continually moulded and transformed by land use changes e.g. when forest is converted to pastures or arable land. Land use change is the proximate cause of land cover change (De Sherbinin 2002).

The changes of land cover cannot be interpreted and explained without any knowledge of land use changes, which are determined by human activities. Land use changes are reflected not only in changes of land cover, but also are the cause of changes in landscape structure and the processes in landscape, so they initiate many environmental problems. Among the most significant changes are:

- Change, threat and degradation of natural ecosystem, firstly in the consequence of direct occupation or fragmentation of the natural ecosystem and the barrier effect as the result of increasing industrialization, urbanism, agriculture, recreation and other human activities. The outcome of this process is the increased antropization i.e. the increase of the share of semi-natural and anthropogenic ecosystem at the expense of natural ecosystems. The natural ecosystems are also threatened indirectly by endangering their conditions – climate change, change of the hydrological regime, spread of synantropic and invasive species etc. These are the side effects of expansion of human activities in the landscape. The result of these activities is the violation of natural development of native ecosystems and endangering of the environmental stability of the area and decrease in biodiversity.
- Change, threat and degradation of natural resources. Qualitative and quantitative attributes of the individual natural resources are threatened while the land-building components, which are capable to satisfy human needs through their useful attributes are considered the natural resources. These resources as well as abiotic resources are directly threatened by occupation

and depletion in the consequence of human activities – e.g. occupation of the qualitatively best land by building, occupation of forest for agricultural production etc. Indirect threat to natural resources is happening via the production of foreign substances, as the side-effect of many forms of land-use – water pollution in the consequence of intensive agriculture, leakage of fuel from agricultural and forest machines etc.

- Change of environmental quality. Combination of land cover elements creates various landscape structures, landscape mosaics, which represent the basic living area for humans. The structure and organisation of these elements are the basic indicators of the environmental quality and aesthetics. Inappropriate land cover with domination of negative elements can considerably disrupt the aesthetics, landscape image as well as the overall environmental quality.

- Violation of landscape processes, particular acceleration of natural risks and hazards – unsuitable landscape use, e.g. deforestation, removal of vegetation, inappropriately intensive use of soil often implicates erosive-accumulative processes, landslides, etc. Removal of vegetation also affects the hydrological regime in the area (accelerated floods etc.) and can be an interacting factor of the climate change (endangering the microclimate area regulation, causing lower oxygen production, lower absorption of pollutants, etc.)

Consequently, it is important the land-structure studies must concentrate not only on the study of land use and land cover forms, but also the study of the position and relationships in landscape (the cause and effect relationship). The basis is the knowledge of driving forces in land use and subsequent impacts, positive and/or negative. The major categories of the driving forces of land use are: political, economical, cultural, technological and natural (Hersperger, Burgi 2007; Wohlmeyer 2003; Burgi et al. 2004; Doorn, Bakker 2007; Moreira et al. 2001 etc.). The foundation of sustainable land use is the harmonisation of all these interests. The appropriate instrument for the realisation of this goal may be a landscape-ecological plan.

The landscape plan has been also recognized by the Slovak legislation. Pursuant the Law of the National Council SR No. 237/2000 that amends Law No. 50/1976 about territorial planning and the construction order (Construction Law) in wording of later issued provisions, the proposal of optimal spatial arrangement and functional exploitation of a territory taking into consideration landscape-ecological, cultural and socio-economic conditions (landscape-ecological plan) is considered an integral part of surveys and analyses. The ecologically optimal spatial arrangement and functional use of a territory is defined by this Law as a comprehensive process of mutual harmonisation regarding spatial requests of human economic and other activities facing the landscape-ecological conditions given by the landscape structure of a particular territory. Such arrangement simultaneously provides for:

- The satisfactory ecological stability of landscape spatial structure and creation of the TSES;
- Protection and rational use of nature and biodiversity;
- Protection and rational use of natural resources,
- Landscape-forming and environmental protection policies.

The landscape-ecological plan is included into surveys and analyses. As based on the analysed territorial conditions, it proposes the best possible ways of territorial exploitation/land use; it secures the respectful use of nature, natural resources, conservation of biodiversity and support to ecological stability.

The basic output of surveys and analyses is the sketch of main conflicts of interests in a territory (a problem sketch) expressing first of all the limits of land use as ensuing from the generally binding legal provisions, administrative decisions, developmental plans and intentions and the most serious problems calling for solutions. Precisely the landscape-ecological plan may play an important role in processing of the quoted conflict-of-interest sketch as the outputs of such plan are:

- Map of landscape-ecological complexes i.e. homogeneous landscape-ecological units of spatial and functional land use;
- Map of environmental problems i.e. specification and identification of environmental

problems that result of stress factor effects on nature, on natural resources and the environment;

- Map of alternative ecological selection. A set of feasible activities is defined for each area. It means the selection of activities, which are not limited by any feature of landscape-forming components,
- Map of ecologically optimal land use. It represents the ideal activities for a given area including the ecostabilizing measures.

Table 1: The methodology consists of the following steps

Methodological procedures	Characteristics
Landscape-ecological analyses	Characteristics of features attributed to landscaping territorial components
Landscape-ecological syntheses	Delimitation and characteristics of homogeneous spatial areas
Landscape-ecological assessment	Identification of landscape-ecological problems resulting from conflicts of interests in landscape
Landscape-ecological proposals	A proposal for elimination of quoted problems and a proposal for optimal spatial and functional use of the territory in question

The basis for the compilation of a landscape-ecological plan is the decision-making process consisting of two basic steps (cf. [Table 1](#)):

A. Landscape-ecological evaluation – Establishment of suitability of landscape properties for the location of selected social activities ([Ružička, Miklós 1982](#)). The evaluation constitutes the core of the whole decision-making process where demands of individual activities for landscape-ecological conditions are confronted with the real landscape assets by means of limits. The evaluation process ([Hrnčiarová et al. 2000](#)) comprises:

- Landscape-ecological background materials – a set of explicitly defined landscape-ecological background materials represented by the

synthetic units i.e. types of the landscape ecological complexes consisting of abiocomplexes (ABK); the present landscape structure (SKS), complexes of the positive socio-economic phenomena (KSJP), complexes of the negative socio-economic phenomena (KSJN), and complexes of natural stress factors (KPSF). The types have their real spatial expression on maps with different combinations of natural and socio-economic landscape indicators;

- Proposed activities and land use which reflect the demands of the settlement community for the development and land use in a given settlement.

Establishment of suitability of landscape properties for the location of selected social activities is carried out via identification of factors limiting the performance of individual socio-economic activities. The basic principles are:

- Abiotic conditions are the determining factors for the existing diversity in the given territory. Such differentiation also determines different forms of land use. Regarding the permanent unchangeable character of these elements, properties of abiotic landscape elements should be considered the determining factors of the socio-economic development;
- In localities susceptible and prone to manifestations of degradation processes (localities prone to erosion-accumulation processes, landslides, earthquakes and the like) in the consequence of socio-economic activities, a form of land use palliating the negative manifestation of the quoted factors should be carried out;
- In protected territories, ecologically valuable and stable territories (localities of the territorial system of ecological stability) it is necessary to prioritise the development of activities that do not threaten natural assets of the landscape wholes such as research & science, nature conservation or therapeutic and recreation activities;
- Likewise, it is necessary to exclude development of such socio-economic activities that could possibly affect individual natural resources in the territories with legally stipulated protection of natural resources and to prefer development of activities connected with the

support to protective functions of natural resources;

- Activities sensitive to hygienic parameters of the environment are excluded from areas with a severe load of stress factors such as air pollution, soil and water pollution or noise overload;
- Territories free from the load of stress factors are not suitable for location of different industries/businesses that might threaten the current satisfactory hygienic quality. They are suitable first of all for the activities demanding high quality hygienic parameters such as housing, recreation, amenities, growing of crops for direct consumption, wine growing, etc.

B. Landscape-ecological proposition – a proposal of landscape-ecologically optimal land use consisting of:

- Setting an alternative ecological choice. A set of activities feasible in a given area which are not limited by any of landscape-forming components is defined;
- Setting of an ecologically optimal way of land use – selection of the optimal socio-economic activity for a given area;
- Definition of landscape-ecological measures pursuing the typology of specified landscape-ecological problems:
 - Measures focused on the improvement of the territorial ecological stability and biodiversity;
 - Measures protecting natural and cultural/historical resources
 - Measures aimed at the improvement of environmental quality and aesthetics.

Application on the local level

A model landscape-ecological plan on the local level has been prepared as exemplified by the cadastral territory of Križovany nad Dudváhom (Fig. 1). The territory is situated in the district of Trnava (Administrative Region of Trnava). Križovany is a typical rural settlement in the vicinity of the centre of the region Trnava with the prevailing agricultural function. According to the recent census, its population is 1,756. The overall area of the cadastral territory is 1026.15 ha. The character of landscape structure of this settlement is given by its situation in the Loess Plane of Trnava with a typically flat relief.

Situation of the village next to most fertile soils of Slovakia with favourable climate determines a high farming potential enhanced by the opportune position in terms of transports and next to the energy resource (Nuclear Power Plant of Jaslovské Bohunice). The economic basis is indistinct and represented, besides a farming company, by small industrial and servicing businesses.



Fig. 1: Location of the study area Križovany nad Dudváhom within the Slovakia

The dominant position within the landscape structure is that of agricultural land occupying 83.50 % of the cadastral area (856.49 ha). The greatest proportion corresponds to arable land of which amounts to as much as 96.36 % of an overall Soil Pool area. It is followed by gardens (3.2 %) and permanent grassland (0.40 %). Area of vineyards is subtle (0.05 %). Ecostabilizing elements of landscape structure comprise forests and water bodies. A compact forest canopy of the Križovianský háj and a small wood outside the village represent the forestland. The area of the Forest Pool is 3.76 ha i.e. 0.34 % of village's total cadastral territory.

The basis for compilation of the landscape-ecological plan (hereafter LEP) was the preparation of the map of landscape-ecological problems and the proposal of landscape-ecologically optimal land use. The following landscape-ecological problems have been identified in the territory of interest:

1. Threat to spatial stability. Stability problems result from the conflict between stress factors and the Territorial System of Ecological Stability (hereafter TSES) elements and the rest of the ecostabilizing landscape elements. The most important problems of this nature are: threatened TSES elements due to logging – Križovianský háj, collision between the economic

function of forest with the forest gene pool and the ecostabilizing function; the Križoviansky háj, threatened TSES elements due to waste dumping in the wood next to the village, logging and altered structure of natural wood species affecting important biotopes – Jančová Valley (Čepeň), reaches of the Derňa, threatened TSES elements in the consequence of increased concentration of pollutants in the air emitted by the industry in the centre of Trnava, threatened hydric biocorridors due to polluted water in streams, biocorridors of varied degrees – regional or local biocorridors, etc.; threatened to hydric biocorridors by the disturbed hydrological regime of the area – Križoviansky Canal (dry mill-race), the Derňa, disturbed spatial stability of the area due to heavy antropization and monofunctional farming landscape with prevalence of large-block arable land in central and northern parts of the relevant territory with the minimal proportion of ecologically stable elements.

2. Threatened natural resources – are the results of the spatial conflict between stress factors and natural resources. This group of problems includes: threat to water sources due to contaminated soil (collision of the Zone of Hygienic Protection of Water Sources due to contaminated soil with possible infiltration of contaminants into water source) – water source: Majcichov - Križovany nad Dudváhom – Opoj – Vlčkovce, threatened water sources due to contamination of river sediments by infiltration of air pollutants first of all in the floodplains, due to unexpected infiltration of manure in the fields, collision of polluted streams with their function of significant streams in terms of water management – the Blava, and the Derňa, collision of the Zone of Hygienic Protection of Water Sources with local farming activities, threatened soils due to increased concentration of foreign substances in soil, due to intensive transports and spreading applied in winter maintenance of roads – soil in close vicinity of heavily burdened transport corridors – motorway D61 Bratislava-Trnava-Piešťany, I/51, threat to the Soil Pool due to increased concentration of foreign substances in the air, threat to soil due to water and wind erosion and due to incorrect farming with preference of large-block structure of arable land, disturbed farming landscape due to the dense network of overhead power lines.

- Threatened environment. Problems included in this group are caused by the spatial conflict of stress factors with humans and the environment. The most important are: the threatened home environment due to the negative effects of transports (emissions, noise, light effects, and the like) due to the polluted air, collision of industries (metalwork) with the residential areas – increased level of noise, affected aesthetic quality of the environment due to monofunctional agriculturally intensively exploited landscape (central and northern parts of the territory) and in the consequence of aesthetically intrusive technical elements and corridors in landscape, risk of consumption of water that does not meet parameters of drinking quality due to increased concentration of foreign substances in groundwater and soil; risk of threat to the settlement environment due to disturbed hydrological regime – undesirable filling of dry canals, straightening of meanders, etc.

Landscape-ecological plan proposed the elimination of the above-quoted landscape-ecological problems. The proposal consists of the following groups of issues:

- Space-organizational – focused on changes of elements in land use in localities where land use does not meet landscape-ecological requirements; first of all it is the completion of eco-stabilizing areas, completion of the functional skeleton of the TSES, increased proportion of eco-stabilizing areas (park or linear greenery), creation of a 20 m wide buffer zone around streams to protect them from the runoff of pollutants, grass planting to prevent erosion or introduction of anti-erosion land management, planting of insulating vegetation in the vicinity of stationary and mobile emission sources with the possible impact of the Soil Pool, planting of insulating hygienic vegetation around technological structures in order to eliminate adverse hygienic effects on the environment, removal of waste dumping sites, and the like.

- Technology-functional – focused on proposing technological measures with the aim to reduce effects of secondary stress factors (elimination of sources); installation of new filters or increased efficiency of the existing installations, building of efficient technologies protecting water sources, completion of the sewer system in the settlement, securing a special regime of

waste/contaminated water management, application of integrated forest protection based on a efficient technologies in the framework of ecological forest management, harmonization of logging with the ecostabilizing function of the TSES localities, introduction of efficient waste recycling and elimination; construction of the water main and ensuring the greatest possible portion of population connected to the water main,

- Revitalizing – A priority revitalization of the TSES localities, providing for a progressive change of species composition in localities under a heavy anthropic pressure with the preference of natural species, adjusting the water regime in localities representing the hydric biocorridors.
- Space-protecting – focused on the proposal of legal protection of ecologically valuable landscape structures and their components; ensuring the protection of biocentres of all levels, biocorridors and other ecologically important elements based on their real significance (to declare the locality Križoviansky háj a protected area); conservation of the semi-intensive character of gardens with high fruit wood species, harmonization of the exploitation of Agricultural Soil Pool in the Zone of Hygienic Protection with the protection of water sources application of biological forms of management in floodplains.
- Diagnostic and precautionary – building of a comprehensive monitoring system with the aim to acquire information about the status of environmental components, a comprehensive agricultural survey to establish the level of foreign substances in soil and establishment of the level of the foreign substance load, regular collection and separation of domestic wastes, regular care for and maintenance of public space of settlements.

Application of landscape-ecological regulations in the Territorial Planning Document in a model area

The village, as one of few settlements of Slovakia, boasts an excellently prepared landscape-ecological plan following the recommendations of the Ministry of Environment of the Slovak Republic methodology and the documentation for the local Territorial Plan. Nevertheless,

regulations imposed by the landscape-ecological plan were not appropriately respected by the Territorial Plan Documentation (hereafter TPD). This part of the paper is involved with the assessment how and to what extent landscape-ecological regulations were respected by the TPD and the delimitation of conflict points/areas where the proposed functional and spatial land use is not in harmony with the landscape-ecological principles.

The assessment was carried out via an overlay of two fundamental cartographic materials: the proposed TPD and the landscape-ecologically optimal proposition. The current proposed TPD was confronted with regulations of the landscape-ecological proposition. Localities where landscape-ecological limits were not respected are referred to as zones of conflict, i.e. localities where the landscape-ecological plan disagreed with the proposed TPD.

The result of such confrontation is that:

- The TPD devoted the minimum attention to environmental conservation policy-making concentrating only on the technical aspects of the issue. Environmental principles and regulations have been expressed by one sentence: “To prevent emergence of any new sources of air pollution, uncontrolled/illegal waste dumping sites, to prevent air, soil or water pollution by legal tools”. The Plan rather concentrated on the prevention and devoted little attention to the elimination of the existing sources of environmental pollution and revitalization of the damaged environmental components.
- The TPD did not take into account the landscape-ecological principles of sustainable land use. The proposal of spatial and functional land use did not respect landscape-ecological conditions. The greatest discrepancy between the TPD and the Landscape Ecological Plan (LEP) in terms of the proposed spatial and functional land use was in the following issues:
 - A proposal of ecostabilizing element of the TSES and measures for the creation of a functional skeleton of the TSES, protection of the TSES elements, management of the forest ecosystems, conservation and management policies for permanent grasslands are absent in the proposed TPD. Likewise, there is not proposal for location

of other vegetation pursuing the required functions: hygienic and protecting vegetation, decorative vegetation, counter-erosion vegetation, ecostabilizing vegetation, architectural insulating vegetation, etc.

- The proposed TPD did not take into account the existing status of threat and damage to individual environmental components, soil and water; no hygienic limits or regulations are set for the use of the polluted soil and/or water,

- Limits of land use, first of all arable land in terms of protection of other natural resources namely water sources are not respected in the proposal either. The Zone of Hygienic Protection of a water source needs a special regime of the permanent grassland management which is ignored in the proposal as it is in terms of the protected deposit territory,

- Limits given by abiotic conditions, which determine emergence of natural risks and hazards, particularly erosion-accumulation processes in this case are not respected. Soils in areas susceptible to manifestations of geodynamic processes require a special management regime, which is not taken into account in the proposed TPD. Unsuitable use of susceptible areas to manifestation of natural risks and hazards may trigger accelerated origins and rate of such processes.

3. Discussion

Even in spite of the undoubtedly significant role played by the landscape-ecological plans for the territorial planning documents, their implementation and practice ran into a great resentment. The principal causes of unsuccessful inclusion of landscape-ecological plans (LEP) into the TPD are possibly:

- Misunderstanding of the significance of the landscape ecological plan for the TPD by the local administration as a tool of optimal use of territory's potential, which besides elimination of specified environmental problems, also ensures prevention of new environmental problems. Simultaneously, the LEP may represent a suitable tool for prevention and mitigation of natural risks and hazard – flooding, erosion-accumulation processes, landslides, etc. A well-prepared LEP may also serve as a document for the assessment

of ecological stability and a proposal for the territorial system of ecological stability.

- The complexity of the methodological procedure involved in preparation of the LEP. The recommended methodology of the LEP by the Ministry of the Environment of the SR (Hrnčiarová et al. 2000) is based in the LANDEP methodology of landscape-ecological planning (Ružička, Miklós 1982). It is an open system of a set of subsequent steps modifiable based on specificities of a territory, a scale of the task, time horizon of the task, etc. It must be mentioned though that the modification of individual steps requires an expertise and knowledge of basic principles of this methodology, eventually experience with similar landscape-ecological planning.

- Lack of experts capable to prepare a LEP. Obviously, the preparation of a LEP requires experience with the landscape-ecological planning methods and a LEP cannot be entrusted to town planners, architects or other professions. Some knowledge of relationships and processes that take place in landscape is indispensable otherwise preparation of a LEP is limited to the mapping of the existing landscape structure confusing the "green areas" with the TSES elements. Preparation of a quality landscape-ecological plan should be in hands of an interdisciplinary team, examples of which, unfortunately, are only too few in the Slovak Republic.

- Lack of experience in preparation of a LEP. Even in spite of legal coverage of the need to prepare the LEPs as integral parts of surveys and analyses, good quality LEPs are rare. The reason is, beside other, the position of the methodology for such task, as a recommended and not binding methodology. In everyday practice preparation of LEPs is restricted to the processing of the analytical parts: the Present Landscape Structure, positive factors on the one side and stress factors on the other, and occasionally to identification of the TSES elements.

- Poor promotion and edification in the issue. Low level of awareness, first of all, of the involved stakeholders in terms of the demands connected with the preparation of quality LEPs. Because of lack of "positive" examples there is a scarce option to compare. Likewise, the competent body (Ministry of the Environment of the SR before

2003 and now the Ministry of Constructions and Regional Development of the SR) has devoted and still devotes little attention to promotion of landscape-ecological plans. The circumstance that no expertise is obligatory for the preparation of a LEP often leads to the situation when experts in the relevant field do not prepare the LEP.

- Low efficiency of checking on the quality of preparation of the LEP and inclusion of results into the subsequent states. The demanding expertise of the LEP methodology and its situation as mere recommendation is the cause why it is ignored in preparation of LEPs, which are then fashioned on various quality levels. The fact that the persons providing for such plans have no idea about importance of a LEP is the cause why they do not demand their preparation in a satisfactory quality.

- Inappropriate inclusion of a LEP in the framework of surveys and analyses. Inclusion of the LEP in the framework of preparation of a TPD, i.e. in the stage of surveys and analysis is also considered a negative factor. The point is that the LEP is prepared as an independent indispensable part of surveys and analysis, which does not meet the demand of ecologically optimal spatial arrangement and functional land use as defined in the amended Construction Law. The new Law defines ecologically optimal spatial and functional arrangement as a comprehensive process of mutual harmonisation of spatial requests upon economic and other human activities with the landscape-ecological conditions of the given area as ensuing from landscape structure. Processing of a LEP as an independent document is pointless and purposeless. In terms of landscape-ecological optimisation it is indispensable to project and respect the regulations following of the LEP into the concept of the proposed TPD. Otherwise the preparation of the LEP is irrelevant.

- Disapproved methodological procedures for the preparation of the LEP, methodological guidance for the preparation of the TPD and the Ordinance concerning the TPD. The problem of successful application of the LEP in the TPD also lies in the legal position of the LEP and of the relevant methodologies for both the LEP and the TPD. Such situation offers a wide range of discretion for the preparation of the documents, causing their varied final nature and quality.

- Denial and underestimation of the LEP by preparers of the TPD. Preparation of the LEP is not supported by compilers of the TPD as it increases the demands on solutions of spatial and functional arrangement of the territory compared to classical forms of the TPD which enjoys a long tradition in Slovakia and there is little will to change the run in procedures, while the obligation to prepare a LEP is often considered a tedious task.

- Limited funding for the preparation of the LEP and TPD. The responsible persons often do not possess enough means for the preparation of a LEP. Tables for calculation of prices based on number of population, number of houses, size and situation of the cadastral territory exist for elaboration of the TPD. No such tables exist for the LEP. In reality, the price of preparation of a LEP is maximum 2 % of the price paid for the preparation of the TPD. It must be also noted that a reasonable processing of the LEP does not necessarily have to increase the overall price of the TPD as the great deal of information used is identical for both documents particularly that concerning the individual environmental components.

- Drawbacks in the methodology of the LEP. The methodology is too complicated and not particularly layman-friendly, difficult to comprehend for those not possessing any experience with compilation of landscape-ecological plans.

4. Conclusion

Regarding the role of the Landscape-Ecological Plan as the means of regulating land use based on the landscape-ecological principles, it may be considered the principal tool for implementation of sustainable land use while it also represents a contribution to the fulfilment and promotion of the idea of sustainable development in everyday life following the principles of integrated approach to the exploitation of natural resources pursuing the Chapter 10 of AGENDA 21 and creates the fundamental bridge for the transfer of knowledge into real life.

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