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THREATENING OF CHOSEN TYPES OF LANDSCAPE OF SLOVAKIA BY ANTHROPIC ACTIVITIES (DIAGNOSTIC AND PROGNOSIS)

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Landscape threatening by anthropic activities represents a serious theoretical, methodological and practical problem. The article deals with this problem of the diagnostic and prognostic aspects. Author diagnoses and prognoses the phenomenon of threatening of chosen landscape types in the territory of the Slovak Republic, whose increased threatening is caused by a set of causes - from imminent characters of natural structure to its position or exposition of the nature as a whole against the source of threat. Prognosis of the development of landscape types in the light of their threatening is presented in a multivariant way.

Key words: landscape potential, stable and unstable landscape patterns, threatability of the landscape, hazards, risks, irreversible changes, regional and subregional dimension, multidimensionality, diagnosis, prognosis

INTRODUCTION

The topic of threat, vulnerability, sensitivity and the related characters of landscape enjoys in the world and domestic specialized literature a considerable - though not sufficient

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- attention. Out of the available Slovak and Czech literature we can mention the works of J. Demek (1974), J. Drdoš (1981,1990), M. Huba (1984), M. Lehotský (1991), E. Mazúr (1977), I. Míchal (1992), J. Ořáhel' and Š. Poláčik (1987), J. Urbánek (1983), etc.

The notion of threat appears with increasing frequency especially in connection with the rapidly growing reduction of biodiversity all over the planet. But threatening of life on the Earth is related not only to the accelerated reduction of its species diversity, but also to such phenomena like the global change of climate, destruction of ozone layer, acid rains, desertification, and other. The topic of the threatened landscape (biosphere, etc.) can be studied in various time and space dimensions, but with regard to the global character of the topic, it is not possible to abandon the mutual casualistic bonds existing between the single dimensions or scopes of research.

In the present study we shall move mostly on regional and subregional spatial dimensions and the topic of threatening of the landscape will be interpreted in its relation to anthropic processes, eventually to the natural, though anthropically conditioned or accelerated ones.

The cited and other works treat the topic of threatening, vulnerability, sensitivity and the related characters mostly at the levels of theory and diagnostics.

The study tries to assess the chosen landscape types in the territory of Slovakia, increased threatening of which is given by immanent characters of their natural structure, and by the preceding destabilizing action of man on one side, and position in relation to the source (sources) of threat or other factors, on the other.

Along the diagnostic aspect we try to treat it also from the prognostic aspect as a decisive one from the point of view of purpose. Prognosing of the development of landscape types with increased rate of threatening is approached multivariantly.

THREATENING OF LANDSCAPE VIEWED OF PROGNOSTIC ASPECT

What do we understand under the prognostic aspect? First of all it is important to assess the time dimensions of prognosis. The planning and decision-making practice most frequently operates on the basis of years: 2000 (short-term), 2005 (medium-term) 2010, 2030 and more (long-term prognosis). With regard to the social aspect these are time horizons of realistic life-length of the contemporary (especially the medium and younger) generations, i.e. an absolute majority of population, and thus these considerations shift from the abstract-hypothetic level to more concrete, relevant one also for those, who are not worried by the questions of continuity of human efforts, finality of space, the second thermodynamic law, etc.

The growing dynamism of the world considerably complicates the possibilities of creation of even short-time prognoses, not mentioning the long-term ones. But that does not reduce their importance. To the contrary, usefulness of the prognosis multivariantly applied, non-tendenciously interpreted, and understood as a system, are increasingly evident. The primary assumption of such serious prognoses is a thorough analysis of the studied phenomenon. The more complicated phenomenon, (like landscape perceived as a heterogeneous, richly structured, dynamic and synergic system, undoubtedly is), the more complicated diagnosis and subsequently, prognosis. Therefore it is very important to search

for an adequate rate of generalization, identification of landscape elements and the ongoing processes, relevant to the relation to the topic of threatening, or in turn, contributing to the phenomenon of threat, the same as the identification of factors threatening the landscape. We shall have to go back to such fundamental and yet ambiguous questions like, for instance, the very definition of landscape, rate of integration of society to our perception of landscape, problem of absoluteness and relativity (or purposefulness) of the fact of threatening, etc.

Which of the numerous cited questions can be answered comparably immediately and without the risk of excessive relativism?

1. We are talking about threatening of the landscape from the short-term, eventually medium-term aspect.

2. We talk about the threatening the landscape by anthropic activities or anthropically modified (for example, accelerated) processes.

3. We are thinking of the threatening of fundamental key and structure-forming immanent characters of landscape, but mainly its live component, and again especially from the point of view of perspective human interests (society), the point here is a survival on acceptable level. Our point is then anthropocentric view including also the necessity to preserve imminently natural characters (functioning, self-regulative abilities, natural productivity, renewable and unrenewable resources, etc.) as indispensable conditions of survival.

RELATIVELY STABLE VERSUS DESTABILIZED LANDSCAPE STRUCTURES

Approximately 40 % of the territory of Slovakia is occupied by forest land linked to the mountain ranges, and the rest consists of: agricultural soil fund, water areas, waste lands, etc. Still forested mountain ranges have created in the course of the whole history a feeling of safety in population of Slovakia. This feeling is connected with the oldest tradition that originated in pre-historical era (for instance, pre-Slavonic fortified places strategically located in the environment of the forests and mountains with difficult access) and it was even strengthened in the period of Tatar invasion in about 1241, as well as Turkish raids in the 16th and 17th centuries, up to the tradition of Jánošík and the retreat to the mountains after the failure of the Slovak National Uprising.

In relation to the threatening of the landscape by anthropic activities, the cited tradition gains a new quality with perduring strategic meaning of the prevailingly forested mountains. The new quality related to eco-compensative and psycho-compensative functions. Prevalingly forested mountains create at the "chessboard" of Slovakia, typical for the alternation of negative - concave (lowlands, basins) and positive - convex (mountains) relief (eventually landscape) macroforms, "fields" of contrasting colour to the "fields" deforested, settled and more or less intensely anthropically attacked lowlands and basins.

Man, his activities and his products on one side, nature though altered, on the other. The heritage of geotectonics and the way of landuse (contrast between the forest and non-forest areas) determine also the contemporary consciousness and subconsciousness of the inhabitant of Slovakia in the sense of some intuitive quasi-nomadism, expressed as follows: exploiting the entire forest-free ecumene I am still left the anecumene of forested mountains as a reserve.

This idea in the contemporary science - particularly in landscape ecology is expressed

by the notions like: regions of relative (geo)-ecological stability, where the environmental quality is still satisfactory, or regions forming the basis of the territorial system of ecological stability.

Thus originates an idea (and reality) of areas absolutely or relatively unstable and relatively stable regions, the "task" of which is to compensate the load (overload) of the landscape in the first type of areas. As a matter of fact it is a compensative action in all components of landscape - in the area of water supply the mountains represent, in the consequence of prevailingly positive water balance a compensator of the deficit of available water stock of basin-lowland regions with generally negative water balance.

Compensating effect of the mountains is expected also in relation to air - from oxygen production through melioration of the thermal and humidity conditions to the filtration of harmful substance of the air.

Forest environment represents also a decisive refuge for the survival of native plants and animals.

But for the current citizen the most important image of the mountain forest environment is the one of compensator of negative biological, psychological and social effects of disturbed and very deficiently functioning, more or less artificial environment of the settlements and productions of anthropogenized lowland-basin landscape.

Mountains are then, first of all, carriers of recreational and geo-eco-stabilizing potential and supply a feeling of safety to threatened man, in terms of the possibility of regeneration of the physical and spiritual forces.

We believe that the idea of hinterland, refuge, compensator, and safety that the forested mountains have evoked in the inhabitant of Slovakia, results in the existing relatively weak feeling of biological and psycho-social threatening, in spite of the fact that he lives his everyday life in prevailingly harmful environment - as it consequently manifests also - in comparison with the surrounding countries - very low engagement in the protection of environment.

Unfortunately the cited "relying" on compensating power of those 40% of Slovakia, relatively natural environment of the Slovak forested landscape, loses gradually a realistic justification and this environment too is with passing time less and less capable to compensate the negative influences, and becomes also a source of conflicts.

How did it happen?

Concentration of settlement-production-transport activities along the rivers and central parts of basins (lowlands) with deep historical roots and reinforced after the 2nd World War by the process of industrialization and urbanization of Slovakia, as well as the process of concentration of agricultural large-scale production, system of centralization, emphasizing of chosen transport routes, and communications and by other manifestations of concentration and centralization, increased man impact on the central (bottom) parts of valleys and basins, as well as transport corridors, connecting urban-productional cores and regions. Practically all prominently developing industries were remarkable for high consumption of energy and raw material resources and on the other side by heavy production of wastes in all forms, and a very variegated chemical composition.

Here belong metallurgy, chemical industry - petrochemistry, heavy military chemistry, production of fertilizers and synthetic fibres, cellulose-paper industry, etc., extraction and processing of magnesite, limestone, asbestos, ores, and all that on prevailingly energetic base of very poor quality brown coal and lignite with high contents of SO₂ and highly toxic

arsenic. This and other productions, mostly in heavily worn out state, caused a rapid deterioration of environment in very densely populated basins.

Along with intensive, concentrated and in comparison with developed countries, inefficiently overburdened transports, the situation gradually concluded in a pre-collapse threatening of rapidly growing population in poorly aired basins. But practically until the 70-ties, thanks to the predominant use of short chimneys, local or microregional, eventually sporadically mezzoregional character of air pollution was conserved, without any serious effects upon the surrounding mountains.

Frequent stable stratification of atmosphere over the basins also assists to the elimination of penetration of polluted air (air masses) over the surrounding mountain ranges. And vice versa, in comparison, with, for example, contiguous regions of Moravia and Bohemia, natural imminent resistance of Slovakia's forest communities is generally higher, because of substantially higher area representation of the soil-forming substrate (limestones, dolomites, vulcanites) that is richer in minerals, as well as more original species composition of forest communities and analogically higher ecological stability.

However, all above mentioned facts guaranteed the relative resistance of the Slovak forests only up to certain limits of load and literally during the last years the pace of deterioration of the health condition of our forests was accelerating to become one of the most rapid in Europe. Estimation of the area of afflicted forests, as opposed to recently predicted 13 % to be reached in 2000, moves at the present moment around 40-50 %, but some authors assert that even this interval should be considered optimistic (after J. Račko (1988) in 1988 only 26 % of forests of the SR was healthy).

According to B. Maňovská (1989) an irreversible disintegration of needle-leaved forests can be expected in the forthcoming years not only in the Krkonoše Mts, but also in Beskydy, High Tatras and some other mountain ranges. Moreover, according to this authoress, also in lower mountain ranges should this disintegration be expected. J. Vološčuk (1992) estimates the proportion of seriously diseased forests of the Tatra National Park to 60-65%.

THREATENING OF THE LANDSCAPE TYPES

1 Larger water streams and the landscape of aquiferous alluvial sediments

This type, eventually a set of landscape types bounds a decisive population, production (especially industrial) and a large part of transport potentials to relatively very limited space.

Out of all evaluated types it is here, where a serious conflict of coexistence of the exceptionally important polyfunctional landscape potential and increased instability of landscape system, conditioned above all by good-very good permeability and water bearing of substrate.

From among the single landscape potentials it is necessary to mention first of all water-management potential, integrating a decisive part of the surface and underground water stocks. Also the landscape potential seen from the view of the agricultural production is important, with regard to the occurrence of, as a rule, top quality soils and a good accessibility and workability of soils in the plain landscape. This landscape also offers hydroenergetic and partially water-transport potential. Bio-productional potential is high

too in the floodplain forest communities, eventually artificial poplar monocultures. Also the recreational and bio-productive potential of a part of so far not devastated alluvial landscape and its fragments is important. As above mentioned, extraordinarily important is the populational and generally socio-economic potential concentrated in the studied set of landscape types. It is the concentrated and insufficiently regulated, often inadequate pressure of socio-economic activities on the landscape in terms of landscape-ecological characters of the landscape and the processes taking place in them, that is the cause of high rate of its threatening and simultaneously threatening of the purpose characters of this landscape in form of irreplaceable polyfunctional landscape potential. Future of Slovakia depends considerably precisely on the fact, whether we will be able to rationally utilize, apply sanative process to this landscape, palliate the anthropic load exceeding its autoregulative capabilities, and give it back its perceptual qualities that it used to have in the first half of this century which are very important exactly in relation to the fact that this landscape represents an immediate environment of a significant part of population of the cities in the territory of the Slovak Republic.

The topical and potential conflicts of rational and irrational land use:

- excessive current and non-periodical emergency pollution of surface and ground waters in an extent and intensity exceeding the autoregulative capabilities of the streams and water reservoirs,

- threatening of the qualitative and quantitative (balance) characters of hydrosphere and consequently of the functioning of the entire landscape system technocratically approached by water-economic works and adjustments, - hydroenergetic constructions, accumulation reservoirs, by heavy technization of river beds, like transformation of rivers to purely technical water transport routes (channels) etc. This goes not only for the rivers, permanently artificially flooded or otherwise technically transformed area, but frequently also thousands of hectares of integrating landscape, where water regime is consequently changed.

- coverage, drowning and other forms of irreversible liquidation of agricultural and forest soil fund in the given landscape, often without preceding comprehensive research and economic balance of all negative consequences, including the ecological and psycho-social ones,

- liquidation of riverine growths, drying up of swamps and other forms of depreciation and liquidation of important nature-protective, potential, recreational and other production landscape values,

- secondary pollution of hydrosphere, pedosphere, biosphere and sociosphere by means of intense pollution of atmosphere regarding the fact that great part of industrial, transport, construction and communal sources of air pollution are located precisely in this type of landscape type (set of types).

Problems and possibilities of their solution in horizons of prognostics:

Variants of prognosis:

- a) it can be characterized as prolongation, gradation of the so far existing extensive development of the area, characterized by high rate exploitation and devastation of material and non-material resources. It would be in fact a prolongation, deepening and highly probable synergic multiplication of above mentioned problems accompanied by the origin and propagation of new problems and disorders, so to say higher quality problems.

b) re-evaluation of all adjustments of surface streams and water-management situation of the rivers and alluvia. Purely technical approaches will be substituted by comprehensive ones, placing emphasis on the ecological, environmental, hygienic, psycho-hygienic and other characters. Construction of the planned water-management, hydroenergetic and other water works in this area will be completely re-evaluated.

Those parts of the streams, reservoirs, beds, banks, etc. will be renaturalized, that were not devastated yet by unilateral technical approaches. A highly efficient system of water purifying stations will be established and built. Economic, legislative and organizational sanctions will prevent the technologically unsecured storage of toxic wastes in this area. Agriculture and its organization will be gradually reprofiled on lower use of chemicals, less concentrated, technologically more sophisticated (especially as far as application of agrochemicals, waste storage and processing are concerned) and consequently adjusted to the local landscape-ecological conditions. Urban areas of the existing settlements and areas of productional facilities will be comprehensively evaluated and qualitatively improved.

Production program functioning in this entire, little resistant landscape type (set of types) will be reprofiled stressing the reprofiling or liquidation of economically non-efficient and ecologically harmful or risky productions. Legally, organizationally or otherwise protection of all standing natural, cultural and recreational values of the landscape will be ensured. For the whole cited landscape type (set of types) a strict protection and environmental care will be established, as such significant characters like very important polyfunctional landscape potential, above-average to very high vulnerability of landscape system by non-regulated or poorly regulated anthropic activities and extremely high concentration of the cited activities meet here.

2 Landscape accumulating ground waters of the mountain ranges and forelands

It consists of karstic mountain ranges with fissure-karstic and karstic waters and ground water stocks of local to regional importance on one side, and moraine forelands where the stocks of porous ground waters of prevailing regional significance are along the favourable hydrogeological conditions maintained also by positive balance of surface waters in combination with important supplement of ground water balance.

From the point of view of ground water stocks it is, after the ground water stocks in lowland alluvia, the second most important area of extraordinary significance above all from the regional view, regarding the supplies to the population and production sphere of intensely populated and used basins.

Mesozoic complexes are from the viewpoint of water-management potential and its threatening or threatability, considerably heterogeneous.

It depends of imminent - natural properties of carbonates that predetermine their permeability and accumulative power and of the sources that refill them. Another important factor is the contemporary way of landuse on carbonates. Agricultural use of highly permeable karstic plains, especially in the Slovenský Kras Mts leads to an immediate threatening of their important water-management potential. Mechanized and chemicalized forest management becomes with the passing time more and more important source of threat to the karstic waters. Emissions and calamities of biotic and abiotic origin also mean an increased threat to the karstic landscape, including the qualitative and quantitative aspects

of ground waters. Relatively new, but very important phenomenon of threat of the karstic waters is the travel and tourism, construction of the related facilities. One of the main reasons is, as a rule, a high rate of attractiveness of karstic landscape to the tourism. Extraction of building material attacks very aggressively the karstic landscape. Only one investment activity - construction of the water dams system on the Danube - for instance, required extraction and processing of some millions of cubic meters of quality carbonates. Cement factories and lime works, and especially large quarries supplying them, are located as a rule in places of high landscape and nature-protection value. Karstic areas and karstic waters are threatened also by the most variegated forms of building - from the mentioned travel facilities, through various buildings, to transport constructions and electric lines. Besides emissions also other influences of the neighbouring or more distant regions - for instance, polluted ground water or allochthonous streams - threaten the karstic landscape.

Hydroeconomically important moraines and debris are linked almost exclusively to the Tatra region. In spite of diametrically different landscape-ecological, and hydrogeological characteristics in comparison with karstic landscape, as seen from the aspect of resources and manners of threatening of their water-management potential, we can talk about a considerable rate of relationship. Only the order of importance of the threatening agents differs. It is dominated by insufficiently regulated travel industry and its technologically imperfect infrastructure:

Variants of prognosis:

a) continuation of the negative trends - promotion of extraction of building materials, growing mechanization and chemicalization of agriculture and forest economy, degradation of forest communities, insufficiently regulated building construction, exploitation of tourism, etc.

b) consequent protection and rational use, limited by the rate of admissible loading. Regarding the fact that the legislative conditions of protection are created by classifying the karstic areas into the category of large or small protected areas and simultaneously into the category of protected water-management areas, a strict and uncompromising observation of the protection regime and emphasizing of the superiority of protecting function above all others, ignoring eventual short-time economic damage, will be important.

3 More important knots of water divides (spring areas of some significant streams)

From the point of view of threatability of landscape, especially hydrosphere, we considered as decisive the "knots", where the significant streams meet. These knots are not precisely specified from the cartographic viewpoint and can be represented only schematically. These significant spring areas, that considerably influence the qualitative and quantitative regime of great part of surface streams of Slovakia, occur mainly in highly uplifted and dissected part of highland landscape - in the tier of needle-leaved forests, eventually subalpine and alpine steps over the upper timber line, i.e. in landscape systems belonging to the most vulnerable ones.

In spite of the fact that in the last decades the attractiveness of spring areas diminished by pasturing, and the fact that the majority of significant spring areas, eventually knots of divides, belongs to the category of protected areas, the meaning of new sources of threatening of these areas grows and they are mainly related to the threatening of vegetation cover of the forest and dwarf pine communities by several sources:

1. Emissions and calamities of various character that cause or are caused by permanent lowering of resistance potential of our forests.

2. By inadequate ways of extractions and handling of wood by heavy mechanisms in these almost exclusively "funicular" type of terrains. Chemicalization of forest economy.

3. Intensive pressure upon the construction of the touristic facilities - mountain transport facilities, ski tracks, mountain lodging and catering facilities, visitors, whose number surpasses the rate of carrying capacity, etc.

4. In some places - especially in the Slovenské Rudohorie Mts, Stredné Beskydy Mts and Slovenské stredohorie Mts, the spring areas were threatened beside other also by intensification of agriculture (including insufficiently regulated chemicalization).

Variants of prognosis:

a) Degradation of forest communities and deterioration of their retention function in spring areas will go on. Also the threatening of spring areas by emissions, chemical means, escaping oil substances, dumps of various contaminants, application of unsuitable ways of extraction and handling of wood, intensification of agriculture, promotion of tourism and its material and technical background, etc. will continue. Negative consequences will manifest not only in hydrosphere, but also destruction of vegetation and soil covers, it will mean a negative impact on runoff situation, general threatening of nature-protective and recreational potential.

b) Stabilization of vegetation cover through a strict purposefulness of forests in spring areas and increased care for them will be reached. Substantially more sensitive forms of forest economy will be chosen. A strict prohibition of use of chemical substances in spring areas in all economic spheres will be introduced, negative effects of tourism will be eliminated, including the close down of some facilities that diminish the stability of landscape system and those that threaten hydrosphere, strict observation of nature-protective regime will be imposed.

4 Intramontane poorly aired basins (furrows, vales) and contiguous mountain ranges forming their mountainous edge

It is one of the most typical structural elements of the Western Carpathians and the landscape of Slovakia as a whole. In the limited spatial conditions and numerous other limits, intense concentration of large part of population and socio-economic activities of the Slovak territory occurs in concave forms of the Western Carpathians.

Relative stability of air masses in combination and unsuitably localized, prevailingly technologically worn out industry along with inadequate branching of this industry (unsuitable structure of production, deficit of efficiency of cleaning facilities, drawbacks in technological discipline and other causes) cause a very high concentration of emitted harmful substances - especially in the vicinity of the most important urban and industrial centres. Another category of landscape threatening is represented by numerous sources of surface and ground waters precisely on upper parts of the streams and with insufficient recipient for the dilution of escaping pollution. Deficit or poor quality of drinking water sources, anti-flood, energetic or other reasons lead to the construction of water reservoirs that are drowning the ever growing number of basins and valleys, mainly their most fertile soils.

Excessive orientation of our agriculture to the cultivation of cultures on arable land, that is influenced also by a dissected hilly relief of basins, mainly in the feet of the mountains - in combination with Flysch substrate and positive balance of atmospheric precipitations - threatens by land slides and removal of agricultural soil, and on the other side, also by sedimentations and pollution of water reservoirs.

The mountainous edge of the basins is attacked by a series of negative anthropic effects - starting with emissions, as a rule, by inadequate ways of wood extraction and handling, to the attacks represented by the regional and supraregional interests in the sphere of consumer tourism.

Variants of prognosis:

a) continue in the trends of concentration of population in bottom parts of the valleys - in cities and other central (major) settlements of lower hierarchic levels. Lack of solution, deepening of the problems in production, deposition of wastes of industrial and agricultural production, transport, travel, communal wastes, etc. Continuation in construction of new water reservoirs drowning the most fertile soils and liquidating by means of nature-protective and aesthetically valuable sections of streams and swamps. Continuation in unilateral intensification of agriculture, accompanied by multiplication of soil erosion and land slide activity, destruction of soil cover, intoxication of pedosphere and hydrosphere, silting up and eutrophication of water reservoirs leading to the loss of ecological and aesthetical qualities of landscape, etc.

b) assessment of limits of the rate of population's concentration and its activities in basins. Re-evaluation of the ecological and economic aspects (from the viewpoint of so-called total national economy cost) industrial and agricultural production, transport, extraction, construction hydroeconomic adjustments, forest economy, recreational activities, etc. Activation of disproportionally used (or inadequately, insufficiently used) basins or their parts.

5 Landscape of lowlands, plateaus and open valleys

Highland that dissects these better ventilated landscape types, functions as medium distinct (in some meteorological situation distinct) barriers (the Little Carpathians, Tribeč Mts, Pohronský Inovec Mts, etc).

In comparison to the above characterized basin landscape types there is a lower risk here of immediate concentration of harmful substances, but intoxication affects larger areas. The relatively barrier-free transfer of emissions out of the industrial centres of eastern Austria and northern Hungary is not negligible either.

From the view point of occurrence and concentration of existing and potential sources of air pollution, these are the areas with significant representation of the pollution sources (the Danube and East Slovakia Lowlands) and partially the area with less significant representation of the pollution sources (South Slovakian Basin, the Záhorská Nížina Lowland, Eastern Carpathian region).

Variants of prognosis:

a) insufficient attention will be dedicated to the sources of air pollution and its consequences relying on relatively good dispersion conditions, and that will result in gradual pollution (threatening) of strong concentration and spatial range in entire regions

with high concentration of population and agricultural, as well as hydroeconomic potential of decisive significance,

b) also in this landscape type (set of types) a radical change of production technologies, closing of ecologically and economically inefficient operations will be introduced, and efficient separators, accompanied with the secondary use of wastes (for example, that of leach in Sered') will be practiced.

6 Higher highlands and mountains (windward parts)

Here belongs mountainous landscape exposed to the direct effect of prevailing north-western oceanic air currents, bringing atmospheric precipitations. It ensures a positive water balance and assists to the water-management potential of these regions on one side, but on the other these currents bring along emission of the most industrialized regions of Poland, North Moravia, Silesia, Germany and other industrial areas, thus increasingly threatening the forest growths (especially needle-leaved monocultures) of these mountains.

Besides the cited threat, a pressure of tourism on both sides of these mountains (here belong such turistically attractive regions like the Beskydy, Tatry and Pieniny Mts) must be mentioned.

Variants of prognosis:

a) a development similar to the current one will go on - gradual decomposition of forest communities and consequent calamity extraction, application of inconsiderate wood extraction and handling procedures, insufficient attention paid to the restoration and cultivation of forests. Consequences: risk of the loss of forest cover, growth of soil erosion, landslide activity and other geodynamic processes, in Flysch mountain ranges and in the Tatra regions.

Destructive effect of tourism in form of construction of further facilities, and in the form of joined negative effects of transport (especially motor vehicles) and finally of the effects of excessive visiting (see a multimillion annual visiting only in the area of the Tatra National Park) will go on in an uncontrolled manner.

b) Improvement will be actively pursued. The most efficient measures possible will be taken on the national and international levels with the aim to reduce emissions. A system of preventive and sanative measures for the increase of the stability of forest growths will be taken.

Visiting will be regulated. Construction of the touristic facilities will be stopped in the most affected and the most loaded regions excessive touristic facilities will be moved to the feet of the mountains, especially to the abandoned communes. Protection of these areas will receive the highest priority in relation to its urgent needs and in agreement with the relevant legislation. No exceptions will be granted.

7 High mountains and the summit parts of middle mountain ranges

Here we distinguish the landscape under the upper timber line and the one beyond it.

Chosen characteristics:

Considerable dissection of relief conditioning intense dynamics of geodynamic processes, reaching extreme values especially in the landscape beyond the upper timber line.

Positive water balance on basis of atmospheric precipitations. Locally still pastures,

often oversized. Local and regional occurrence of raw material, in places extraction. Elevated rate of threatability of the single geographical spheres and the whole landscape system (especially in the landscape beyond the upper timber line and contiguous forest landscape on upper timber line).

Forest landscape of the concerned mountain ranges presents an important forest-economic potential. Prevaingly high attractiveness of the landscape for the tourism classifies the majority of the evaluated mountain units into highest categories of travel industry. A complex of specifics, rarities and relatively high rate of originality in combination with high to very high rate of vulnerability of this imminently unstable landscape system caused by anthropic activities conditions the need of most strict protection of these landscape units. They form at the present moment a part of large-area protected territories (in three cases national parks), but the problem are the exceptions and overall inconsistent observation of nature-protective regime.

Variants of prognosis:

a) destruction of vegetation cover under the effect of emissions and related calamities as linked to the extreme natural conditions will go on. Also destruction of easily vulnerable landscape system under the effect of tourism (including transport) will continue.

Inadequate ways of wood extraction and handling, extraction of ores will go on.

Those economic activities that negatively influence the nature-protective water-management, bio-productional, recreational and other landscape potential in the immediate vicinity of high mountain ranges without any substantial changes will continue.

b) In the sense of internationally effective definitions of national parks and other categories of large-area protected territories a consistent protection of nature will be ensured. Further shifts of forests from the economic category to the category of purpose-protected forest will be realized.

Problem of emissions on the national and international levels will be solved.

Preventive and sanative measures against destruction of vegetation, soil covers, as well as entire landscape systems beyond the upper timber line will be consistently applied.

Further construction of tourist facilities of any nature that lower the landscape- stabilizing, nature-protective, recreational, aesthetic and another values of nature landscape system of high and medium mountain landscape will be prevented. Facilities of tourism and a part of visitors that overload easily vulnerable high mountain landscape system will be moved out.

All economic, transport and other realized or planned activities in the area and in the hinterland of high mountain landscape will be indiscriminately revised. Only those activities will be admissible, whose intensity, scope and way of realization are evidently compliant with the dominant nature-protective function of landscape.

8 Practically entirely cultivated landscape with agricultural large-scale production with elevated horizontal and vertical dissection of relief, exposed to intense anthropically accelerated processes of water erosion, landslides and other geodynamic phenomena.

As opposed to the plains with intensely chemicalized and mechanized agriculture, mostly linked to the floodplain and terraced fluvial sediments, in this set of landscape types from the viewpoint of relevance those factors of threatening appear in the foreground that

are related to lower rate of resistance of landscape system towards the used agrotechnical procedures of agricultural large-scale production. Repeated washing-out of fine, easily soluble and organic matters nutrient stock, humus content gradually diminishes, soil water regime deteriorates, microbial activity drops, humus horizon thins and the overall soil profile as well, and finally the soil fertility decreases rapidly. Further damage in agriculture, water economy and other sectors, but especially the land and society as a whole suffers by the wash-out of agrochemicals (annually nutrient losses cause by erosion in 1 ha of soil represent 10-40 kg of nitrogen, 0.3-1 kg of phosphorus, 5-60 kg of potassium and 45-500 kg of calcium (1990). Besides the origin of rills and gorges threatens the soil cover. On the joined fields of outer Carpathians or on paleogenic hills of northern Slovakian basins, namely in case of cultivating unsuitable crops and application of unsuitable agrotechnical procedures also further soil-destroying processes develop. Along with cited unsuitable management also recreational and nature-protective potential of landscape drops down, and functional, and overall aesthetic qualities of the landscape deteriorate.

Variants of prognosis:

a) Continuation of the current ways of management, eventually intensification of negative trends in the area of removal of scattered green and anti-erosional terrain adjustments, inadequate meliorations, purely technical adjustment of water streams, growing chemicalization, use of heavy mechanisms, plowing of grasslands, etc.

b) realization of revision of all realized and projected land adjustments from the viewpoint of landscape-ecological links, aesthetic and other landscape qualities. Gradual reprofiling and re-orientation of our agriculture from the "chemical" to "biological" one, re-orientation of dominant way of feedstuff plant production grown on arable land to adequate use of extended area of grasslands and pastures and direct use of cereal production in the sphere of food industry. Efficient application of all anti-erosional, anti-landslide and other measures. Return of the lost use and aesthetic elements into agricultural landscape.

9 Large areas with occurrence and extraction of ores

Delimitation depends on the scale and definition of dimension of large area. In this case we considered only active deposits of coal, oil and earth gas causing or threatening by acute or potential threatening of landscape.

A key region from this point of view is the region of Upper Nitra.

Occurrence of inorganic raw material is imminently connected with the condition of their extraction and processing and thus also serious and multilateral threatening of landscape. But at the present moment, and especially in the developed countries, an alternative of the philosophy of relation to the existing resources of fuels and inorganic raw materials in general, gets in to the foreground. One of the reasons is the fact of non-restorability of these resources, another is the seriousness of the rate of threatening as caused by the extraction, primary processing, waste storage and related infrastructure. The third reason are the changed criteria and indices of efficiency of the extraction and traditional ways of prevailing extensive processing of extracted fuels and raw material. In ever growing number of cases it is more advantageous not to extract, also because the non-restorable resources forming part of Earth's crust are not liable to disappear or lose its value, on the contrary, the scientific and technical progress is continuously improving the conditions of their re-evaluation by means of new technologies and for the creation of new products.

Finally, the distinct trend of lowering the raw matter and energetic demands reduces the needs of traditional fuels and raw material.

In the light of above mentioned characteristics of progressive world trends, there appears the need to search for the answers to the questions of developmental regressiveness or progressiveness, including the perspectives of landscape threatening.

CONCLUSION

The aim of the paper is to call attention to the growing seriousness of the problem of landscape threatening by anthropic activities, leading frequently to undesirable irreversible changes of landscape system. Threatening of the landscape represents a multidimensional phenomenon, that integrates as imminent characters of natural landscape structure, properties of the contemporary landscape, situational aspects and developmental trends, as well as a complex of sources of landscape threatening. A contemporary and continuously dynamizing world incites a growing theoretical and practical interest in this extraordinarily topical problem. Investigation of the phenomenon of threatening of landscape is immediately connected also to the research of environmental risks and hazards, as well as the research of landscape potential.

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OHROZENOSŤ VYBRANÝCH TYPOV KRAJINY SLOVENSKA ANTROPICKÝMI AKTIVITAMI (DIAGNÓZA A PROGNOZA)

Problematike ohrozenosti, zraniteľnosti, citlivosti a príbuzných vlastností krajiny sa vo svetovej i domácej odbornej literatúre venuje značná - aj keď nie dostatočná - pozornosť. Problematiku ohrozenosti krajiny možno študovať v rôznych časových i priestorových dimenziách, avšak vzhľadom na čím ďalej tým viac globálny a kontinuálny charakter ohrozenosti krajiny (biosféry, planéty...) nemožno abstrahovať od vzájomnej príčinnej previazanosti jednotlivých dimenzií či mierok výskumu.

Predložená štúdia sa zaoberá prevažne regionálnou a subregionálnou priestorovou dimenziou a problém ohrozenosti chápe vo vzťahu k antropickým procesom, resp. k procesom prírodným, avšak antropicky podmieneným, či urýchleným.

V štúdií sa hodnotia vybrané typy krajiny na území Slovenska, zvýšená ohrozenosť ktorých je daná jednak imanentnými vlastnosťami ich prírodnej štruktúry, predchádzajúcim destabilizačným pôsobením človeka, prípadne polohou vo vzťahu ku zdroju (zdrojom) ohrozenia, či ďalšími faktormi.

Popri diagnostickom aspekte sa v štúdií nazerá na problém aj z aspektu prognostického, ktorý je z hľadiska praktickej aplikácie výsledkov rozhodujúci. K prognózovaniu vývoja krajinných typov so zvýšenou mierou ohrozenosti sa pristupuje viacvariantne. V samostatnej kapitole sa konfrontujú relatívne stabilné štruktúry krajiny s labilnými, resp. destabilizovanými.

Problematika ohrozenosti krajiny sa diagnostikuje a prognózuje na týchto vybraných typoch krajiny Slovenska so zvýšenou mierou ohrozenosti:

- krajine vodných tokov a zvodnených aluviálnych sedimentov;
- krajine akumulujúcej podzemné vody pohorí a podhorí;
- krajine významnejších uzlov rozvodí (pramenné oblasti významnejších tokov);
- krajine vnútrohorských neprevetraných kotlín (brázd, podolí, dolín) a príľahlých pohorí, tvoriacich ich horskú obrubu;
- krajine nížin, nízkych plošín a otvorenejších kotlín;
- krajine náveterných častí vysokých vrchovín až hornatín;
- krajine vysokých pohorí a vrcholových častí stredohorí;
- prakticky úplne zoranej krajine s poľnohospodárskou veľkovýrobou, so zvýšenou horizontálnou i vertikálnou členitosťou reliéfu, vystavenej intenzívnemu pôsobeniu antropicky urýchlených procesov vodnej erózie, zosuvov a iných geodynamických javov;
- krajine s veľkoplošnými areálmi výskytu a ťažby nerastných surovín.