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THE UPPER NITRA REGION: MAN AND HIS ENVIRONMENT

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The subject of the study is a geographical view of the problems of relationship between man and his environment in the Upper Nitra Region. The character of natural environment, its anthropogenic transformations, population and its environmental perception, attitudes and behaviour as well as environmental pollution and destruction sources are analysed.

Key words: natural conditions, population, settlements, industries, emissions, anthropogenic transformations, environment, population health, environmental perception, environmental attitudes.

INTRODUCTION

The Upper Nitra Region is a traditional research territory of Slovak geography. The first complex-aimed work emphasizing the economic development and its consequences falling

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to the human environment comes from K. Ivanička (1961). Another work, with accent on the geomorphological conditions, was published by M. Lukniš (1968).

In 1990 a group of workers of the Institute of Geography, the Slovak Academy of Sciences, undertook the research of human environment from the geographical aspect, following up with the results of both above mentioned authors.

The Upper Nitra Region belongs, according to the Report on the State of Human Environment in Slovakia (Správa o stave životného prostredia na Slovensku 1991) to the most affected areas. The level of air and water pollution is, however, different at present against the situation before 1990 due to the economic damping and restructuralization programmes as well as due to ecological measures realized. Further on, however, persist consequences of acting of an entire series of factors connecting with industrial production, agriculture and urbanization of the territory.

The work brings views of the territory from the viewpoint of individual geographic professions, being aimed at the key problems of human environment.

METHODICS OF THE WORK

The research of natural conditions has been carried out by means of standard physicogeographical analyses. In evaluating anthropogenic transformations of the territory environmental impact assessment methods have been used. The vulnerability of natural environment has been assessed according to Roberts methodics (1991), who uses environmental sensitivity for it, namely in an application according to Drdoš and Kozová (1992).

In human-geographical analyses of the territory we went out from the data of statistical yearbooks and from health statistics.

The percepted environment has been defined according to Walmsley and Lewis (1985). The behavioural-geographical research (realized within intentions of the principles of the work by Colledge and Stimson 1990) made possible to obtain an idea on perception of the environment, to evaluate the level of environmental awareness of inhabitants and to evaluate their attitudes and proposals on solving the problems. The source of information was a questionnaire. The set of respondents (140) taking part in the survey was close to the Upper Nitra population structure as to the primary social-geographic characteristics.

NATURAL CONDITIONS

The wider territory of the Upper Nitra Region developed in the Pre-Mesozoic period, during which the Variscan mountain system was formed, and in the Young Mesozoic and Tertiary periods, during which the Alpine mountain system was formed. In the territory in question, which includes the basin proper and the foot parts of the mountains, sedimentary rocks of the Krížna and Choč nappes, volcanites, marine and lacustrine deposits as well as Quaternary terrestrial deposits occur. In the Middle Miocene a seaside bend stretched here, which was dammed by masses of volcanites, due to which a water basin arose and this gradually freshened. In ultimate phasis of its existence, due to accumulation of river materials brought by water streams from the surrounding slopes, the water basin was transformed into morasses with an ample moory flora. Brown coal and lignite developed gradually from the organogenic sediments. Since the beginning of this century they are in this way the primary raw-material source in the Upper Nitra Region. During a further volcanic phasis a volcanic mountain range arose in the centre of the area, having developed through erosion-denudational and tectonic processes until the present into the shape of present-day Vtáčnik Mountains. At the same time the Upper Nitra Basin (Hornonitrianska kotlina) and the Handlová Basin (Handlovská kotlina) were formed. The carboniferous beds occur in the middle part of the Upper Nitra Basin, below the Vtáčnik Mts and in the Handlová Basin. They made conditions for the development of mining, power and chemical industries, which represents a basis for employment and simultaneously the source of environmental degradation.

The Upper Nitra Basin is an erosion-tectonic one. It is separated from the Strážovské vrchy Mts by a tectonic line, on which there are issues of thermal waters at Chalmová and Bojnice, where they gave rise to spas.

Periglacial alluvial cones are characteristic for the Upper Nitra Region relief. They were deposited in glacials during the short summer period, when part of frozen ground was melting. Weathered materials moved down into the beds of water streams, by which they were accumulated in peripheral part of the basin, particularly on the foot of the Vtáčnik and Malá Magura Mts (see Lukniš 1968). The cones lie on a clayey basement, which made conditions for the development of slide processes. Large slides skirt particularly the foot of the Vtáčnik, reaching also its slopes and partly also those of the Strážovské vrchy Mts. Another element are moderately dissected hilly lands on Neogene sediments and on volcanites. The youngest element of the relief are flood-plains of the water streams. The flood-plain of the Nitra reaches a width of 200 to 300 m, nevertheless maximum up to 2 km. The moderately inclined surface of cones and of hilly lands forms suitable conditions for the development of intensive agricultural production.

The climate of the basin is warm, moderately humid, moderately sunny and moderately windy (Soták 1991). All the meteorological elements are marked for a considerable variability. The central water axis of the basin is the river Nitra with an average annual discharge of 6.37 sq.m.sec⁻¹ at Chalmová (for 1931-1960). The usable efficiency of underground water in the water-economic region of the Upper Nitra is 50-200 l sec⁻¹, which represents mean value in the territory of Slovakia. The soils reach a mean value of fertility. Luvisols prevail on alluvial cones, locally gleyed soils, brown soils on volcanic substrata prevail. Fluvisols are typical for the flood-plains. Potential vegetation is represented by oak hornbeam-wood, on gleyed, heavy soils oak-wood with Potentilla alba occured. Flood-plain ash-alder wood was characteristic for the flood-plains. The natural forest vegetation has been preserved up to the present day on higher volcanite hills only.

The ecological vulnerability of the region (in the sense of Roberts, 1991) ranges in the largest areas between degrees 3 and 4 (middle and high vulnerability of territory) within the five-degree scale. A critical vulnerability is displayed by surficial streams and their banks (according to Vrana's methodics, 1992) and the areas with gley soils (Bedrna 1992).

POPULATION AND SETTLEMENTS

The territory of the Upper Nitra became in the 50-s a young, immigrationally attractive industrial region on the basis of the development of branches of heavy industries. An unusually complicated and indistinct period of the transition from the centrally regulated economy to the market one, with a transparent reduction of subventions for the development



of primary region-forming element (coal extraction), which leads to the present-day economic regression and has as well as will have impact also on the demographic behaviour of population, should be reflected (after the re-evaluation of the Urbanization Project of Slovakia), with a high probability, on a revitalization of peripheral rural spaces and on retarding their depopulation tendencies.

From the viewpoint of population development in the district of Prievidza we can observe lately some unfavourable tendencies, corresponding to the development in the entire Slovakia. Total growth of population lowered significantly, being influenced in deciding degree by decrease of the values of natality and by increase of those of mortality. Since the 60-s the district is migrationally inattractive and grows only through the natural reproduction of its population. By reducing the fluctuation of population the district which as a whole belongs in Webb's typology (Webb 1963) of territorial units (according to relationships between individual components of all-round movements of population) to A type becomes more stable.

In 1961 48,160 inhabitants (48.3 % of district population) lived in 17 communes of the delimitated and in this way analysed region of the Upper Nitra. During a 30-year period the number of them increased up to 84,925 inhabitants (61.3 % of district population), which is evidence for a growth of population concentration within the above-mentioned space, which due to a shift particularly of the economic gravity centre from the Handlová basin gains a priority position within the district. If population number in Prievidza district increased in 1961-1991 by 38.9 %, then that in communes of the Upper Nitra Region did as much as by 76.3 %.

The increasing concentration tendencies of population are indicated also by the following numeric data. In the period 1971-1980 there were 9 communes with total growth of population and 8 ones with total decrease of population in the Upper Nitra Region. In the following decade (1981-1990) along an incessant growth of population number in the space delimitated the number of communes with population growth decreased to 7 and that of communes with population decrease increased to 10.

Fig. 1. Natural environment and its vulnerability.

1. Environment of alluvial plains

1. Environment of water streams, of their banks with bank vegetation, of low alluvial plains, with critical vulnerability

2. Alluvial-plain environment with gley soils and critical vulnerability

3. Alluvial-plain environment with alluvial soils and high vulnerability

2. Environment of alluvial cones

1. Cone environment with action of oxidation-reduction processes in soil and with high vulnerability

2. Cone environment without influences by surficial and underground waters and with middle vulnerability

3. Environment of hilly lands

1. Hilly-land environment with action by oxidation-reduction processes in soil and high vulnerability

2. Hilly-land environment on carbonate substratum with high vulnerability

3. Hilly-land environment with susceptibility to increased erosion of soil and middle vulnerability

The largest commune is the steadily growing district town Prievidza (53,424 inhabitants in 1991). Particularly since 1980 the natural growth took part mostly in the growth of Prievidza. It means that the process of population concentration (thus also total growth of its number) to the district town became slower and the town grows more from its own sources through the natural, gradually lowering reproduction. It may be stated that the young population basis of the hinterland has been exhausted to a considerable degree and therefore no surprisingly high index of growth should occur in the future.

The relatively most rapidly growing commune within the Upper Nitra Region as well as in the entire district of Prievidza is Kanianka, which demographically gained through constructing a housing estate, to which inhabitants removed from the sinking and depopulating Koš. A significant supply immigrants appears since 1987, culminating in 1990, when the commune gains more than 1,100 new inhabitants. As time goes on, after the supply with young inhabitants, also natality increases and with it also the natural growth of population, but the commune grows further on above all due to the unusually high positive migration balance, which alters this rural commune into a typical satellite settlement as to transportation conveniently linked with the not far lying Prievidza.

The methodical principle of an alternative quantified assessment of the quality of residential environment of settlements (communes) became the comparative method (Očovský 1989). The basis for comparation were avarage district values (district of Prievidza) of 11 indices, which gave it characteristics from the viewpoint of constructing-technological features of flats, the density of population in flats and the outer conditions of housing expressed by working occasions for economically active population of the commune. Each followed index in each commune was assigned positive, neutral, or negative symbol in dependence from whether the value of given index had exceeded, reached, or had not reached the average district value. Through summing the 11 partial symbols a synthetic numeric symbol was obtained and this is the result of assessing the quality of dwelling environment.

Out of the 17 communes of the delimitated and analysed region of the Upper Nitra the settlements of urban type possess a high quality of dwelling environment, namely Bojnice and Prievidza with high share of relatively new housing construction, which is tied with an over-average equipment. Essential problems in dwelling environment are concentrated in the district town with the highest population concentration to a high population rate with a relatively small dwelling area. It is given by the character of the concentrated housing construction with a considerable share of small flats, which are over-populated frequently due to the attractiveness of the town. Bojnice (with 5,084 inhabitants), in turn, is transformed into a sort of satellite settlement of Prievidza without significant working occasions, where the construction was lately confined, which leads to an over-average number of rent households per flat and to a stagnancy in quality.

In spite of the fact that the quality of dwelling environment is in deciding degree determined by the urban and rural types of settlement, in the case of the communes of the Upper Nitra, its spatial differentiation is influenced also by the relative geographical position. The growth of remoteness of the individual communes from the core of the region is, as a rule, conveyed by lowering of quality of dwelling environment. This connects with an artificially retarded, particularly individual, housing construction bound with higher quality of the housing fund and with the preferred concentration of working occasions with a high commutation to work out of the community of dwelling place.

All the communities with under-average and low quality of dwelling environment are rural, namely they are Poluvsie, Nedožery-Brezany, Cígel', Poruba, Opatovce nad Nitrou, Lazany, Bystričany, Kamenec pod Vtáčnikom, Podhradie. In consequence of population emigration to the core of the region and through their gradual depopulation the area for dwelling per person increases in them (low density of population of flats). Positively is assessed mostly also the size of housing fund, which in deciding degree is formed by flats, as to space, in broad-mindedly solved family houses.

INDUSTRIES AND THEIR EMISSIONS

The Upper Nitra Region is one of the most interesting industrial regions in Slovakia. Deposits of coal and lignite in the Handlová-Nováky Coal Basin were dominant location factor of industries. Together with their exploitation in the deposit Handlová at the beginning of the 20th century also a marked industrial development of the region began (Ivanička 1961).

Its core moved over after 1940 from Handlová to the area between Prievidza, Bystričany and Nováky. New mining extraction enterprises were opened here, namely Baňa Nováky (1940) and Baňa Cígel' (1959). Significant impulse from the development of extraction was the built-up of thermal power plant at Zemianske Kostol'any (ENO) and its introduction into run in 1957 with an installed capacity of 178.8 MW (Kubín 1989). A portion of fly-ash produced by the power plant as a waste is producessed in an enterprise for manufacturing light building materials (Pórobetón, Zemianske Kostol'any), which began running in the same year like the power plant. A complex power chain developed here, reaching from exploitation through processing, transformation and consumption of brown coal and lignite and electric and heat energies produced from them (Szöllös 1993).

The industries of fuels and power engineering were determining factors for the regional development of the Upper Nitra. Their primary position within the branch structure of industries of the region is kept by them up to the present times (Fig. 2) (OO SŠÚ, 1970, 1986). The other branches have a supplementary character and are concentrated at Prievidza. The largest tradition within the region falls to the industry of foodstuffs (Carpathia), wood-processing (Tatra furniture) and boot-and-shoe one (ZDA), which ensured employment particularly for women. The development of mining was an impulse for the origin of engineering industry (BME Nováky).

The quality of extracted coal is very low (Tab. 1), which together with the obsolete technology of transformation results in the fact that ENO is the largest source of air-pollution (Fig. 2), while the Chemical Plants (NChZ) with their annual production of 11 million cu metres of waste waters (in particular with the content of chlorides) have a large impact particularly on water pollution (Investconsulta, 1990).

An inevitable presupposition for continuation in exploiting power resources from the local deposits is bringing to end the complex technological reconstruction of ENO and its transition to boilers with fluid combustion. The maintenance of competition ability as well as the development of production in the other industrial branches, in particular in chemistry and mining, depends on abilities to make production more effective, up-to-date and ecological.

Ostatné odvetvia

Energetický priel



Fig. 2. Development of share of individual branches in the industrial employment.

	1	Ц	П	IV	V
	heating power	water content	ash content	sulphur content	arsenic content
	[MJ.kg ⁻¹]	[%]	[%]	[%]	[gt ⁻¹]
1. Mine Cígeľ	12,53	30,29	22,97	2,46	80
2. Mine Handlová	16.77	20.14	21,89	1,68	45
3. Mine Nováky	11,61	35,38	23,33	3,72	602

Tab. 1. Qualitative parameters of coal extracted in the Upper Nitra mines

70.0%

60.0%

50.0%

40.0%

Source: SLOVENSKÉ UHOĽNÉ BANE (1986). Charakteristika jednotlivých banských závodov (Baňa Cígeľ, Baňa Handlová, Baňa Nováky). Interný materiál SUB, Prievidza.

ANTHROPOGENIC TRANSFORMATIONS OF THE NATURAL ENVIRONMENT

The Upper Nitra belongs to the regions with critical environmental situations in Slovakia (see Správa o stave životného prostredia v SR 1990, i.e. Report on the Human Environment Status in the Slovak Republic). Through the unfavourable impacts of industries and conveying activities, but also through those of intensive agriculture (plant and animal production) are affected all the elements of land use. A special issue is concentration of technical elements and "evacuation of the landscape" due to homogenization of the pattern of humanized landscape, which had reduced the natural elements in an agricultural environment.



Fig. 3. Development of emissions in Nováky power plant (ENO).

The main source of air pollution is the thermal power station at Zemianske Kostol'any and the Chemical Plants at Nováky. The power station is the largest consumer of coal (average annual output about 1.5 million tons) with sulphur content from 1.36 to 3.56 % and ash materials from 20 to 40 %. This resulted in the fact that before technological arrangements began 229,000 tons of emissions (SO₂, arsenic, fly-ash, dust) were emitted in the air in 1991, also further sources in the basin taking part in it. The air pollution has a consequence in forests having been impaired in the Strážovské vrchy and the Vtáčnik Mts as well as an increased morbidity of population (see Jakubis 1991). The Chemical Plants at Nováky produces annualy 6,000 tons of waste calcium carbide. The annual produce of slag and ash is 1,200,000 tons, being transported by piping in watered state to a dump in the karst sinkhole Drienok. The water from the dump percolates into the carstified basement, contamination underground waters and rock environment, destroying pore waters in the alluvial plain and consequently also those on the surface in form of sinking. In 1991 a series of depressions was formed on arable land and a spillway on a way to Chalmová with a depth of 3 m. A rise of underground waters in the alluvial plain and the impacts on the thermal waters is displayed according to Jakál (1993) also by the dump at Chalmová, which is located on the alluvial plain. Under this impact the temperature of the thermal waters has altered (decrease of temperatures in 2 springs as much as 4°C, increase in one spring by 2°C, partial removing of springs). The oldest dump in a lateral valley above Zemianske Kostol'any was finished in 1963 with a breakdown event, which resulted then in loss of 1 human life, material damages and an extensive contamination of the river Nitra and its alluvial plain, including a complete liquidation of the river ecosystem.

The mining dumps occur in central part of the basin. The surficial mining at Lehota pod Vtáčnikom began in 1979 and was finished in 1988. Totally nearly 9.5 million cu metres of overburden were moved away and more than 1.6 million tons of coal extracted. During the work three large slides of overlying rocks occurred. In course of 1991 and 1992 the territory was recultivated (100 hectares of agricultural soil). Through the mining activities



numerous slides in the Vtáčnik Mts and its foot were activated, new ones were arising and numerous cracks and poils (see Fussgänger et al. 1985) were formed. Through undermining in the basin many cracks and subsiding depressions were formed. Due to the undermining the mountain range and the central portion of the basin has an anthropogenically modelled mezorelief. Through disturbances on the surface due to an undermining 502 hectares of the soil were affected, of them 229 hectares devastated.

An unfavourable impact on the natural environment is carried out also by the large-scale vegetable production, by agricultural estates producing organic waste. As concequence of the intensive vegetable production a typical so called "evacuated landscape" developed in the Upper Nitra in the form of a humanized steppe with a strong reduction of biotic elements and with contaminated water and underground waters. An increased occurrence of Ph, Zn, Cr, Cd, Mn, As and others are stated by Tomašuková (1991) in all the territory of the basin, although with an increase in the surroundings of Nováky. Larger increase is displayed by nitrates and nitrites. In total 19,000 hectares of agricultural soil are contaminated to a degree requiring a recultivation.

Strongly disturbed water conditions are in a portion of agricultural areas. In the undermined territory underground water level has sunk by 25 m and the water streams were canalized and even led by pipes. Similarly foot meadow stands below the Vtáčnik Mts have been drained.

POPULATION HEALTH (COMPARED TO THE OTHER TERRITORY OF SLOVAKIA)

In evaluating the distribution of diseases we went out from the results being prepared to the press, or partly already published (see Krajčír 1993). All of them go out from the basis of mortality.

On a cartographical record (see Krajčír 1993), which represents the distribution of all diseases together (all the causes) the Upper Nitra is "healthier" than Slovakia in total, but

Fig. 4. Transformation in the landscape provoked by coal extraction in the area Nováky - Koš (state of April 1993 - J. Jakál).

- 1. Basic information on the Nováky mining district
 - 1.1 Boundary of extracted area
 - 1.2 Boundary of present-day extracted area
 - 1.3 Undermined area
- 2. Transformations of natural environment
 - 2.1 Lakes filling bottoms of subsidence depressions
 - 2.2 Draining channels
 - 2.3 Abandoned dry beds of creeks
 - 2.4 Waste dumps
 - 2.5 Water reservoirs
 - 2.6 Wildcat waste dumps

- 3. Transformations of urbanized environment
 - 3.1 Depopulated parts of communes and farmyards
 - 3.2 Deformed main roads
- 4. Other elements of map
 - 4.1 Settlements
 - 4.2 Industrial areas
 - 4.3 Main roads
 - 4.4 Railways
 - 4.5 Water streams
 - 4.6 Contour lines

less "healthy" than the district of Prievidza (as a whole). The highest mortality is recorded by Koš and Podhradie (evidently also due to their age composition). Both Prievidza and Kanianka are young settlements and thus just through their age composition they improve the all-round character of the Upper Nitra from the viewpoint of human environment. This circumstance has an implicately proportional impact also in further records.

It may be perhaps paradoxical, but from the viewpoint of the occurrence of infectious and parasitary diseases Prievidza and Bojnice dominate, and then Bystričany and Oslany. The other settlements display zero intensity of occurrence. The intestinal infectious diseases have their representation only in the district seat, but in spite of this only settlement record (the town with numerous population) we can see the Upper Nitra (as a whole) affected more than the area of the district or all the territory of Slovakia. Tuberculosis is displayed only at Prievidza and Oslany. Records of both the settlements correspond to the whole-Slovakian average, but the Upper Nitra as a whole is better in this case than Slovakia. Septicaemia stands out only at Prievidza, Bojnice and Bystričany. Consequently also the entire Upper Nitra figures as "ill" with higher incidence (in the sense of mortality) against the district whole and also against Slovakia.

The malignant tumours appear in the Upper Nitra, in general, more frequently than within the district unit, nevertheless to a lesser degree than in Slovakia (as a whole). Out of them the malignant tumour of stomach is equal to the whole-Slovakian average in the record of the Upper Nitra, while the district of Prievidza is "healthier". In the malignant tumours of trachea, bronchi and lungs the Upper Nitra Region is worse, it is true, than the district of Prievidza, but better than Slovakia in total. The same holds good in leukaemia. In diabetes neither the Upper Nitra nor the district reach the degree of intensity for Slovakia.

Out of the circulatory diseases the acute infarction of myocard on average, it is true, equals to the occurrence in Slovakia (in the sense of mortality, of course), but also the district as a unit is better in it. The same holds good about the vascular diseases of brain. The ischaemic disease of heart is displayed by Slovakia to a higher average than the Upper Nitra or the district unit. In general, it holds good also about the arteriosclerosis, only in this case the Upper Nitra displays a higher degree of incidence than the district itself. In the chronic rheumatism of heart it is to say that the record for the Upper Nitra is more favourable than that for the district, or also for Slovakia. In hypertensive disease the whole-Slovakian average is exceeded by Poruba and Opatovce nad Nitrou, while the other settlements display occurrence under the whole-Slovakian average. In general, the discases of circulatory system are more frequent in the Upper Nitra (than in the district unit), but under the average of Slovakia.

Through the pneumonia the Upper Nitra, it is true, exceeds the district whole, but not here it reaches Slovakia's average. A similar result (compared to Slovakia) has been displayed in bronchitis and in asthma, only in spite of a large enough differentiality of incidence within the territory studied both the units (Upper Nitra and the district of Prievidza) are equal each to other. The same holds good about the ulcerous disease of stomach. In the chronic disease of lever and cirrhosis the Upper Nitra exceeds the district, but it does not reach the intensity of Slovakia. Nephritis in the Upper Nitra equals to the Slovakian average, but the district average is "better" in this case. The congenital malformations are equal for Slovakia and the Upper Nitra, but the district possess them to a lesser degree.

In the injuries and poisonings (as a whole) we can follow sequence from the "worst"

Slovakia, through the Upper Nitra to a "better" district whole. The same holds good also in the fractures. The burns in the Upper Nitra with the same average in the district do not reach "the level" of Slovakia. Out of the whole mentioned (injuries and poisonings) the poisonings alone and intoxications are the same in the Upper Nitra and in Slovakia, in the framework of the district, however, they display a "better" average.

POPULATION HEALTH STATE AS PERCEIVED

Along analysing health statistical data, pilot behavioral-geographical research makes possible to obtain a certain idea about population health state. Through this research it is possible to analyse a perceived population health state within the critical environmental zone in the Upper Nitra.

The full majority of respondents of the region's population are agreed on the fact that they live in an unhealthy human environment, in spite of a few years ago only 44.3 % respondents compared to 67.8 % respondents from the present times assessed the problems in the human environment within the Upper Nitra Region as expressive to very expressive. One half of respondents consider the health problems within their households approximately the same like a few years ago. Nearly one quarter believes that they have got expressive ones particularly during the last three years. More than one sixth believes that health problems within their households get expressive ones already for 10 years in connection with the state of human environment. In this connection almost one third expects impairment of health state in the following five years. On the contrary, 15 % of respondents believes that no impairment will come.

According to the subjective assessment diseases of the respiratory system (32.1 %), allergies (22.1 %) and dermal diseases (10.7 %) belong to the heaviest health problems in children within the families of respondents. In the adult population the diseases of respiratory system (41.4 %, in risk localities even 52.8 %), further vascular diseases (20.0%), allergies (12.9 %), nervous disorders (10.7 %), dermal diseases (10.0 %) and neoplasms (10.0 %) are considered health problems within the families of respondents.

MY ENVIRONMENT PERCEIVED ENVIRONMENT

A characteristic feature in analysing the perception of quality of human environment by inhabitants of the Upper Nitra Region is its negative dimension. More than nine tenths of respondents believe that they live in an unhealthy environment. In the proximity of risk localities (power plant, chemical plants, dumps of waste) is the share still something higher (96 %). The state of human environment has been impaired during a few last years according to the asked inhabitants. A few years ago only 44 % of respondents considered environmental problems expressive to very expressive. At present as many as 68 % of the asked assess problems in the human environment as expressive to very expressive.

In connection with the impaired state of human environment in the Upper Nitra Region the respondents consider polluted air (91 %), poor health state of the population (58 %), in

the proximity of risk localities (64 %) and water pollution (49 %) the most significant questions.

The position of human environment within the system of values is conditioned by man's decision as well as his spatial behaviour. The respondents were confronted with a task to order 7 problems (amount of salary, health, work, human environment, financial circumstances, family and politics), namely in a way to what degree significant for them at present they are. The most significant value for the respondents was health. Human environment together with amount of salary represented the second most significant value.

ENVIRONMENTAL ATTITUDES

In spite of being aware of the unfavourable environmental situation almost three fifths of respondents would think of a removing from the region in no case. Almost 19 % of the asked would remove in the case that the present state of human environment will get impaired, 11% will do so also when the present state will not change, and only 7 % will speculate about removing also if the state of human environment gets improved. In this case the potential mobility is influenced by the character of recognized values. Almost three fifths of respondents remain to live in the region due to family and relatives bonds, 29 % due to favourable residential conditions, 20 % due to employment and only 16 % due to a strong emotional bond to the commune, or also to the region. Those ready to remove to another, from the viewpoint of human environment, healthier region, give most frequently the individual areas, or also localities in central Slovakia (area of the Tatra Mts, Liptov and Orava regions). As to the localities mentioned above all clear air, healthy environment, pretty nature, mountains, forests.

Mining, power engineering and chemical industry were in the period of post-war industrialization primary elements of regional development. Nearly 30 % of respondents assess the impact of mines and of power station at Zemianske Kostol'any on development of the region (from the economic aspect) positive both as to the past and the present. More than 21 % of the asked considered it positive for the past only. The Chemical Plants (Chemické závody) at Nováky have been and are a contribution of economic development of the region according to 36 % of respondents. The economic activities mentioned have strikingly influenced and influence both human environment and the health state of population. In spite of the impact of extraction on the character of utilizing the territory of some communes, only 38 %, or 29 % of respondents assessed the impact of mines Cigel' and Nováky, respectively, as very unfabourable to very unfavourable. The impacts of the power plant at Zemianske Kostol'any and that of the Chemical Plants at Nováky on human environment and the health of population have been assessed substantially less favourably. As unfavourable to very unfavourable it has been denominated by 86 %, or 90 % of the asked, respectively.

In spite of negative assessment most respondents see solution of the unfavourable state in leaving the plants running as well as in up-to-dating technologies (71 % in the case of the power plant and 72 % in the case of the chemical plants).

According to opinions of 66 % of respondents the largest possibility to influence solving the problems concerning the region's human environment is in the hands of the government of the Slovak Republic. According to 21 % of respondents the largest possibilities are at

communal offices and according to 19 % at the district office. In endeavour for improving the human environment are the most active, according to opinions of the respondents, voluntary conservation groups (55 %) as well as political parties and movements (22 %).

A WAY TO THE FUTURE

Presuppositions of regional and environmental development

The regional development of the Upper Nitra is based since its beginnings on the extraction of brown coal and lignite. Although the extraction was upprofitable, its development was supported by the state endeavouring to keep full employment within the region (Ivanička 1974). At present idleness of the policy with state subsidies manifests itself completely as to the inefficient mining branch in the Upper Nitra. The crisis situation begins to be solved through the programme of regional development on the basis of small and middle-sized enterprises. In the Upper Nitra are convenient presuppositions to continue with the handicraft development and manufactural traditions. The Upper Nitra has conditions also for the development of tourist travel. From one hand an attractive basis is formed by thermal waters at Boinice and Chalmová, where the environment, however, is strongly deteriorated by a dump, by an inconvenient use of the manor-house, by an overdimensioned farming estate in its immediate neighbourhood, by a low-quality urbanization of recreation area of the spas as well as by an inconvenient leading the piping to transport fly-ash to the dump. Such a use of Chalmová would require extensive rescues as well as landscape arrangements of the locality. On the other hand, presuppositions for the development of tourist travel are provided by attractive mountain environment in the hinterland of rural settlements as at Bystričany and in particular in northern part of the basin (Nitrianske Pravno and others).

The solution of environmental problems is complicated. The expected damping and stoppage of coal extraction till 2000 will exert influence on the power industry, which was primary source of problems in human environment in the past. Already the present-day ecological measures have substantially lowered the amount of emissions (indicated, for instance, by presence of bees also in an immediate proximity to the plants after 40 years), which should be reduced to 5 % till 1995 (related to the state in 1989).

The chemical plant has begun due to the restructuralization to be aimed at a harmless production.

Nevertheless the dumps and surficial disturbations due to the earth's crust load with wastes and due to undermining in the form of subsidence depressions and cracks remain persistent consequence of mining activities and power production. Both underground waters (fall of the level in undermined areas, rise of the level in surroundings of the dump at Chalmová) and surficial waters (in undermined areas) remain affected for long term.

The second significant source of environmental degradation is large-scape agriculture, which is the cause of soil and underground-water contamination as well as of strong reduction of the regional ecological infrastructure. Already at present, like in the entire territory of Slovakia, a programme is to be realized, namely that for creating a regional ecological infrastructure, whose aim is reconstructing the ecological diversity of landscape. The programme for communes renovation solves the devastation of rural settlements, being

aimed at their architectonic, urbanistic and environmental reconstruction. A long-term problem remains the contamination of soils (16,000 ha of agricultural soils) and of underground waters.

CONCLUSION

The Upper Nitra is a typical environmental phenomenon of European continent with degraded human environment caused by unfavourable impacts of both industry and intensive agriculture. Similarly as in other countries also here the development of industries caused an unfavourable transformation of urbanistic structures and extinction of traditional cultural values, air and water pollution, soil contamination and damage of ecosystems. The agriculture produced the so called "evacuated landscape" (ausgeräumte Landschaft) with typical marks of humanized steppe and decimated plant and animal communities.

At present, although belated to other European countries, in the Upper Nitra a process is running, namely that of restructuralization and ecologization of industries as well as programmes for both communities renovation and for creating a regional ecological infrastructure, all of them together being guarantee of environmental development of the territory.

Translated by A. Krajčír

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HORNÁ NITRA: OBČAN A JEHO PROSTREDIE

Kotlina Hornej Nitry patrí ku karpatským kotlinám s priaznivými prírodnými podmienkami pre život človeka. Kotlinový reliéf kuželov a pahorkatín je mierne modelovaný, pôdy stredne úrodné, klíma teplá, mierne vlhká a mierne slnečná. V strednej časti kotliny je výskyt uhľonosných vrstiev. Oba tieto zdroje - zdroj prírodného prostredia a zdroj nerastných surovín umožnili silnú koncentráciu ľudských aktivit - veľkoplošného intenzívneho poľnohosodárstva so všetkými atribútmi chemizovanej a mechanizovanej veľkoprodukcie a priemyselnej výroby s veľkoprodukciou tuhých, tekutých a plynných odpadov. Oba tieto základné faktory podmienili životné prostredie, ktoré charakterizujú dve vlastnosti: veľké, homogénne plochy "vyprázdnenej krajiny" so silnou redukciou biotických prvkov, na druhej strane silné znečistenie prostredia toxickými i netoxickými odpadmi a rezíduami.

Obyvateľstvo Homej Nitry, a najmä postihnutého priemyselného regiónu s centrom v Zemianskych Kostoľanoch a Novákoch citlivo vníma kvalitu životného prostredia. Až 67,8 % respondentov považuje environmentálne problémy za výrazné až veľmi výrazné a vyše polovica má pocit problémov s dýchacími orgánmi. Až 91 % respondentov považuje za najvýznamnejší problém znečistenie ovzdušia v rizikovej oblasti, 64 % problém zlého zdravotného stavu a 49 % znečistenie vody. Skutočnosť, že 60 % respondentov by sa v žiadnom prípade nevysťahovala z Hornej Nitry svedčí o silnej nadviazanosti občana na jeho domovský región. Vyše 70 % respondentov požaduje zmenu technológie v oboch hlavných závodoch, čo je podľa nich bázou riešenia environmentálnych problémov.

Budúcnosť Hornej Nitry vidíme v reštrukturalizácii priemyslu a prispôsobení jeho mierky mierke krajiny. Treba sa teda uberať cestou rozvoja malých a stredných závodov, využívať termálne a horské vody, resp. podhorskú prírodu na rozvoj rekreácie. Dôležitou úlohou je ekologická rekonštrukcia poľnohospodárskej krajiny a obnova dediny, pre ktoré už boli vytvorené osobitné programy.

Obr. 1. Typy prírodného prostredia a ich zraniteľnosť.

1. Prostredie riečnych nív

- 1 Prostredie vodných tokov, ich brehov s brehovou vegetáciou, nízkych nív s kritickou zraniteľnosťou;
- 2 Nivné prostredie s glejovými pôdami a kritickou zraniteľnosťou;
- 3 Nivné prostredie s nivnými pôdami a veľkou zraniteľnosťou
- Prostredie náplavových kužeľov.
 - 1 Kužeľové prostredie s pôsobením oxidačno-redukčných procesov v pôde a veľkou zraniteľnosťou;
 - 2 Kužeľové prostredie bez vplyvov povrchových a podzemných vôd a strednou zraniteľnosťou;

- 3. Prostredie pahorkatín.
 - 1 Pahorkatinové prostredie s pôsobením oxidačno-redukčných procesov v pôde a veľkou zraniteľnosťou;
 - 2 Pahorkatinové prostredie na karbonátovom substráte a veľkou zraniteľnosťou;
 - 3 Pahorkatinové prostredie s náchylnosťou na zvýšenú eróziu pôdy a strednou zraniteľnosťou.

Obr. 2. Vývoj podielu odvetví priemyslu na zamestnaní v priemysle.

Obr. 3. Vývoj emisií v ENO.

Obr. 4. Zmeny v krajine vyvolané ťažbou uhlia v oblasti Nováky-Koš (stav do apríla 1993 - J. Jakál). Vysvetlivky:

- 1. Základné informácie o nováckom ťažobnom revíre
 - 1.1 Hranica dobývacieho priestoru
 - 1.2 Hranica súčasného dobývacieho priestoru
 - 1.3 Podrúbané územie
- 2. Zmeny prírodného prostredia
 - 2.1 Jazerá vyplňujúce dná poklesových depresií
 - 2.2 Odvodňovacie kanále
 - 2.3 Opustené suché korytá potokov
 - 2.4 Haldy jaloviny
 - 2.5 Vodné nádrže
 - 2.6 Divoké skládky odpadu
- 3. Zmeny urbanizovaného prostredia
 - 3.1 Vysídlené časti obcí a hospodárskych dvorov
 - 3.2 Deformované hlavné cesty
- 4. Ostatné prvky mapy
 - 4.1 Sídla
 - 4.2 Priemyselné areály
 - 4.3 Hlavné cesty
 - 4.4 Železnice
 - 4.5 Vodné toky
 - 4.6 Vrstevnice

Tab. 1. Kvalitatívne parametre uhlia ťaženého v baniach Hornej Nitry.