

MORAVIAN GEOGRAPHICAL REPORTS



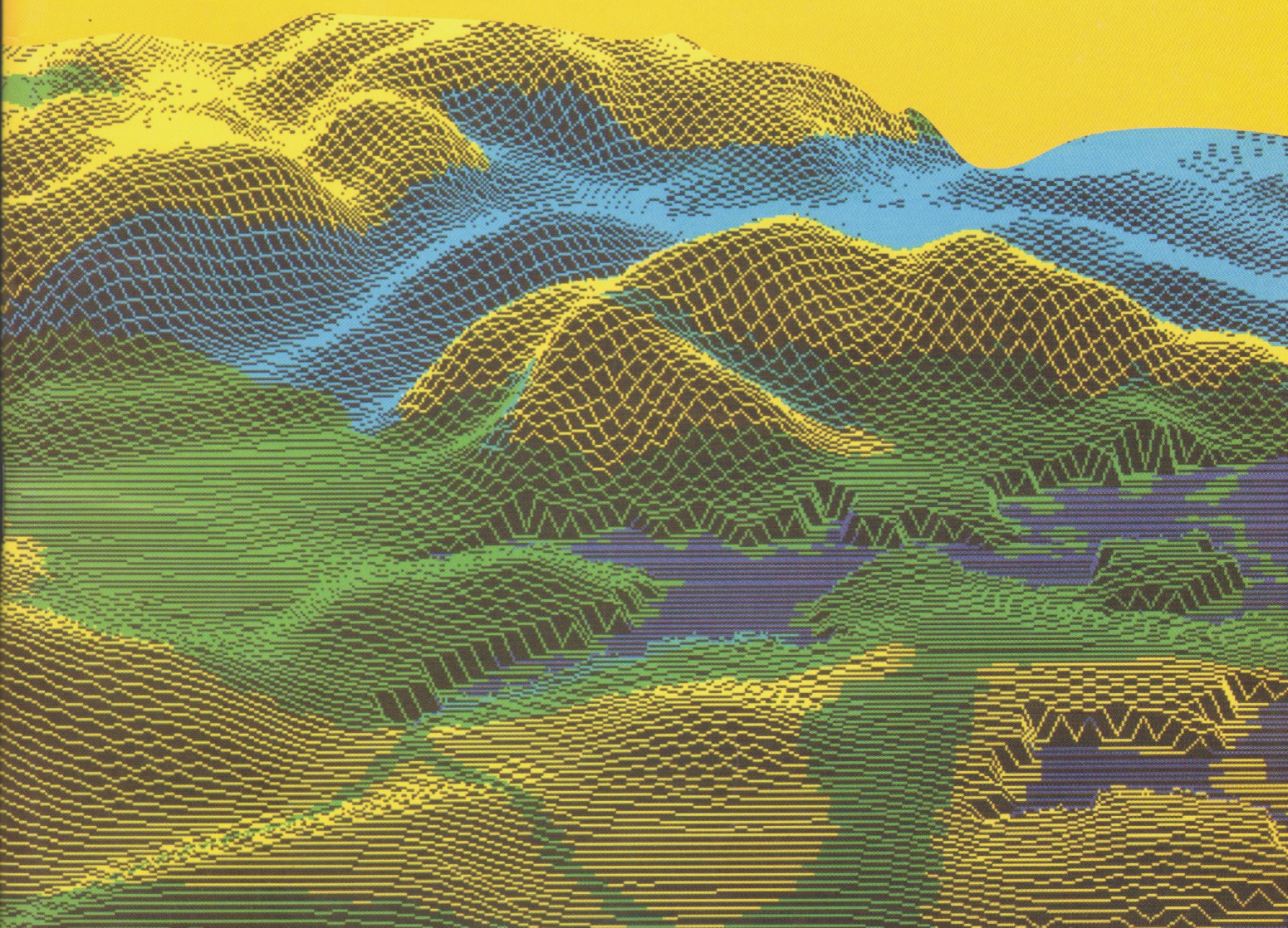
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The town of Olomouc looked like Venice at the time of flood culmination. Cars in streets had to be replaced by boats. (Wednesday, 9 July 1997)

Photo: V. Galgonek



Rožnov pod Radhoštěm: destroyed bank and main road in the town centre after flood on the Rožnovská Bečva River. (Thursday, 17 July 1997)

Photo: K. Kirchner

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HYDROLOGICAL REGIME OF THE RIPARIAN LANDSCAPE OF THE MORAVA RIVER IN THE LIGHT OF THE PAST AND RECENT CHANGES

Anna GREŠKOVÁ

Abstract

The paper deals with the southernmost (Slovak-Austrian) reach of the Morava river, until now saved from the ever growing anthropogenic pressure thanks to strictly guarded border area. In spite of it, also here some important changes of the hydrological regime of the riparian landscape, namely in consequence of shortening and straightening the Morava river stream and construction of an extensive drainage system, are evident. The paper analyses these changes with the emphasis on surface and ground waters.

Shrnutí

Příspěvek je věnovaný nejnižnějšímu (slovensko-rakouskému) ústí řeky Moravy, který byl do nedávné minulosti díky přísně střeženému hraničnímu pásmu a pravidelným záplavám uchráněn před silným antropogenním tlakem. I přesto zde došlo k významným změnám hydrologického režimu poříční krajiny, a to hlavně v důsledku napřímení a zkrácení toku Moravy, a také vybudováním rozsáhlého odvodňovacího systému. Příspěvek pojednává o těchto změnách s důrazem na povrchové a podzemní vody.

Key words: the Morava river floodplain, anthropogenic impact, hydrological regime of riparian landscape, surface and ground waters, water management.

1. Introduction

The landscape system of Morava floodplain was, until now saved from the ever growing anthropogenic pressure thanks to the strictly guarded border area. An almost intact and unique natural system has been preserved here. In spite of the fact that the anthropogenic impact in the Morava floodplain area was minimal, i.e. lesser than in floodplain areas of other Slovak streams for its border situation and regular floods preventing the change of floodplain in to arable land and consequently more intensive use, traces of negative impact of anthropogenic activity are found also here. We are going to point out some of them concerning especially the changes of water regime in the riparian landscape with the emphasis on surface and underground waters.

2. Character of the territory

Before November 1989, when the river Morava and the surrounding landscape of its floodplain were opened to the growing anthropogenic pressure, not only economic activities but also research were limited in the Slovak-Austrian borderland. Today the area enjoys a lively interest of both experts and non-experts who want to visit, to study but also to exploit and transform this land.

The reach of Morava from the confluence with Myjava and Dyje up to the estuary to Danube (i.e. the

Slovak-Austrian part of the border area) and the riparian area, subject of this contribution (Fig. 1), is a part of the Lower Morava floodplain (Mazúr - Lukniš, 1980). The Slovak-Austrian part of the Morava alluvium should be interpreted as a part of the larger system of river floodplains of the Danube, Morava and Dyje rivers. The area of Morava floodplain represents a landscape system with a colourful mosaic-like structure where neighbouring units are often ecologically very much different. A pronounced differentiating factor in the given landscape system is precisely the water phenomenon (Grešková, 1993).

The area under study is typical of high biodiversity and it is considered a significant gene-pool also from the international point of view. It is remarkable for the occurrence of some rare ecosystems of dead branches, numerous wetlands, swamps, wet meadows, pastures and remainders of botanically valuable alluvial forests. The unique continuous alluvial forests were preserved above all in the confluence area of the Morava, Myjava and Dyje rivers. Their existence depends especially on the frequency and extension of floods, input of nutrients and the ground water table regime. These unique and relatively well preserved floodplain forest ecosystems, wetlands and meadows as ecologically important segments of the landscape have their irreplaceable role in the network of biocorridors and biocentres. They are a natural stabilizing element of the landscape represent-

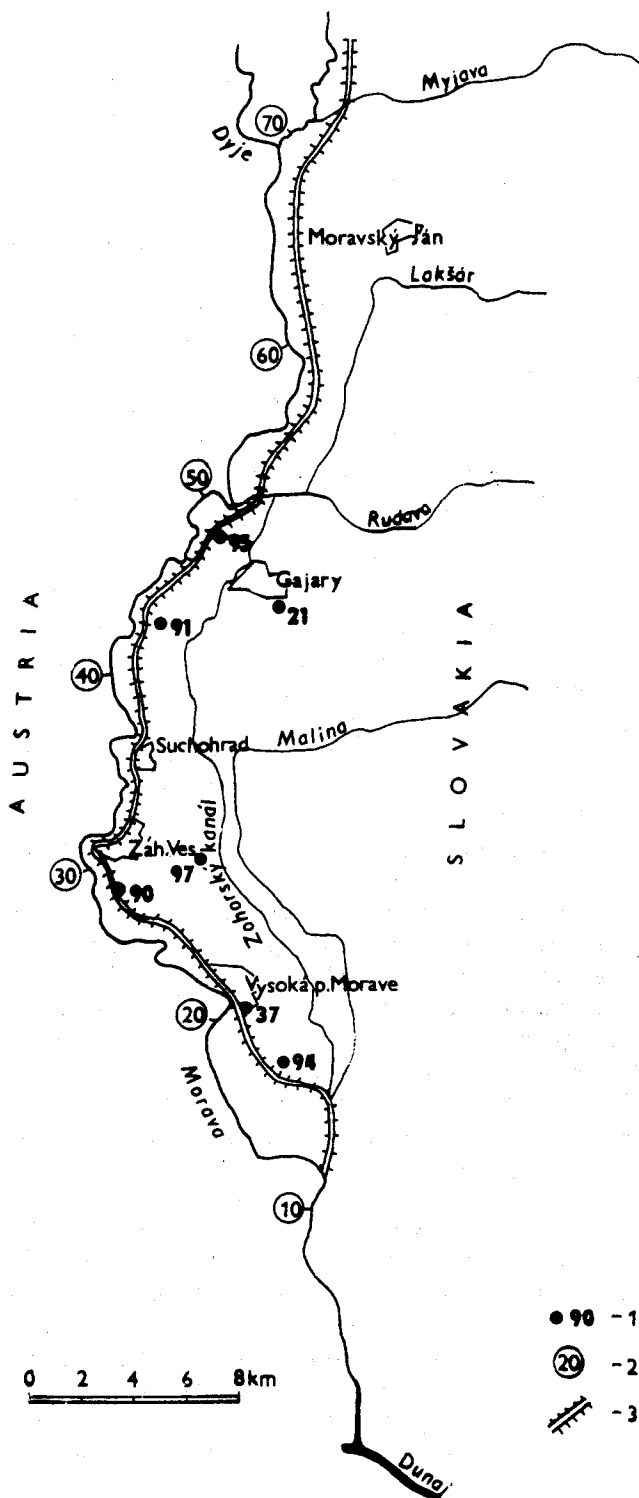


Fig. 1 The reach of the Morava river from the confluence with Myjava and Dyje up to the estuary to the Danube and the riparian area.

- 1 - groundwater level observation object
- 2 - km of the river
- 3 - dam

ing the best preserved and most valuable landscape fragments of the area under study and the skeleton of ecological stability in the territory.

The floodplain of Morava consists of several kilometres wide, little dissected belt of a slightly undulated plain. Two types of relief can be found here - accumulation and accumulation-erosional. They are result of accumulation, transporting and erosional activity of the stream and wind. The dominant relief type is that of the fluvial plain and eolian-fluvial plain. The Morava floodplain is skirted with a belt of the terrace step remainders eroded by stream activity. The arrangement of the terraces and their altitudinal situation reveals that the Morava river was displacing its bed from the east to the west in Pleistocene. Thickness of the terrace accumulations as a rule does not surpass 5 m (Kullman, 1980). Through the Holocene meandering the gravel-sand sediments were partially destroyed. In the rests of disturbed sediments, sporadically dispersed along the stream of Morava wind-blown sands can be found.

Dissection of the Záhorie Lowland to single elevation and depression wholes is based on the course of the main break lines (Buday et al., 1967). Our study area overlaps, as caused by the tectonic dissection, the SW fringe of the Zohor-Marchegg depression, the central lowering and the Kúty depression. Tectonic movements, thrust of the Little Carpathians and the normal fault of the Záhorie Lowland determined the relief development. In the Younger Tertiary and Quaternary accumulation processes prevailed in the dropping lowland. The cause of riparian sediment accumulation was a tendency of the river to level up the relief disturbed by the tectonic movement. In the Zohor-Marchegg depression (south of Vysoká p. Morave) even 85 m thick aquiferous Quaternary sediments were confirmed by K-8 bore hole. In the central lowering the Quaternary sediments reach the mean thickness of 10-15 m. The least thickness of the Quaternary sediments in the floodplain (5.2 m) was detected in the surroundings of the Záhorská Ves commune and N of Vysoká p. Morave (Kullman, 1980).

Important differences in thickness of quaternary sediments on a relatively short distance are determined by the existence of distinctly delineated Zohor-Marchegg tectonic depression, in which favourable conditions for the formation thick layers of quaternary sediments have developed in a consequence of joint action of intense sedimentation and neotectonic subsidence.

3. Hydrological characteristics of the territory

The river network of this territory is in continuous development and also at present time a subject to important changes. After Kullman (1980), the formation and changes of the river network in the area of Záhorie Low-

land were affected by Lower Quaternary tectonics, climatic conditions and an intense eolian activity. A relatively steady and mild inclination of the stream from the confluence with the Dyje river up to the estuary to the Danube (only 0.2 %) resulted in river meandering in the past and changing its bed almost after each flood a good evidence of frequent change of the bed. Numerous abandoned dead branches along the whole length of the stream are the small inclination of the river also gave rise to extensive wet areas drained by a network of draining channels. Old dead branches are filled with muddy sediments of sand and clay nature with organic admixtures. At the present the sedimenting process of flood muds is concentrated into a narrow space between the dykes.

The floods on the lower reach of the Morava river occur most frequently between January and April. Because of considerable differences in the period of flood occurrence in the Morava and Danube where the largest floods come in summer, there is no threat of the floods coinciding in both rivers. But the effect of the Danube shows in the lower reach of Morava. That is the reason why the biggest floods in this region occurred at the time of the highest water levels on the Danube. Annual inundations were limited by the water management adjustments into the narrow space between the dykes.

We characterize the Morava regime on the basis of a data set obtained from the gauging station in Záhorská Ves. The mean monthly water level of Morava in the period of 1981-1990 recorded by this gauging station are presented in Fig. 2. In the ten years' average the maximum water levels occurred most frequently in March and April. The highest mean monthly water level was 408 cm (April 1987). The lowest level of 46 cm appeared in August 1990. The mean water level for the mentioned period of 1981-1990 is 172 cm.

A long-term mean discharge in Moravský Ján (1931-1960) is $109 \text{ m}^3 \cdot \text{s}^{-1}$. The highest so far detected discharge was $1508 \text{ m}^3 \cdot \text{s}^{-1}$ (March 3, 1941) at the level of 579 cm. The lowest so far measured discharge was $7.7 \text{ m}^3 \cdot \text{s}^{-1}$ (August 2, 1934).

Anthropogenic impact

The river Morava originally formed numerous meanders and was remarkable for small inclinations and regular inundation of the surrounding area. Capacity of its bed was very small in the past, inundation profile too large, both factors contributing to the rise of rapid floods of long duration. The man tried to change the situation in order to satisfy his needs and requirements.

The fact that the area is borderland with Austria affected the extent of man's interventions in the nature. These are mostly represented by water-management adjustments, especially by regulation of the Morava tributaries (Malina, Rudava, Lakšársky potok), construction of the draining system, cutting of the meanders

and shortening the original length of the stream. Such measures have speeded up the discharge and dried the area.

Based on the historical analysis of the stream development and adjustments we find out that the efforts in regulation of the Morava river, or elimination of flood threat, as well as the attempts to make it navigable, possibly to connect it with the Odra river started in the 16th century. Many of the schemes were not realized because of the fact that the river represented the boundary between two states and that would require rather complicated international negotiations. Authors of the first project tried to improve the discharge and navigation of the river by increasing the discharge amount in the stream's bed and diminishing, possibly removing the floods in a wide area. Valuable information about the mentioned activities was published, for instance, by Farkaš (1995) and Holčík (1996). A comprehensive adjustment of the border part of Morava from the estuary of the Dyje up to the Danube was brought about by a „General Project of Regulation of the Border part of the Morava River“ in 1935. As the project included also construction works initiated back in 1911 and principal works were finished in 1964, we can say that the adjustments took more than a half century. By punching the fully developed meanders, straightening and shortening of the stream was achieved from the original 80 km to 69.1 km. The project originally planned 18 punches but only 16 were realized (9 in the Austrian and 7 in the former Czechoslovak territory). Straightening of the stream resulted in a uniform longitudinal profile from the Dyje River up to Devín with the grade of 0.18 ‰ compared to the original 0.15 ‰. Another result of water management steps is also the discharge of $440 \text{ m}^3 \cdot \text{s}^{-1}$ compared to previous $210 \text{ m}^3 \cdot \text{s}^{-1}$. On both sides of the stream dykes were constructed. The present space between the dykes represents about 20 % of the original extent of the floods.

Stream management at the upper reach of the Morava River (for instance, the part of Morava from Otrokovice to the estuary of Dyje was shortened in the 30's from the original 130.2 km to the present 100.6 km), stream management of Dyje, and construction of the Vranov dam lake and the system of water dams of Nové Mlýny contributed to the change of discharge parameters and influenced also the lower reach of the stream.

The greatest problem at present is represented by the lower reach of Morava, from its estuary to Danube to the 11th river km, distinctly influenced by the Danube. At the point of estuary of Morava, the Danube forms a sharp concave, its waters bounce against the Devín Rock giving raise to whirls and consequently regressive flow of the water, increased sedimentation, and silting up of this part of the stream (Farkaš, 1995). In the area of the Morava's estuary to Marchegg the effect of held-up big waters of the Danube is evident.

The fluvial and streambed-forming processes of Morava are closely connected with the movements and changes of its local erosional base, represented by the Danube. From 1954 minimum water levels of the Danube in the area of its estuary with Morava dropped by 0.90 m (Nemetz - Sáři - Benz - Redl, 1995). Consequences of the drop are evident especially with low water levels when old branches in the area of estuary dry up. Deepening of the Danube streambed at the point of estuary with Morava provoked deep erosion of the Morava river and its tributaries affecting also the groundwater table. The cause to the deep erosion of the Danube and consequently of its tributaries is probably the accelerated tectonic sinking in the area of the Danube Plain, the Danube was not capable of levelling up by accumulation of the deposited material and was forced to deep erosion in the area of Devínska brána (Lukniš, 1968; Krejčí, 1983).

Meanwhile there still exists a threat to the unique landscape system of the Morava floodplain represented by a brushed-up project of the construction of water way of the Danube-Odra-Labe (Grešková, in print). Possible implementation of the project might provoke other changes connected with denaturalization of the landscape, destruction of ecological stability of the area and water regime in the contrast to present general efforts aimed at revitalization of the landscape, streams and their basins.

4. *Water regime changes of the riparian landscape*

Regulation of the Morava River and its tributaries was alone a violent intervention into the natural development of the stream and the surrounding riparian landscape. Along the additional water-managing adjustments, especially construction of extensive draining system contributed to speeding up of the discharge and a large-area draining water off the landscape. Let us quote some particular changes:

- the discharge was accelerated,
- cutting of meanders led to the reduction of natural river dynamics,
- construction of dykes reduced the retention space,
- regular floods were limited in to the narrow space between the dykes,
- the streambed was deepened and minimum water tables dropped,
- groundwater table decreased as reflected also in the general situation of ecosystems, especially alluvial forests,
- soil moisture reserves were reduced,
- some localities dried up.

5. *Changes in groundwater table*

The network of groundwater observation objects along the Morava River is relatively thin and the general

level of investigation of the area was poor before 1989. The majority of observation objects in the basic network built up by the Slovak Hydrometeorological Institute carrying have been out their observations since 1970, exceptionally since 1958. We tried to recognize the trends of groundwater table development and the Morava water level for the last two decades (1971-1990). Bearing in mind that if there were certain changes in the groundwater table, these would reflect not only water-management and other anthropogenic measures but also the rate of stream flow, we can state that during the two decades there were extraordinarily dry or extraordinarily wet years in the given area. In the decade of 1971-1980 the year 1974 was exceptionally dry and the year 1977 in turn was exceptionally wet. In the following decade (1981-1990) the year 1984 was unusually dry and years 1986-1987 were quite wet. The facts projected into the development of the rate of stream flow, influencing also the groundwater table.

Estimating the changes of groundwater table in the adjacent area we have concentrated on some observation objects in the riparian area, i.e. parts where the effect of river shows in lateral direction (width of 3-5 km from the stream), and on mean annual groundwater tables for the observation objects: Gajary-21, Vysoká pri Morave-37, Záhorská Ves-90, Gajary-91 (W), Vysoká pri Morave-94, Gajary-95 (NW), Vysoká pri Morave-97 (Dúbrava) for the period 1971-1990 (Fig. 1). Also the mean monthly and annual water levels of the gauging station Záhorská Ves for the period 1981-1990 were evaluated.

The water levels of Morava and their duration had a principal effect on the groundwater table while this relation is spatially deformed and temporally delayed. A study of the correlation between the Morava river and groundwaters in the riparian area confirmed the expected relationship (Grešková, 1994) of the studied variables. Although the direct influence of Morava exists only within a certain distance from the stream, we can observe an agreement between the regime of the groundwater table and that of Morava water levels in the study area (Fig. 2). The effect of precipitations seems negligible in this area. The temporal course of groundwater tables does not correspond to the distribution of precipitations over the year (Grešková, 1994). Low precipitation totals occur at the time of spring high water levels and groundwater tables. In the summer time when the precipitations reach the maximum (July 583 mm/year, during the growing period 351 mm) with high temperatures and intense evaporation (evaporation of soil surface during the growing period 416 mm), the groundwater table decreases.

A precise annual rhythm with occurrence of maximum levels most frequently observable in April and minimum levels in October, is typical of the groundwater table. Lines of the temporal course of water level and groundwater table changes show a slight shift of maxi-

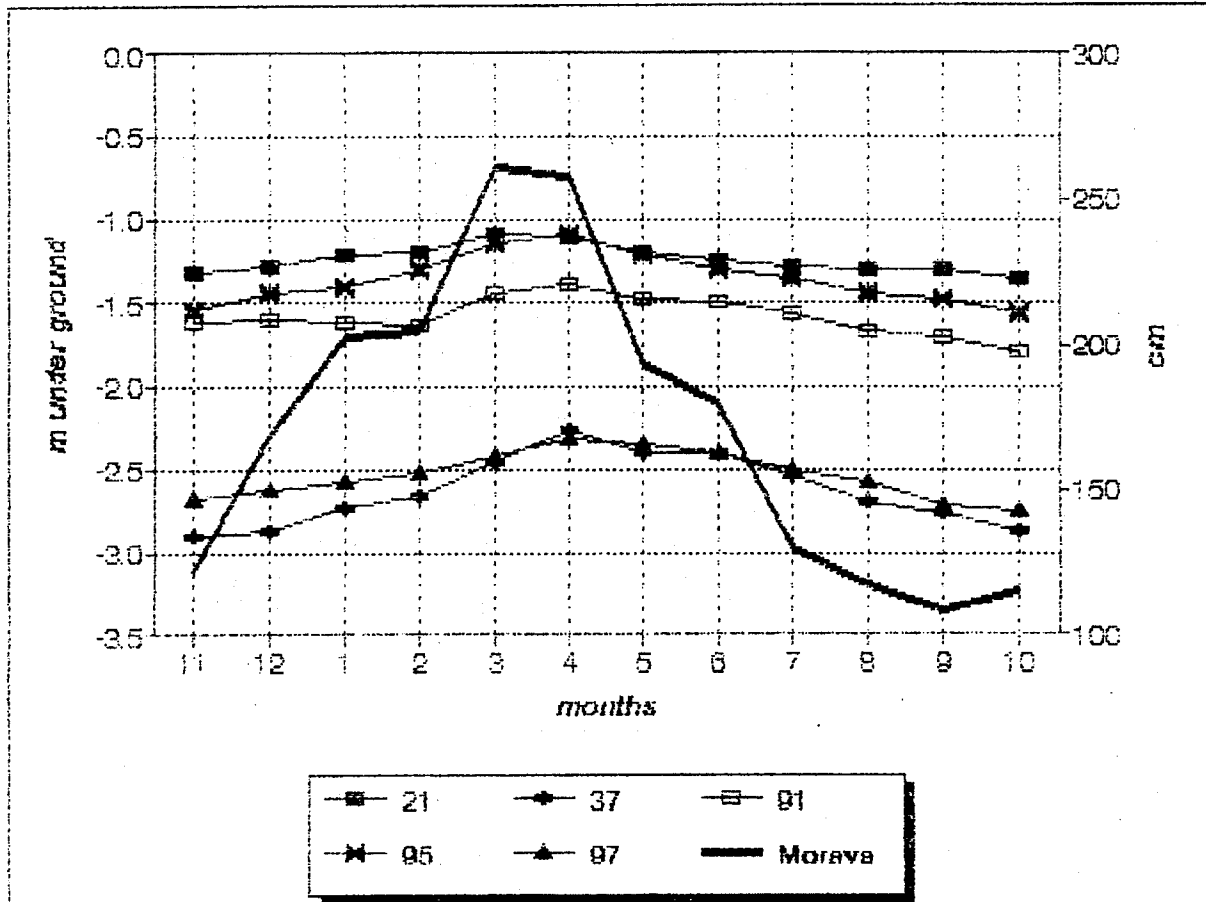


Fig. 2 Mean monthly groundwater table values in metres under terrain and water levels of the Morava river in cm for the period 1871-1990

imum groundwater table values following the level of the stream. The mean depth of groundwater table in our study area oscillated 1.2-2.7 m under the terrain in the period of 1871-1990. Discharges of Morava were rather fluctuating, lower levels were more frequent in recent years (Fig. 3) and the majority of surrounding localities were affected by groundwater table drop of in the consequence of a series of water-management steps. Vybíral (1995) claims that the mean groundwater table dropped by 0.5 m in the consequence of regulations carried out on the Morava and Dyje Rivers.

6. Discussion

The onset of decreasing trends was not observed in all relevant objects. The analysis of groundwater table mean monthly and mean annual values confirmed that in the study area there are localities where it dropped in recent years (observation objects Nos. 21, 90, 94), but also localities where the dropping trend was not proved (observation objects Nos. 37, 91, 95, and 97). Localities with the manifested drop of groundwater table are depicted in Fig. 4. The observation object No. 37 shows a situation when mean monthly groundwater table values in 1981-1990 slightly surpass levels of the preceding decade. The mean increase oscillated in the range from 6 to 28 cm. A possible conclusion is that the analysis of mean annual levels of groundwater table in studied lo-

calities reflects the water volume in individual hydrological years and copies the course of mean annual water levels of the Morava River. The decreasing trend of minimum groundwater table levels in the relevant period was confirmed (Fig. 5).

7. Conclusion

There is no doubt that the natural hydrological situation and the original dynamics, i. e. the unchanged regime of both surface and underground waters, which are vitally important for stability of the local riparian landscape are relevant for maintaining the dynamic balance of such a landscape type as is the Morava floodplain.

Mitigation of negative consequences of the anthropogenic impact and restoration of the disturbed water regime in the riparian landscape can be achieved partially also by means of adequate revitalizing measures applied to the Morava stream and to the whole catchment. Let us summarize the processes that should be initiated and the structures needing a restoration in order to improve retention capacity of the area and to win back its original hydromorphic character:

- restoration of meandering character of the stream by inter connecting the artificially separated meanders,

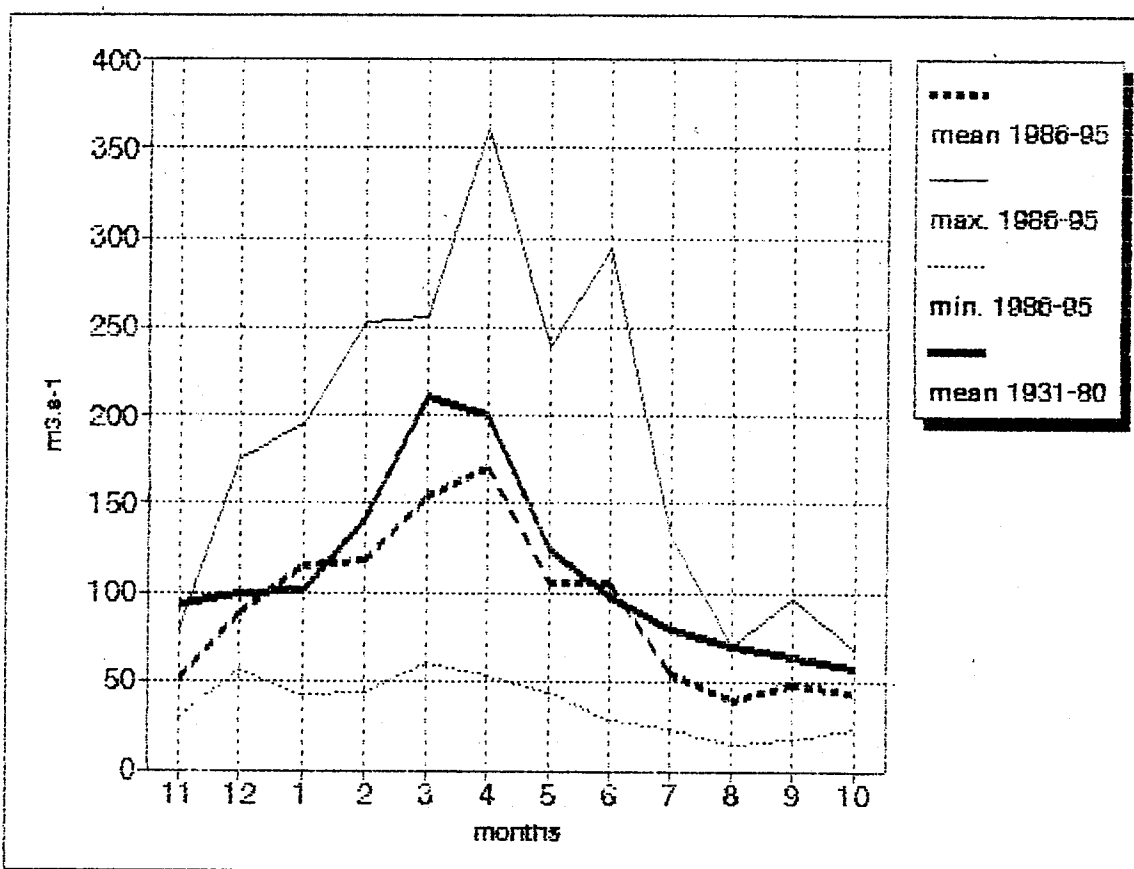


Fig. 3 Mean monthly discharges of the Morava river in Moravský Ján in the years 1931-1980 and 1986-1995 and the extremes

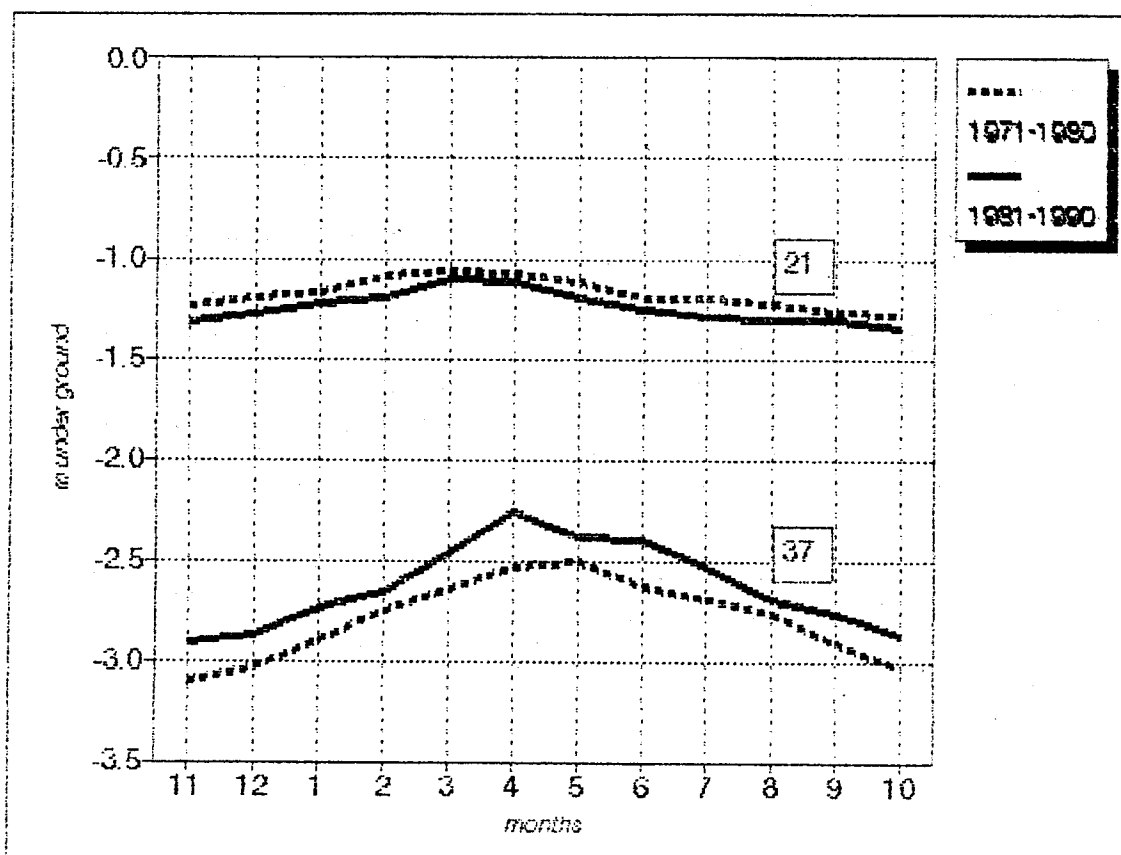


Fig. 4 The temporal changes of groundwater table levels in observation objects Nos. 21, 37

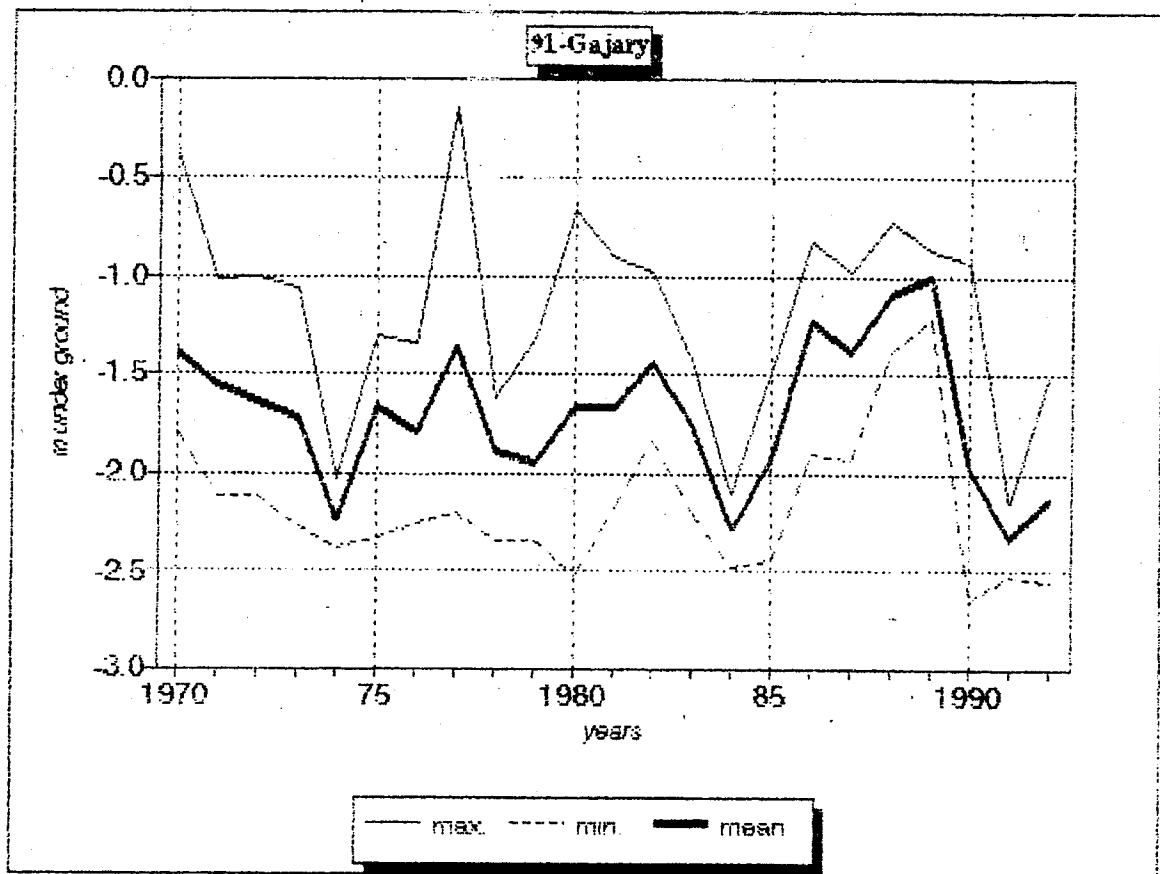


Fig. 5 Typical levels of groundwater table in the object No. 90-Gajary

- restoration of natural fluvial landscape-forming and streambed-forming processes (abrasion, sedimentation, meandering),
- restoration of original flood dynamics,
- slowing down of water runoff and retention in the catchment,
- strengthening of ecological stability of the landscape and diverse mosaics of ecosystems,
- restoration of natural condition of the ecosystems of the river and its surroundings,
- seasonal flooding of the area (alluvial forests) behind the dyke.

In practice this means to retain the water in the landscape as long as possible, to accumulate it so that as much water as possible is immediately retained by soil and vegetation and as much water as possible penetrates in the reserves of the groundwater. This should ensure a more fluent runoff in the area resulting in elimi-

nation of the growing trend of maximum discharges, as well as the improvement of minimum discharges of the streams.

In the case of further anthropogenic interventions in the riparian country of the Morava river in the future, it will be indispensably necessary to assess the rate of ecological bearing capacity of the area and to resolve with the utmost responsibility the conflict between the contradictory water management and environmental and conservationist interests on EIA level (Environmental Impact Assessment). Only such measures and projects should be applied in the future that would meet not only the contemporary ecological criteria but also the ones established in the sense of sustainable development.

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DEMOGRAPHICAL DEVELOPMENT OF NATIONAL MINORITIES IN SLOVAKIA

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Abstract

The papers offers basic information on nationality structure on the territory of Slovakia. The development of ethnic structure is possible to observe since the second half of the 19th century. However, statistical data and their quality are changing according to time and various nationalities.

The Hungarian minority is the most numerous one, it is characterized by stationary development. The Rome - Gipsy minority is the most problematic one from demographic point of view, mainly because of its extremely values of natality. With the exception of the Romes, with extremely high proportion of people in relative higher proportion of postreproductive age groups in comparison with the Slovak ethnicum, and this fact reflects also in their demographic behaviour.

Shrnutí

Příspěvek poskytuje základní informaci o národnostní struktuře na území Slovenska. Vývoj etnické struktury na území dnešní Slovenské republiky je možné sledovat od druhé poloviny 19. století. Množství a kvalita dat o jednotlivých národnostech jsou však rozdílné.

Nejpočetnější maďarská menšina je charakterizovaná stacionárním demografickým vývojem. Z demografického hlediska představuje nejvýraznější problém rómské etnikum, které je charakterizované extrémními hodnotami porodnosti. S výjimkou rómské populace, s extrémně vysokým podílem obyvatelstva v předproduktivním věku, jsou všechny ostatní menšiny charakterizované relativně vyšším podílem věkových skupin obyvatelstva v postproduktivním věku v porovnání s obyvatelstvem slovenské národnosti, což se odráží i v jejich demografickém chování.

Keywords: National minorities, Slovakia, demographic development

1. Sources of data

The contemporary picture of nationality composition of the population in the Slovak Republic is a result of long and relatively complex historical development. It was influenced by numerous different factors such as economic, social, political and power-political, cultural, and geographical ones. As Slovakia is located in the centre of Europe, it was very often a setting for changes and migration of the population of different ethnic groups. Thus, in the course of centuries a relatively diversified ethnic structure of population formed. Northern and central Slovakia preserved prevalingly Slovak identity. The southern part of the country is neighbouring with the Hungarian ethnics since the 10th century and consequently it developed into a territory with mixed Slovak-Hungarian ethnic groups. A similar situation can be observed in the eastern part of the country where a mixed belt with Slovak, Ruthenian and Ukrainian population originated. Other nationalities - Bohemian, Polish, German, Moravian and Roma live dispersed all over the territory. The Hungarian minority is the most numerous one in the country, so we are dealing with it more precisely.

Modern and regular censuses in Austria-Hungary were carried out from 1850. However, data on ethnic structure are available only from 1880 and then in intervals of 10 years up to 1910. The First World War interrupted the regularity of censuses and the next one was realized as late as in 1921.

Today's Slovakia was a part of the old Austrian-Hungarian Monarchy with two dominating nations - Austrians in the western part and Hungarians in the eastern part of the country. Results of such a situation upon the statistic data are documented by changes of ethnic structure in the years 1880-1910. The share of Slovak population (in the territory of today's Slovakia) in the quoted period dropped from 61.2 % to 57.7 %, while the share of Hungarians increased from 22.3 % to 30.3 %. The number of Slovaks increased meanwhile by only 13.1 %, and the number of Hungarians grew by 63.8 %. It means that the number of Hungarians was growing almost 5 times more quickly than that of Slovaks. This phenomenon cannot be explained in a natural way or by causes such as increased emigration of Slovaks, population power of Hungarians or their immigration to Slovakia - the orientation of migration was out of Slovakia and southwards. The quoted discrepancy at

the turn of the 19th and 20th centuries can be explained only as a consequence of overestimating the number of Hungarians in those years, most distinctly manifested in southern Slovakia - in the nationally mixed area, and in the national structure of urban population outside this area.

During the existence of the First Czechoslovak Republic (1918-1939) two censuses were accomplished - in 1921 and 1930. They were recording nationality and mother tongue was considered an objective and usual criterion for its definition. However, in this period a concept of the united (sole) Czechoslovak nationality was emphasized. Data about the share of Hungarians (and other nationalities) in total population of the Republic and in the individual regions are available. Regarding the mentioned facts, according to the specialized literature, the 1930 ethnic structure data are considered the most exact data from the period before the Second World War.

Effects of the Second World War on the ethnic structure in Slovakia did not show directly, but new factors appeared that influenced results of the first after-war census in 1950. That is why the data of this inquiry are accepted only as guiding ones and if we wanted to be consequent, they should not be used for final evaluation of the war effect upon the changes of ethnic structure. In the course of the war, southern and a part of eastern Slovakia were occupied by Hungary and a substantial part of Slovaks living in the area were evacuated. An exchange of inhabitants between Czechoslovakia and Hungary took place after the war with 68 thous. Hungarians learning Czechoslovakia and more than 70 thous. Slovaks coming back home. Slovaks who came from Hungary settled down in communes in an ethnically mixed area of southern Slovakia, reducing percentage of Hungarians living in this area. Then an extensive migration within the state boundaries followed, related to colonization of the western border

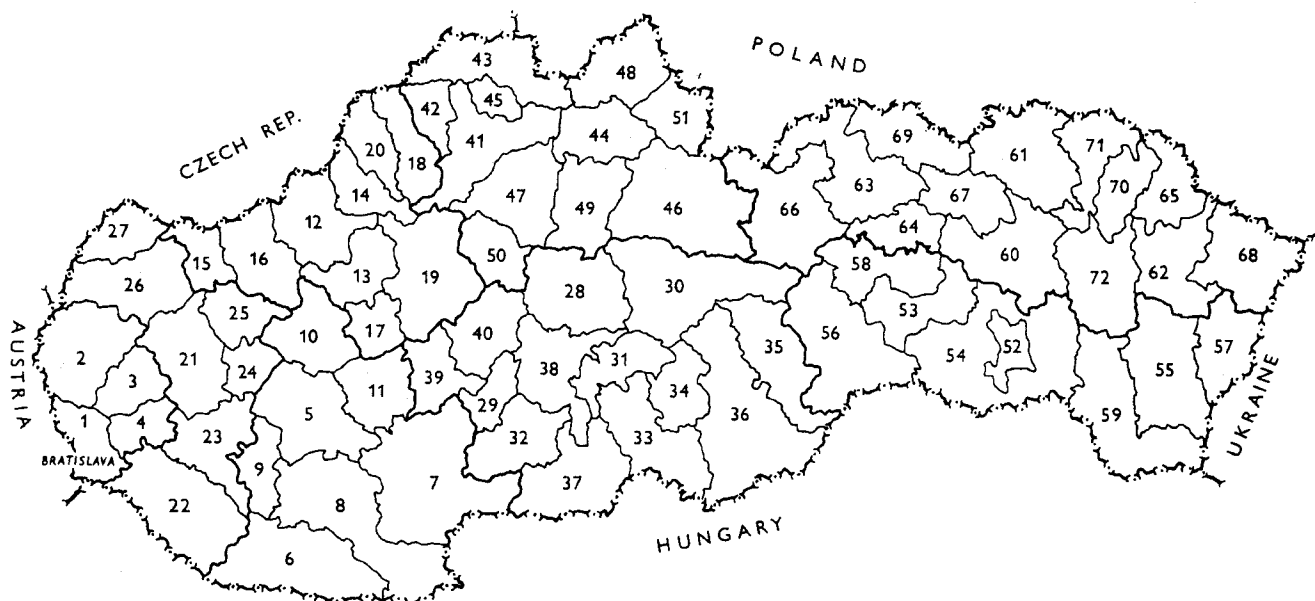


Fig. 1 Administrative districts of the Slovak republic

- Region Bratislava: 1 - Bratislava, 2 - Malacky, 3 - Pezinok, 4 - Senec,
 Region Nitra: 5 - Nitra, 6 - Komárno, 7 - Levice, 8 - Nové Zámky, 9 - Šaľa, 10 - Topoľčany, 11 - Zlaté Moravce,
 Region Trenčín: 12 - Trenčín, 13 - Bánovce nad Bebravou, 14 - Ilava, 15 - Myjava, 16 - Nové Mesto nad Váhom, 17 - Partizánske, 18 - Považská Bystrica, 19 - Prievidza, 20 - Púchov,
 Region Trnava: 21 - Trnava, 22 - Dunajská Streda, 23 - Galanta, 24 - Hlohovec, 25 - Piešťany, 26 - Senica, 27 - Skalica,
 Region Banská Bystrica: 28 - Banská Bystrica, 29 - Banská Štiavnica, 30 - Brezno, 31 - Detva, 32 - Krupina, 33 - Lučenec, 34 - Poltár, 35 - Revúca, 36 - Rimavská Sobota, 37 - Veľký Krtíš, 38 - Zvolen, 39 - Žarnovica, 40 - Žiar nad Hronom,
 Region Žilina: 41 - Žilina, 42 - Bytča, 43 - Čadca, 44 - Dolný Kubín, 45 - Kysucké Nové Mesto, 46 - Liptovský Mikuláš, 47 - Martin, 48 - Námestovo, 49 - Ružomberok, 50 - Turčianske Teplice, 51 - Tvrdošín,
 Region Košice: 52 - Košice, 53 - Gelnica, 54 - Košice-okolie, 55 - Michalovce, 56 - Rožňava, 57 - Sobrance, 58 - Spišská Nová Ves, 59 - Trebišov,
 Region Prešov: 60 - Prešov, 61 - Bardejov, 62 - Humenné, 63 - Kežmarok, 64 - Levoča, 65 - Medzilaborce, 66 - Poprad, 67 - Sabinov, 68 - Snina, 69 - Stará Lubovňa, 70 - Stropkov, 71 - Svidník, 72 - Vranov nad Topľou.

area (after departure of Germans who were displaced). Besides all these changes of the actual ethnic structure, consequences of the war manifested also in subjective factors that explain why so few citizens registered as Hungarians or Jews. Moreover, in the census of 1950 the Roma nationality was not delimited so that Gipsies in this and the following censuses registered under prevailing nationality in the environment they were living in.

In the period that followed after 1950, socio-economic processes which led to population migration intensified and showed not only in the overall ethnic population structure of Slovakia as a whole, but especially in nationally mixed areas. Also consequences of the changes of demographical behaviour of the population manifested in connection with urbanisation growth, number of mixed marriages (e.g. 28.1 % of all marriages were mixed in 1991), gradually diminishing values of demographical reproduction, particularly rural areas, etc.

As a result of the effect of quoted factors, the ethnic population structure in Slovakia stabilized, while the distribution of members of nationalities was changing within Slovakia, and mainly in cities. In the period of 1961-1991, the number of Slovaks, Czechs and Hungarians recorded a consistent growth, the number of Gipsies showed extreme growth rates, while the number of other nationalities was stagnating or decreasing.

A the principle used to define nationality at the censuses was that of the decision of a particular respondent regardless of his knowledge of mother tongue. Nationality was defined for needs of the statistical inquiry as appurtenance to a nation, to which the given person

feels internally bound and to which he or she wants to belong. New elements were introduced in the changed social conditions in 1991 census. For instance, the Roma nationality was established, but only about one quarter of the actual number of Roma living in Slovakia registered for it.

Current registration of the natural movement of citizens according to their nationalities is accomplished in the Slovak Republic. These data facilitate elaboration of annual balance of the number of individual nationals. Mixed marriages, their divorces and the number of children are followed at the same time. Approach to and work with these data must be most responsible, and their information value must not be considered absolute. It is necessary to observe above all that these data can be different from the results obtained from the census. Their source are records of new born, dead, moved in or out, wed, divorced and when inquired they often do not quote identical nationality to the one they declared at the moment of census. Statistics of the new born, for instance, notes the nationality of the child as identical to that of its mother who is free to declare the nationality of her own. But in the censuses the same parents can declare another nationality. Finally the accuracy of the data of the current statistics also depends on officials who set up or check the files.

2. National minorities on the territory of the Slovak republic

A typical feature of the development of Hungarian population in the territory of Slovakia after the end of the Second World War is its stagnating number. A slight de-

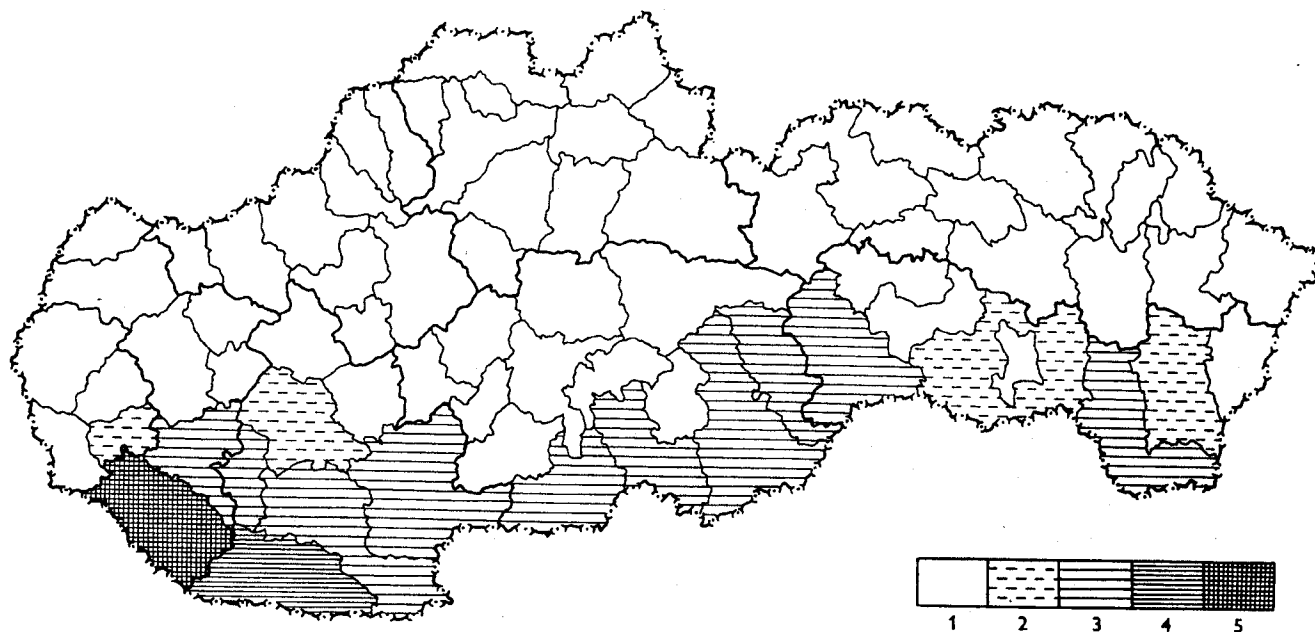


Fig. 2 Territorial distribution of Hungarians in Slovakia

Share of Hungarians in administrative districts (in %):

1 - 0.0-4.9 2 - 5.0-24.9 3 - 25.0-49.9 4 - 50.0-74.9 5 - 75.0 and more

crease in a relative representation of Hungarians over the whole Slovak Republic is caused mainly by higher dynamics of the Slovak population. The decrease of Hungarian minority can well be seen particularly in larger urban districts - Bratislava-City, Košice-City and Nitra. The absolute number of Hungarians in these centres slightly decreased during the last 60 years, but the relative number decreased more distinctly. A reason consist lies in lower dynamics of demographical growth in comparison with the Slovak population and in the movement of younger Slovak population from other parts (especially north and east) of the country into these cities. Territorial distribution of the Hungarian population is illustrated in Fig. 2.

Roma represent the second most numerous national minority in the Slovak Republic. The first Gipsies settled down in the territory of Slovakia already at the beginning of the 13th century. The number of Roma in Slovakia was markedly increased by numerous migration waves at the beginning of the 17th century and then in the second half of the 19th century from the South-East. To study the demographical development of this minority is very difficult because of the lack and discrepancies in data. An old tendency of Roma people was to declare themselves Slovaks (or Hungarians in the south of the country). Reasons for this were very simple - in the first half of this century they were afraid of ethnic discrimination. Because of this fact really great discrepancies in statistical data are found throughout the years. In the 1950 census, the Roma nationality was not established so that Gipsies in this and the following censuses registered under prevailing nationality in the environment they lived in. This fact is especially important in the mixed Slovak-Hungarian area where the Roma affect

the ethnic structure, but the actual sources whether they registered as Slovaks or as Hungarians, are missing. Similarly the Gipsy population biases also the data of the current migration statistics and population structure recorded according to nationality, mainly because of their extremely young age structure and extremely high birth rate.

The latest census carried out in 1991 produced almost entirely inaccurate results regarding characteristics of Roma. So if there is a possibility, it is useful to use data from a special survey - Register of the Roma carried out in 1989. According to these data there were 253 943 persons in 1989 (i.e. 4.8 % of the total population of Slovakia) who declared themselves to be Roma, inhabiting particularly southern areas of the country and using Hungarian, Slovak or Romany as native languages. However in the East of the country there is a large historical region of Spiš reaching northwards as far as the Polish border and extraordinarily densely populated by Gipsies, too. According to the 1991 census data there are only 75 802 Roma, but it is a real fact, that many of the Gipsies declared themselves to be Hungarians or Slovaks respectively. Territorial distribution of the Gipsy population (according to the 1991 census) is illustrated in Fig. 3.

There are no more nomadic Gipsies in the territory of Slovakia, but their mobility and internal migration are still rather high, representing one of the most serious problems with this ethnic group. The migration of Roma causes a lot of difficult problems for the state, district and local administrations. For a considerable number of migrants especially in towns the high level of anonymity in crowds and harder identification (or easier conceal-

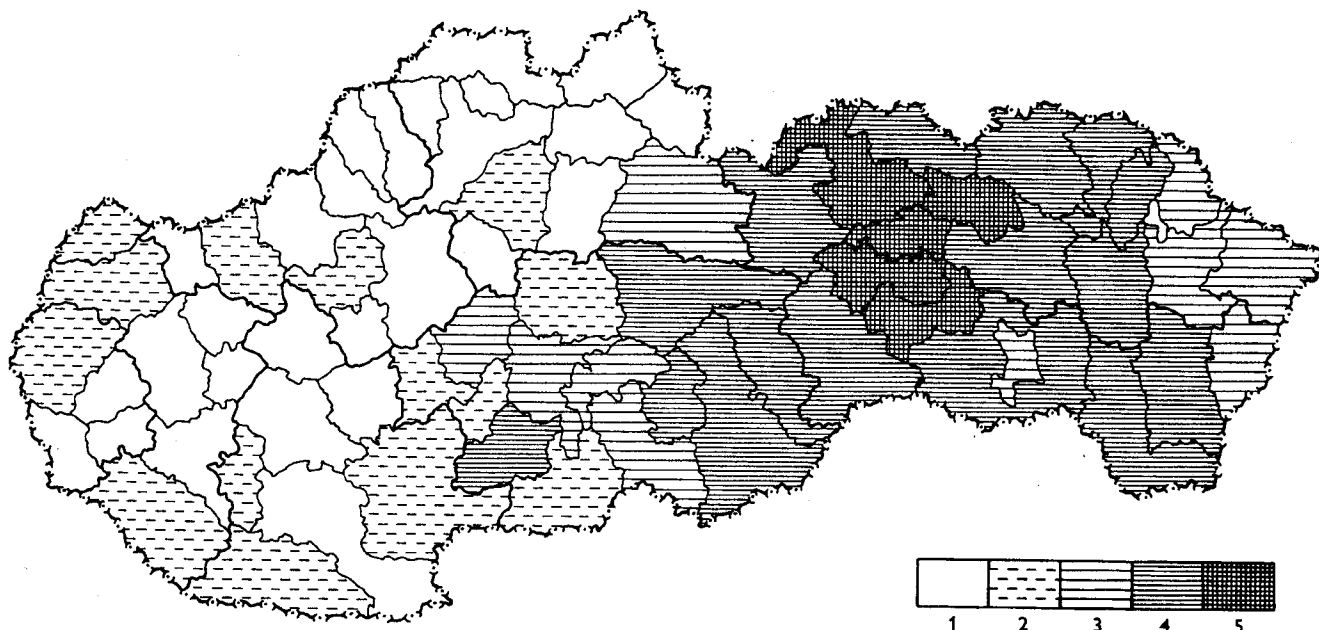


Fig. 3 Territorial distribution of Roma in Slovakia
 Share of Roma in administrative districts (in %):
 1 - 0.00-0.49 2 - 0.50-0.99 3 - 1.00-1.99 4 - 2.00-4.99 5 - 5.00 and more

ment) after committing an offence. The percentage of Gipsy people living in towns increased between 1970 and 1990 from 30.8 to 47 % (in total Roma population).

Data of natural change for Roma in Slovakia have never been collected separately, with the exception of a few ethnographical, demographical, geographical or sociological surveys (Kalibová, 1989, 1993). However, it is possible to mention at least the basic characteristics. For the age structure of Roma an extremely high proportion of children and a low percentage of aged persons are typical. According to the latest available data there were 40.2 % of people under 15 and only 5.3 % of persons in the post-productive age (i.e. men over 60 and women over 55). An extremely high reproduction rate is the next characteristic demographical feature. The number of live born children per one Gipsy woman was 6.0 in the age group 45-49, but only 2.3 for the whole population in 1980 (Kalibová, 1993). Fertility rates are extremely high particularly in lower age categories. Infant mortality of Gipsies in Slovakia still remains very high: 34.8 per 1 000, while in the population without them it was 14.6 per 1 000 (1985). Natality of the Roma is two times higher than that of the Slovaks (approx. 30 per 1 000 as compared with 14.5 per 1 000 of the Slovaks). The position of Roma is going to be changed. It is to be expected, that the extreme high reproduction rates will slightly decrease in coming years, but anyway it is possible to expect too, that because of the extreme young age structure and still extremely high reproduction rates the Roma minority will become the largest minority in the country in not so far future. It will also depend on how many actual Roma will declare themselves to be Gipsies and not Hungarians or Slovaks in forthcoming censuses and surveys.

The first larger immigration of Czechs to Slovakia dates back to the first years of the common state after the year of 1918. The Czechs came and took jobs as teachers and clerks. In 1930 there were more than 120 000 Czechs living in Slovakia (Tab. 1). According to the last common Census in 1991, there were more than 300 000 Slovaks living in the Czech Republic and more than 50 000 Czechs living in the territory of Slovakia. More exact data are given in Tab. 1. Some more changes (although not very dramatic) are possible when the situation clears up after expiry of the time limit for inhabitants of the former Czechoslovakia to make a final decision and choose one or another new country's citizenship, which is 2 years after the split. Territorial distribution of the Czechs, Moravians and Silesians is illustrated in Fig. 4. It is characterized by a higher concentration of these nationalities along the state border with the Czech Republic, in more urbanized areas and the largest agglomerations - Bratislava, Košice, Žilina, Martin, Banská Bystrica, etc. The Czech population is significantly older than the Slovak population with only 11.5 % of young people under 15 and 24.4 % of the population in the post-productive age.

The Ruthenians and Ukrainians form about 0.5 % of the total population. Most of them live concentrated in the north-eastern part of the country (Figs. 5 and 6). The majority of them take themselves for Ruthenians with the common language and culture in the past. In 1910, more than 96 000 people declared themselves Ruthenians. This ethnic group split later into two: Ruthenian and Ukrainian. After the Second World War and annexation of Transcarpathian of Ukraine (the most eastern part of the former Czechoslovak republic until the end of the war) to the Soviet Union, there was a strong tendency to

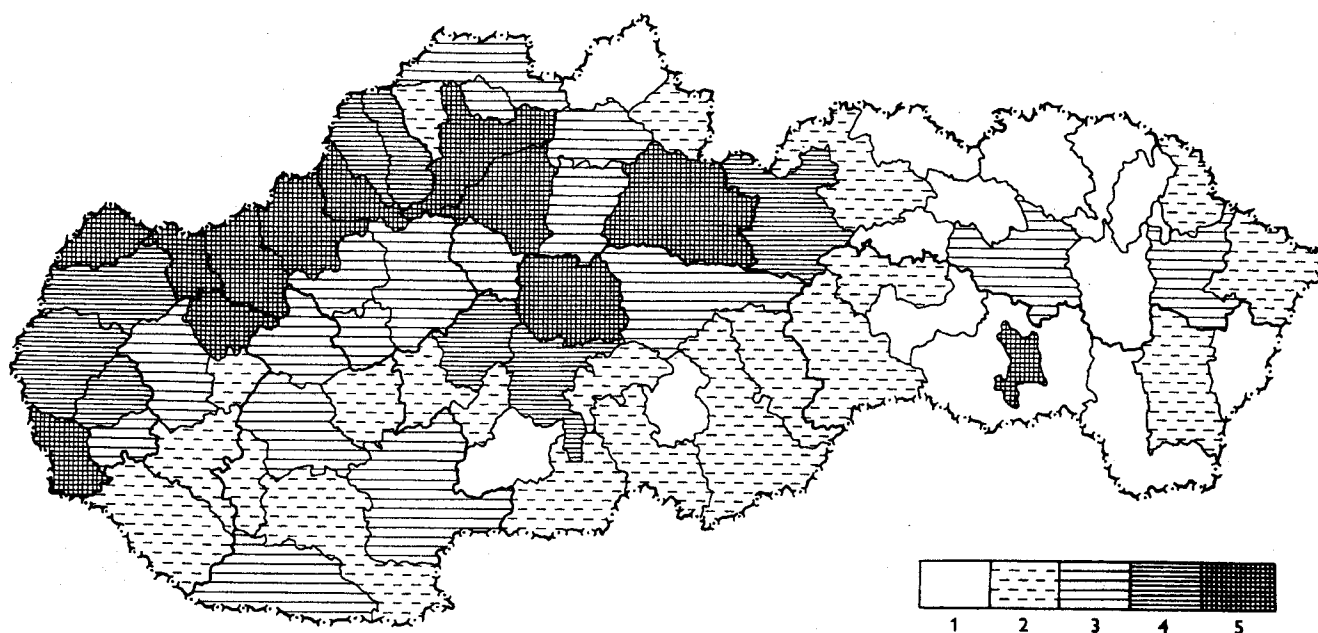


Fig. 4 Territorial distribution of Czechs, Moravians and Silesians in Slovakia

Share of Czechs, Moravians and Silesians in administrative districts (in %):

1 - 0.00-0.49 2 - 0.50-0.74 3 - 0.75-0.99 4 - 1.00-1.49 5 - 1.50 and more

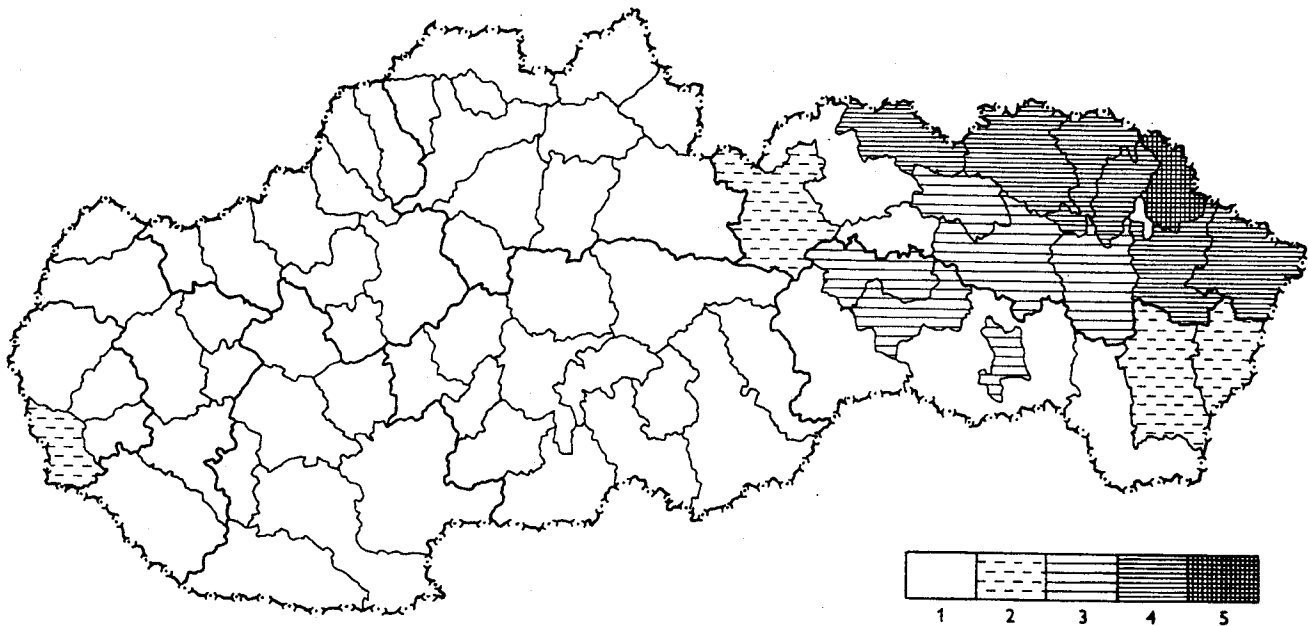


Fig. 5 Territorial distribution of Ruthenians in Slovakia
 Share of Ruthenians in administrative districts (in %):
 1 - 0.00-0.04 2 - 0.05-0.09 3 - 0.10-0.90 4 - 1.00-9.99 5 - 10.00 and more

force these nationalities to join the Soviet Union too. A great part of these people (mainly the Ruthenians) did not agree with this policy and began to be afraid of their possible government forced emigration, so they began to declare themselves Slovaks. This was the reason why the number of Ruthenians - Ukrainians dropped to less than 50 000 in 1950. In the 50's, the Ruthenian nationality was prohibited, their religion - the Greek-Catholics was prohibited too. They were forced to change for the Orthodox church. Because of these reasons, the number of these nationals was heavily re-

duced, many of them declared themselves as Slovaks. After the year of 1989, the Ruthenian nationality was revitalised and the Greek - Catholic religion too. In 1991, the first census with a free declaration of nationality (e.g. without any fear of a possible ethnic persecution after 50 years) only 16 937 people declared themselves Ruthenians and 13 541 Ukrainians. Their age structure is very old, so it is probably not possible to expect a dynamic demographical growth in coming years, this part of population is characterized by decreasing tendencies.

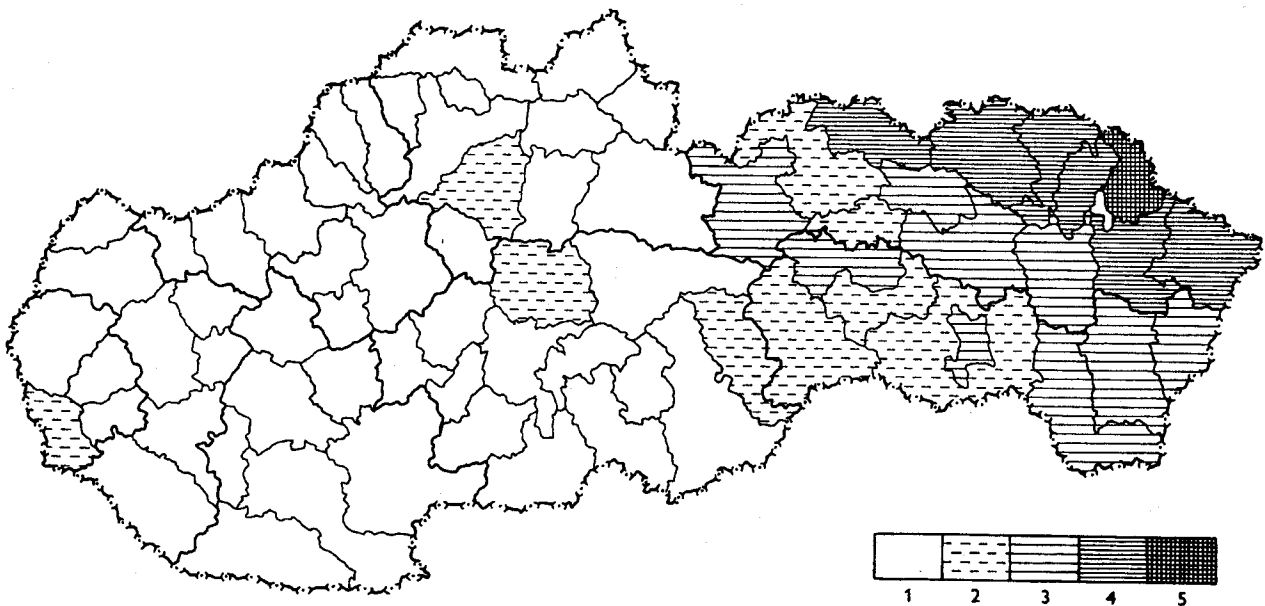


Fig. 6 Territorial distribution of Ukrainians in Slovakia
 Share of Ukrainians in administrative districts (in %):
 1 - 0.00-0.04 2 - 0.05-0.09 3 - 0.10-0.90 4 - 1.00-9.99 5 - 10.00 and more

In the economic and cultural history of Slovakia the German minority played a very important role since the 13th century. By the end of the 19th century more than 220 000 Germans lived there. In 1930, 156 279 people declared themselves to be Germans. After the forced emigration of Germans after the end of the Second World War, only 5 179 people of this nationality remained in Slovakia according to the 1950 census. Nearly a similar number of Germans (5 414) live in Slovakia according to data of the last 1991 census. Because of an extremely old age structure (more than 48 % of Germans are in the post-productive age and only 8 % of them are younger than 15), a danger exists of a possible extinction of this minority (despite strong cultural revitalisation during last years).

In the 1991 census there was a possibility to declare Moravian Silesian nationalities. Nearly 4 000 Moravians and 2 000 Silesians used this chance. Almost 3 000 inhabitants declared themselves Poles. There is also a Jewish minority, not in the sense of statistics, but religion, and a very small and interesting group of Croatians (several hundreds) living in the surroundings of Bratislava. They live in several villages with their own language and cultural traditions but in terms of statistics they declare themselves to be Slovaks.

3. Basic demographical trends

We can see an evident process of demographical ageing in the after-war population of the whole Slovakia. Changes are observed in proportions of children and post-reproductive population. As a consequence of the decreasing birth rate, but also for other reasons, we can observe decreasing number of children - in 1961, the group of 0-14 year old formed 31.5 % of the Slovak population, in 1980 and in 1991 it was only 26.2 % and 24.9 %, resp. The share of older population increases: while in 1961 the post-productive age groups (i.e. men of 60 and older and women of 55 and older) constituted

13.8 % of the Slovak population, in 1980 it was 16.3 %, and in 1991 already 17.3 %.

These basic characteristics of age structure of the whole population of Slovakia show also in the age structure of minorities although certain differences can be observed also in these indices. With the exception of Roma (with an extremely high proportion of people in pre-reproductive age), all other minorities are characterized by a relatively higher proportion of post-reproductive age groups in comparison with the Slovak ethnics (see Tab. 3) and a relatively higher representation of older age groups is becoming still more and more evident.

Data on gross natality, mortality and natural increase of the two major ethnics in Slovakia are quoted in Tab. 2. A consistent decrease of birth rate and natural increase since the end of the Second World War (with the exception of the 70's) is evident. Such a trend is characteristic of all nationalities living in the territory of the Slovak Republic, with the Roma ethnic being the only exception. Reproduction rates of Roma are so extremely high that it is possible to expect that in 25-30 years the Roma may become the largest minority in Slovakia (in the case that the development of Hungarian minority with a very weak demographical dynamics will continue). The Roma nationality is the only one in Slovakia with a relatively extreme demographical behaviour. The demographical development of other nationalities is becoming more or less similar. In coming years it may happen that the demographical development of the Roma may significantly influence the population structure in Slovakia and the Roma may become the most numerous minority in the country.

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Tab. 1 Nationality structure in the territory of Slovakia in the years 1880-1991

YER	NATIONALITY						
	SLOVAKS	HUNGA- RIANS	OTHERS	CZECHS	UKRAINIANS+ RUTHENIANS	GERMANS	POLES
1880 (1)	1 489 707	540 492	104 534	-	78 781	221 771	-
1910 (1)	1 684 681	885 397	53 463	-	96 528	198 775	-
1921	1 952 368	650 597	84 397	72 635	88 970	145 844	6 059
1930	2 250 616	585 434	107 280	121 696	95 783	156 279	7 023
1950	2 982 524	354 532	9 678	40 365	48 231	5 179	1 808
1961	3 560 216	518 782	6 621	45 721	35 435	6 259	1 012
1970	3 878 904	552 006	10 922	47 402	42 238	4 760	1 058
1980	4 317 008	559 490	13 242	57 197	39 260	2 918	2 053
1991	4 519 328	567 296	96 466 (2)	52 884	30 478	5 414	2 469
in %							
1880 (1)	61.2	22.2	4.3	-	3.2	9.1	-
1910 (1)	57.7	30.3	1.8	-	3.4	6.8	-
1921	65.1	21.7	2.8	2.4	3.0	1.8	0.2
1930	67.7	17.6	3.2	3.7	2.9	4.7	0.2
1950	86.6	10.3	0.3	1.2	1.4	0.1	0.1
1961	85.3	12.4	0.2	1.1	0.9	0.1	0.0
1970	85.5	12.2	0.2	1.0	1.0	0.1	0.0
1980	86.5	11.2	0.3	1.1	0.8	0.1	0.0
1991	85.7	10.8	1.8 (2)	1.0	0.6	0.1	0.0
percentage change							
1880-1910	13.1	63.8	- 48.9	-	22.5	- 10.4	-
1910-1921	15.9	- 26.5	29.6	-	- 7.8	- 26.6	-
1921-1930	15.3	- 10.0	27.1	67.5	7.7	7.2	15.9
1930-1950	32.5	- 39.4	- 91.0	- 66.8	- 49.6	- 96.7	- 74.5
1950-1961	19.4	46.3	- 31.6	13.3	- 26.5	20.9	- 44.0
1961-1970	9.0	6.4	65.0	3.7	19.2	- 23.9	4.5
1970-1980	11.3	1.4	21.2	20.7	- 7.0	- 38.7	94.0
1980-1991	4.7	1.4	628.5	- 7.5	- 22.3	85.5	20.3

(1) In the years 1880 and 1910 not nationality but mother tongue was registered

(2) From this number there are about 75 802 inhabitants who declared themselves as Roma and make 1.4 % of the total population of the Slovak Republic.

Source: Censuses in the years 1880-1991

Tab. 2 Population movement - natality, mortality and natural increase of Slovaks and Hungarians (1950-1994)

Natality
(Average of the years - values in ‰)

YEARS	SLOVAKS	HUNGARIANS
1950-54	28.6	25.3
1955-59	26.4	26.1
1960-64	22.3	18.0
1965-69	18.5	15.4
1970-74	19.8	16.0
1975-79	21.2	16.7
1980-84	18.8	15.6
1985-89	16.5	14.0
1990-94	14.6	12.1

Natural increase
(Average of the years - values in ‰)

YEARS	SLOVAKS	HUNGARIANS
1950-54	18.4	12.1
1955-59	17.6	13.4
1960-64	14.4	8.1
1965-69	10.3	5.4
1970-74	10.6	5.3
1975-79	11.7	6.1
1980-84	8.9	4.6
1985-89	6.5	3.3
1990-94	4.6	1.2

Source: Podolák, P. (1991) - see References

Mortality (Average of the years - values in ‰)

YEARS	SLOVAKS	HUNGARIANS
1950-54	10.2	13.2
1955-59	8.8	12.7
1960-64	7.9	9.9
1965-69	8.2	10.0
1970-74	9.2	10.7
1975-79	9.5	10.6
1980-84	9.9	11.0
1985-89	10.0	10.7
1990-94	10.0	10.9

Author's estimates on bases of births, deaths and average population of censuses and estimations of Statistical office.

Tab. 3 Age structure by nationalities in Slovakia (1994)

AGE	SLOVAKS	HUNGARIANS	ROMA	CZECHS + MORAVIANS + SILESIA NS	UKRAINIANS + RUTHENI-ANS	GERMANS	POLES	OTHERS
0-4	317 578	31 484	11 183	3 626	1 554	100	307	784
5-9	361 021	35 527	11 862	1 155	923	154	49	757
10-14	393 668	39 762	10 754	1 617	1 132	178	57	756
15-19	418 168	44 080	9 614	2 082	1 563	161	73	750
20-24	365 410	40 269	8 466	2 778	1 835	147	73	838
25-29	316 547	37 778	7 095	3 810	2 040	224	206	1277
30-34	336 777	41 620	6 248	4 354	2 547	256	281	1714
35-39	359 395	46 127	5 339	4 937	2 590	288	366	1665
40-44	354 750	47 229	4 035	5 811	2 515	333	564	1578
45-49	277 949	34 468	2 560	6 198	2 284	288	352	1221
50-54	222 281	33 853	1 666	5 314	1 903	430	179	950
55-59	194 368	29 196	1 548	4 060	2 099	414	130	808
60-64	192 092	29 418	1 366	4 095	2 300	553	106	691
65-69	174 742	26 536	977	3 210	2 066	562	97	608
70-74	149 786	23 421	687	2 003	1 956	457	107	605
75-79	62 142	10 291	238	820	766	242	41	310
80-84	59 970	10 890	214	1 061	795	308	25	272
85 +	33 486	6 765	136	713	708	285	26	152
A	1 072 237	106 773	33 799	6 398	3 609	432	413	2 327
B	2 739 999	338 847	45 731	36 983	18 219	2 323	2 129	10 364
C	777 864	123 094	4 458	14 273	9 790	2 625	497	3 023

A - Population in pre-productive age (0-14)

B - Population in productive age (men 15-59, women 15-54)

C - Population in post-productive age (men 60+, women 55+)

SOURCE: Národnosť a rodinný stav obyvateľstva Slovenskej republiky v roku 1994
(Nationality and marriage status of the population of the Slovak Republic in the year 1994) - see References

Tab. 4 Nationality structure in administrative districts of Slovakia (abs.)

DISTRICT	POPUL.	SLOVAKS	HUNG.	ROMA	CZECHS*	RUTHEN.	UKRAIN.	OTHERS
Bratislava	442 197	401 848	20 312	558	11 437	265	410	7 367
Malacky	62 205	60 722	149	323	884	2	8	117
Pezinok	52 078	51 056	259	14	614	23	13	99
Senec	49 871	36 906	12 214	77	472	13	21	168
Nitra	160 725	144 880	13 113	714	1 578	34	45	361
Komárno	109 279	28 460	78 859	820	867	11	19	243
Levice	120 730	80 335	38 169	972	968	18	12	256
Nové Zámky	153 466	87 480	63 747	747	1 097	13	23	359
Šaľa	54 159	31 536	21 754	355	386	7	15	106
Topoľčany	74 138	73 223	132	108	572	2	10	91
Zlaté Moravce	44 378	43 098	640	216	293	0	16	115
Trenčín	111 366	108 379	173	103	2 460	16	22	213
Bánovce n.B.	38 474	37 775	35	320	295	2	3	44
Ilava	61 047	59 688	98	80	1 043	6	21	111
Myjava	28 958	28 339	30	121	437	0	2	29
Nové Mesto n. V.	65 900	64 233	70	366	1 099	8	10	114
Partizánske	48 157	47 546	92	62	364	2	4	87
Považská Bystrica	63 033	62 053	52	48	751	4	14	111
Prievidza	138 537	135 239	705	363	1 222	13	39	956
Púchov	45 103	44 453	13	47	497	2	4	87
Trnava	124 971	123 115	244	186	1 038	3	15	370
Dunajská Streda	109 345	12 364	95 310	690	758	11	14	198
Galanta	92 645	53 069	38 295	452	667	5	7	150
Hlohovec	45 005	44 408	73	137	270	1	7	109
Piešťany	63 906	62 365	161	159	991	3	19	208
Senica	59 873	58 399	82	463	830	2	12	85
Skalica	46 247	43 830	40	411	1 872	0	4	90
Banská Bystrica	113 248	109 474	632	888	1 786	27	53	388
Banská Štiavnica	17 008	16 636	51	168	108	1	4	40
Brezno	64 406	61 947	106	1 782	487	10	10	64
Detva	34 543	33 839	43	384	220	0	4	53
Krupina	23 325	22 466	113	597	96	1	1	51
Lučenec	73 110	48 463	22 704	1 255	468	6	8	206
Poltár	22 145	21 440	124	457	92	6	2	24
Revúca	40 143	27 558	10 256	1 949	255	9	19	97
Rimavská Sobota	83 421	43 874	36 422	2 307	530	8	19	261
Veľký Krtíš	46 813	31 471	14 384	457	295	6	5	195
Zvolen	65 237	62 747	296	1 067	856	10	26	235
Žarnovica	27 967	27 449	43	221	164	2	1	87
Žiar nad Hronom	47 954	46 205	253	548	480	8	4	456
Žilina	151 781	148 671	132	258	2 398	20	45	257
Bytča	30 083	29 839	13	4	199	2	1	25
Čadca	89 860	88 584	29	193	864	1	5	184
Dolný Kubín	41 615	41 000	38	78	379	4	12	104
Kysucké N.Mesto	32 827	32 349	12	115	303	0	4	44
Liptovský Mikuláš	73 469	70 440	143	1 223	1 494	13	24	132
Martin	95 908	92 984	242	475	1 820	21	45	321
Námestovo	45 414	45 179	11	1	129	0	2	92
Ružomberok	58 403	57 579	61	181	472	9	6	95
Turčianske Teplice	17 078	16 564	23	47	129	0	5	310
Tvrdošín	32 333	32 022	13	15	163	2	2	116
Košice	235 160	212 659	10 760	4 282	3 927	679	1 034	1 819
Gelnica	29 833	27 683	24	1 571	128	44	28	355
Košice-okolie	99 292	77 171	16 240	4 479	374	30	59	939
Michalovce	103 828	85 055	13 754	3 699	737	69	253	261
Rožňava	60 681	36 525	21 434	2 183	326	7	45	161
Sobrance	25 552	24 804	16	448	107	24	102	51
Spišská Nová Ves	86 350	78 711	105	6 663	477	94	100	200
Trebišov	100 520	63 765	33 191	2 813	462	43	117	129

DISTRICT	POPUL.	SLOVAKS	HUNG.	ROMA	CZECHS*	RUTHEN.	UKRAIN.	OTHERS
Prešov	151 045	142 498	199	4 587	1 140	881	1 316	424
Bardejov	71 106	64 400	47	2 912	238	1 887	1 443	179
Humenné	61 804	57 770	98	641	498	1 318	1 367	112
Kežmarok	57 730	53 738	46	3 242	347	18	38	301
Levoča	29 298	27 401	22	1 718	96	12	15	34
Medzilaborce	13 122	7 437	9	133	97	4 002	1 378	66
Poprad	96 399	91 001	228	3 330	1 317	45	95	383
Sabinov	49 200	45 713	24	3 036	180	64	134	49
Snina	38 593	33 350	25	517	227	2 493	1 915	66
Stará Ľubovňa	46 513	42 464	29	1 844	183	1 027	696	270
Stropkov	20 098	18 249	7	469	89	844	402	38
Svidník	32 127	26 956	20	685	118	2 674	1 482	192
Vranov n. Topľou	72 229	68 399	49	2 968	253	310	166	84

Remark: Czechs are quoted together with Moravians and Silesians.

Tab. 5 Nationality structure in administrative districts of Slovakia (in %)

DISTRICT	SLOVAKS	HUNG.	ROMA	CZECHS*	RUTHEN.	UKRAIN.	OTHERS
Bratislava	90.88	4.59	0.13	2.59	0.06	0.09	1.66
Malacky	97.62	0.24	0.52	1.42	0.00	0.01	0.19
Pezinok	98.04	0.50	0.03	1.18	0.04	0.02	0.19
Senec	74.00	24.49	0.15	0.95	0.03	0.04	0.34
Nitra	90.14	8.16	0.44	0.98	0.02	0.03	0.23
Komárno	26.04	72.16	0.75	0.79	0.01	0.02	0.23
Levice	66.56	31.62	0.81	0.80	0.01	0.01	0.19
Nové Zámky	57.00	41.54	0.49	0.71	0.01	0.01	0.24
Šaľa	58.23	40.17	0.66	0.71	0.01	0.03	0.19
Topoľčany	98.77	0.18	0.15	0.77	0.00	0.01	0.12
Zlaté Moravce	97.12	1.44	0.49	0.66	0.00	0.04	0.25
Trenčín	97.32	0.16	0.09	2.21	0.01	0.02	0.19
Bánovce n.B.	98.18	0.09	0.83	0.77	0.01	0.01	0.11
Ilava	97.77	0.16	0.13	1.71	0.01	0.03	0.19
Myjava	97.86	0.10	0.42	1.62	0.00	0.00	0.00
Nové Mesto n.V.	97.47	0.11	0.56	1.67	0.01	0.02	0.16
Partizánske	98.73	0.19	0.13	0.76	0.00	0.01	0.18
Považská Bystrica	98.45	0.08	0.08	1.19	0.01	0.02	0.17
Prievidza	97.62	0.51	0.26	0.88	0.01	0.03	0.69
Púchov	98.56	0.03	0.10	1.10	0.00	0.01	0.20
Trnava	98.51	0.20	0.15	0.83	0.00	0.01	0.30
Dunajská Streda	11.31	87.16	0.63	0.69	0.01	0.01	0.19
Galanta	57.28	41.34	0.49	0.72	0.01	0.01	0.15
Hlohovec	98.67	0.16	0.30	0.59	0.00	0.02	0.26
Piešťany	97.59	0.25	0.25	1.55	0.00	0.03	0.33
Senica	97.54	0.14	0.77	1.38	0.00	0.02	0.15
Skalica	94.77	0.09	0.89	4.05	0.00	0.01	0.19
Banská Bystrica	96.67	0.56	0.78	1.58	0.02	0.05	0.34
Banská Štiavnica	97.81	0.30	0.99	0.63	0.01	0.02	0.24
Brezno	96.18	0.16	2.77	0.76	0.02	0.02	0.09
Detva	97.96	0.12	1.11	0.64	0.00	0.01	0.16
Krupina	96.32	0.48	2.56	0.41	0.00	0.00	0.23
Lučenec	66.29	31.05	1.72	0.64	0.01	0.01	0.28
Poltár	96.82	0.56	2.06	0.41	0.03	0.01	0.11
Revúca	68.65	25.55	4.86	0.63	0.02	0.05	0.24
Rimavská Sobota	52.59	43.66	2.77	0.63	0.01	0.02	0.32
Veľký Krtíš	67.23	30.73	0.98	0.63	0.01	0.01	0.41
Zvolen	96.18	0.45	1.64	1.31	0.02	0.04	0.36
Žarnovica	98.15	0.15	0.79	0.59	0.01	0.00	0.31
Žiar nad Hronom	96.35	0.53	1.14	1.00	0.02	0.01	0.95
Žilina	97.95	0.09	0.17	1.58	0.01	0.03	0.17
Bytča	99.19	0.04	0.01	0.66	0.01	0.00	0.09

DISTRICT	SLOVAKS	HUNG.	ROMA	CZECHS*	RUTHEN.	UKRAIN.	OTHERS
Čadca	98.58	0.03	0.21	0.96	0.00	0.01	0.21
Dolný Kubín	98.52	0.09	0.19	0.91	0.01	0.03	0.25
Kysucké N.Mesto	98.54	0.04	0.35	0.92	0.00	0.01	0.14
Liptovský Mikuláš	95.88	0.19	1.66	2.03	0.02	0.03	0.18
Martin	96.95	0.25	0.50	1.89	0.02	0.05	0.34
Námestovo	99.48	0.02	0.00	0.28	0.00	0.00	0.21
Ružomberok	98.59	0.10	0.31	0.81	0.02	0.01	0.16
Turčianske Teplice	96.99	0.13	0.28	0.75	0.00	0.03	1.82
Tvrdošín	99.04	0.04	0.05	0.50	0.01	0.01	0.36
Košice	90.43	4.58	1.82	1.67	0.29	0.44	0.77
Gelnica	92.79	0.08	5.27	0.42	0.15	0.09	1.20
Košice-okolie	77.72	16.36	4.51	0.38	0.03	0.06	0.94
Michalovce	81.92	13.25	3.56	0.71	0.07	0.24	0.25
Rožňava	60.19	35.32	3.60	0.53	0.01	0.07	0.27
Sobrance	97.07	0.06	1.75	0.42	0.09	0.40	0.20
Spišská Nová Ves	91.15	0.12	7.72	0.55	0.11	0.12	0.23
Trebišov	63.44	33.02	2.80	0.46	0.04	0.12	0.13
Prešov	94.34	0.13	3.04	0.75	0.58	0.87	0.29
Bardejov	90.57	0.07	4.10	0.33	2.65	2.03	0.26
Humenné	93.47	0.16	1.04	0.81	2.13	2.21	0.18
Kežmarok	93.09	0.08	5.62	0.60	0.03	0.07	0.52
Levoča	93.53	0.08	5.86	0.33	0.04	0.05	0.11
Medzilaborce	56.68	0.07	1.01	0.74	30.50	10.50	0.50
Poprad	94.40	0.24	3.45	1.37	0.05	0.10	0.39
Sabinov	92.91	0.05	6.17	0.36	0.13	0.27	0.11
Snina	86.41	0.06	1.34	0.59	6.46	4.96	0.17
Stará Lubovňa	91.29	0.06	3.96	0.39	2.21	1.50	0.58
Stropkov	90.80	0.03	2.33	0.44	4.20	2.00	0.19
Svidník	83.90	0.06	2.13	0.37	8.32	4.61	0.59
Vranov n. Topľou	94.70	0.07	4.11	0.35	0.43	0.23	0.12

Remark: Czechs are quoted together with Moravians and Silesians.

ENVIRONMENTAL POLITICS IN RURAL SPACE ON THE EXAMPLE OF WASTE MANAGEMENT. AN AUSTRIAN CASE STUDY.

Walter ZSILINCSAR - Wolfgang FISCHER

Abstract

The goal of the paper is to investigate and to discuss the role of regional and communal environmental politics as to the selection and handling of waste dumps. Moreover the changing awareness of the population living close to such dumps is subject of the investigation. Because of the special local and regional situation of the Ghartwald waste dump the opinion of the population of the market town of St. Johann (Ghartwald) as to the environmental quality and personal encroachments on their living conditions is very important. So the authors made an empirical inquiry among 237 adult inhabitants in order to ascertain the acceptance of the Ghartwald waste dump. Some of the main questions were those of the quality of pre-information of the local citizens, the number of strict opponents of the dump and its correlation with the distance from the waste dump.

Shrnutí

Cílem tohoto příspěvku je prověřit a prodiskutovat úlohu regionální a komunální politiky v otázkách životního prostředí jako je výběr a držení skládky odpadů. Kromě toho jsou předmětem zkoumání i změny uvědomění obyvatel, žijících v blízkosti takové skládky. Kvůli zvláštnímu, místnímu i regionálnímu umístění Ghartwaldské skládky komunálních odpadů je mínění obyvatelstva blízkého města St. Johann, co se týče kvality životního prostředí a vlastních zásahů do jejich životních podmínek velmi důležité.

Aby se zjistil skutečný postoj místních obyvatel ke zdejší skládce, provedli autoři, na základě vlastních zkušeností, anketární šetření u 237 dospělých osob. Některé z hlavních otázek byly např. kvalita informovanosti místních obyvatel před výstavbou skládky, počet striktních odpůrců skládky a jeho vztah ke vzdálenosti od skládky odpadů atd.

Key words: regional and communal politics, waste dump, empirical inquiry

1. Introduction

The problem of waste deposition in rural areas did not really exist as long as rural economy was more or less an agricultural one. What had been produced by the farmers was being used by the rural population itself and the animals which were kept by the single farmers. Almost everything was suitable for recycling on one's own farm. Animal dung came from a sane and natural nutrition (no chemistry, no drugs, no hormones, etc.) and therefore did only little harm to groundwater, soil or plant-life. The farmers themselves lived a very simple life, their personal needs were uninfluenced by aggressive advertising strategies, environmental rules and regulations or special requirements for hygienic standards, the use of packing material even for the modern hay harvest. (Huge hayballs wrapped into white plastic on many fields underline this new development which, perhaps, reduces the farmers' work and costs but, obviously, is no contribution to environmental protection nor does it contribute to a well-balanced image of our rural landscapes). As soon as agriculture gave up its self-sufficient economy and was forced to support a growing

number of people living outside the rural space the consequences for the environment which this new development brought forth were quite obvious and need not be mentioned here. All in all, the new market-oriented agriculture, the increasing industrialisation, the invention and introduction of new, highly developed technologies (mass breeding of animals, use of chemical fertilizers on the fields and nowadays the progress in genetic technology) do have and will continue to have effects on our environment and on the question of how and where to deposit all the waste which is going to be produced directly or indirectly by the newly introduced agricultural production technologies. One should not forget, however, that the demands of the consumers, especially in highly industrialized countries, do influence waste production within rural economies to a very high extent. Form, quality and the level of package of a product very often determine its success on the market.

Not only the changing conditions within modern European agriculture did influence the environmental conditions of rural areas but to an even greater extent

the changing social, economic and demographic structures of the rural population left their traces in rural society.

The goal of the paper presented is to investigate and to discuss the role of regional and communal environmental politics as to the selection and handling of waste dumps. Moreover the changing awareness of the population living close to such dumps is subject of the investigation.

2. Problems of Waste Disposal Economy in Styria/Austria

The topic of waste disposal economy has developed into a crucial problem of Austrian environmental policy. The acceptance and current presentation of this topic in the media (print media and telecommunication) has led to a growing sensitivity not only among a remarkable part of the population but also among the politicians. The rapid economic and technological progress has altered the situation of waste production and waste deposition quantitatively and qualitatively. So hardly any other single economic branch underwent such dramatic changes over the last decades as did the economy of waste. Our policy, however, for quite some time has not been able or willing to react properly and fast enough to this impetuous development. So it took much too long to put modern waste acts into law since too little was known of the consequences of improper deposition of waste on groundwater pollution, public health or air pollution. Another argument for not investing too much political interest into the problem of waste deposition certainly was the high costs for the deposition management and technologies to be used.

There was more or less mutual consent between public opinion and the opinion of many politicians to solve the waste problem by just shifting it to outside the limits of one's own community or sphere of influence. Only in 1974 the province of Styria issued a law regulating the removal and treatment of waste. This law clearly defined what was to be understood by the term „waste“, how it should be classified, how special waste should be treated and where it should be deposited. Furthermore the law compelled the communities to remove all kinds of waste which were produced within their limits and to make sure that no private interests of citizens be infringed. The communities were obliged to install a public system of waste removal. The transport of waste, however, could be entrusted to private enterprises. This law made the communities also responsible for the installation and operation of waste deposits or special plants for the treatment of waste (e.g. incineration plants).

The law of 1974 has been altered several times, the last amendment being that of 1991 (Styrian law of waste management). According to this law the provincial government is obliged to proclaim principles of waste management in accordance with proposals of the Styrian

Federation of Communities, the Austrian Federation of Cities, the Styrian chamber of commerce, the Styrian chamber of agriculture, the Styrian chamber of persons employed in agriculture and forestry and the chamber of architects and civil engineers in Styria and Carinthia. The minimum contents of the principles of waste management according to the Styrian law of waste management of 1991 comprise the following items (Amt der Steiermärkischen Landesregierung, 1991):

- presentation of the basic conditions for the goals of the Styrian waste management and description of the methodology used for controlling the observance of the above goals,
- description of recent developments and tendencies within the waste management,
- strategies for the avoidance, commercialisation and deposition of waste including the deposition of sludge,
- description of the planned organisation of the collection, commercialisation and deposition of waste,
- preparation of a supra-regional concept for the installation of establishments for waste-treatment guaranteeing the deposition of all the waste produced in Styria within the provincial limits.

The waste management concept of Styria has to be reviewed according to its principles, goals and measures. The collection and removal of waste is the duty of the communities. The responsibility for the commercialisation and management lies in the hands of the provincial government or of the regional associations of waste management. It is a main principle of the above law that those who produce waste are responsible for its collection, removal, commercialisation and general management.

In Summer 1988 the federal ministry of the environment published guidelines for waste management. These guidelines followed ecological and economic principles such as (Österreichisches Bundesinstitut für Gesundheitswesen, 1989):

- enforcement of strategies relevant to waste management,
- issuing of regulations for waste management (for the collection and transportation and handling of waste including regulations for waste dumps),
- separate collection of waste for its utilization for commercial purposes,
- providing facilities for the material and energetic utilization of waste,
- providing sufficient space for waste-deposition according to the latest technical development.

It is worth mentioning that future waste disposal systems should be structured in a way that decides only between two categories of waste:

- such waste which must be deposited in legal dumps,
- and such that is suitable to further processing or recycling.

Basically it should be guaranteed that the deposition of waste should be no longer a potential danger for the

environment. This makes it necessary that waste dumps should be filled only with material similar to the composition of the earth's crust. This includes material which is insoluble or at least hardly soluble for a long period, whose reactions with water or other deposited material is very low and which are not expected to contaminate air, water or soil through emissions.

Since it cannot be expected that the goals as to the quality standards of waste dumps will be reached in the short run the waste management council of the Austrian ministry of the environment has defined three types of waste dumps:

- Type A: final deposits for waste being composed similar to the structure of the earth's crust (e.g. solid waste of construction or demolition works).
- Type B: type A waste with contact to the biosphere as long as no or negligible biological, chemical or physical interaction processes with the biosphere are to be expected (monodump).
- Type C: waste dumps with connection to the biosphere which let expect controlled emissions only limited in time and caused by controllable biological, chemical and physical processes (reactor waste dumps).

Among the waste dump types mentioned, type A dumps are most common, followed by type B dumps, which mainly include private dumps of industrial enterprises.

3. A Styrian case study

The regional structure of the Styrian waste management associations can be seen in Fig. 2. According to the Styrian law of waste management of 1990 in 1997 there existed 16 separate waste management associations in Styria.

In order to get clearer insight into the structure of the political responsibilities, the decision making processes and the position of the local population, the authors have chosen the waste management association of Hartberg in Eastern Styria as a case study. The waste management plan for this region was authorized by the

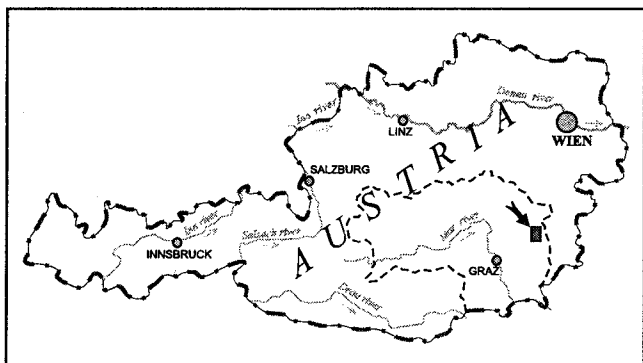


Fig. 1 Localisation of the Ghartwald waste dump in Austria.

Styrian government on Nov. 20, 1989. The region comprises 66 787 inhabitants, who live within 50 communes. The amount of waste which has been deposited there in 1995 amounted to 4 700 m³. The total waste deposited in the region of Hartberg represents 1.04 % of the total annual waste deposited in the province of Styria (Tab. 1).

3.1 Physical Conditions of the Ghartwald Dump Site

The waste dump of Ghartwald covers an area of 7.04 ha and is situated in a wooded area (deciduous mixed forest). Thus the dump is protected by woodland on all sides and does not offer sight-connection to adjacent settlements or traffic routes. The minimum distance to the next single dwelling is 1 km, to the market town of St. Johann appr. 2 km. The geology of the area is characterized by the deposits (mainly up to 17 metres thick layers of tertiary loams and clays interrupted by some occasional lenses of sand). So the geological preconditions for a dump site can be classified as excellent. Despite the density of the groundmaterial any possible penetration of depositions-waters into the groundwater is additionally blocked by a dense layer of impermeable stripes of a waterproof sealing material (Fig. 4). The natural gas resulting from the biological and chemical reduction of the waste is being managed through special installations for gas drainage. It has to be mentioned, however, that according to the strict separation of the single waste components the gas production in the dump is rather low (Fig. 5). A negative effect on the surrounding population through smells coming from the waste dump, therefore, is negligible.

The special local and regional situation of the Ghartwald waste dump induced the authors to examine the opinion of the population of the market town of St. Johann as to the environmental quality and personal encroachments on their living conditions.

The main reasons for the selection of this very dump site were: the closeness of the dump to the province of the Burgenland which dispensed the Styrian government from considering the population of the adjacent communes in the Burgenland, the vicinity (7 km) to the district capital Hartberg (1991: 6 169 inhabitants), the short distances to the highway A2 (1.5 km), to the railway (1 km) and to the local and regional road network. Another important advantage of the site was the fact that a huge part of the dump area is owned by the city of Hartberg. An area of appr. the same extension was privately owned. The whole area is woodland. Thus the conflict potential for the selection of the dump site was relatively low, also due to the fact that one single party - the Austrian People's Party - held 11 of a total of 15 seats in the community council of St. Johann. Thus a greater opposition against the installation of a waste dump only came from local citizens' initiatives and the Social Democrats (4 mandates). The opposition of the

Tab. 1 Styrian solid waste dumps (1995) (Amt der Steiermärkischen Landesregierung, 1996)

waste dump	approved volume of waste dump [m³]	quantity of deposited waste [m³]	rest capacity [m³]
Mariazell	89 000	2 400	55 000
Holleneegg	113 000	7 400	50 000
Frohnleiten	2 400 000	175 200	2 100 000
Hitzendorf	57 000	1 000	45 000
St. Johann in der Heide	500 000	4 700	494 000
Gasselsdorf	660 000	14 100	627 000
Pausendorf	315 000	12 200	229 000
Erzberg	1 430 000	33 900	1 347 000
Bad Aussee	40 000	2 900	22 000
Liezen	350 000	14 800	155 000
Allerheiligen	543 200	14 300	268 000
Halbenrain	1 270 000	76 200	335 000
Karlschacht	1 330 000	51 800	1 198 000
Markt Hartmannsdorf	300 000	18 600	131 000
Weiz	300 000	6 300	127 000
Sum	9 697 200	435 971	7 138 000

Tab. 2 Mandates of Political Parties

	People's Party	Social Democrats	Citizens' Initiative	Liberation Party	Others
1985	11	4	-	-	-
1990	7	5	2	-	1
1995	6	6	-	1	2

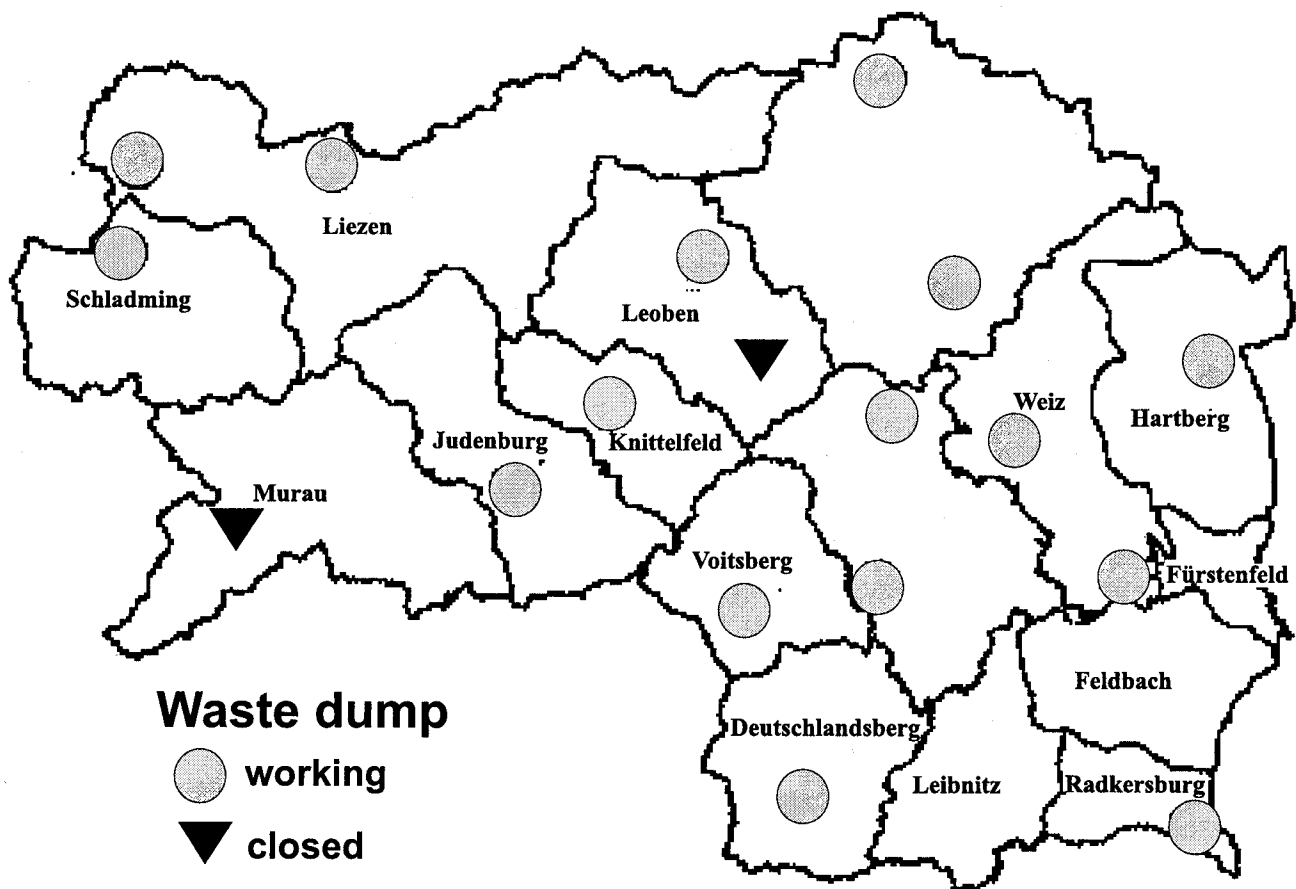


Fig. 2 Regional waste management associations in Styria (Amt der Steiermärkischen Landesregierung, 1995)

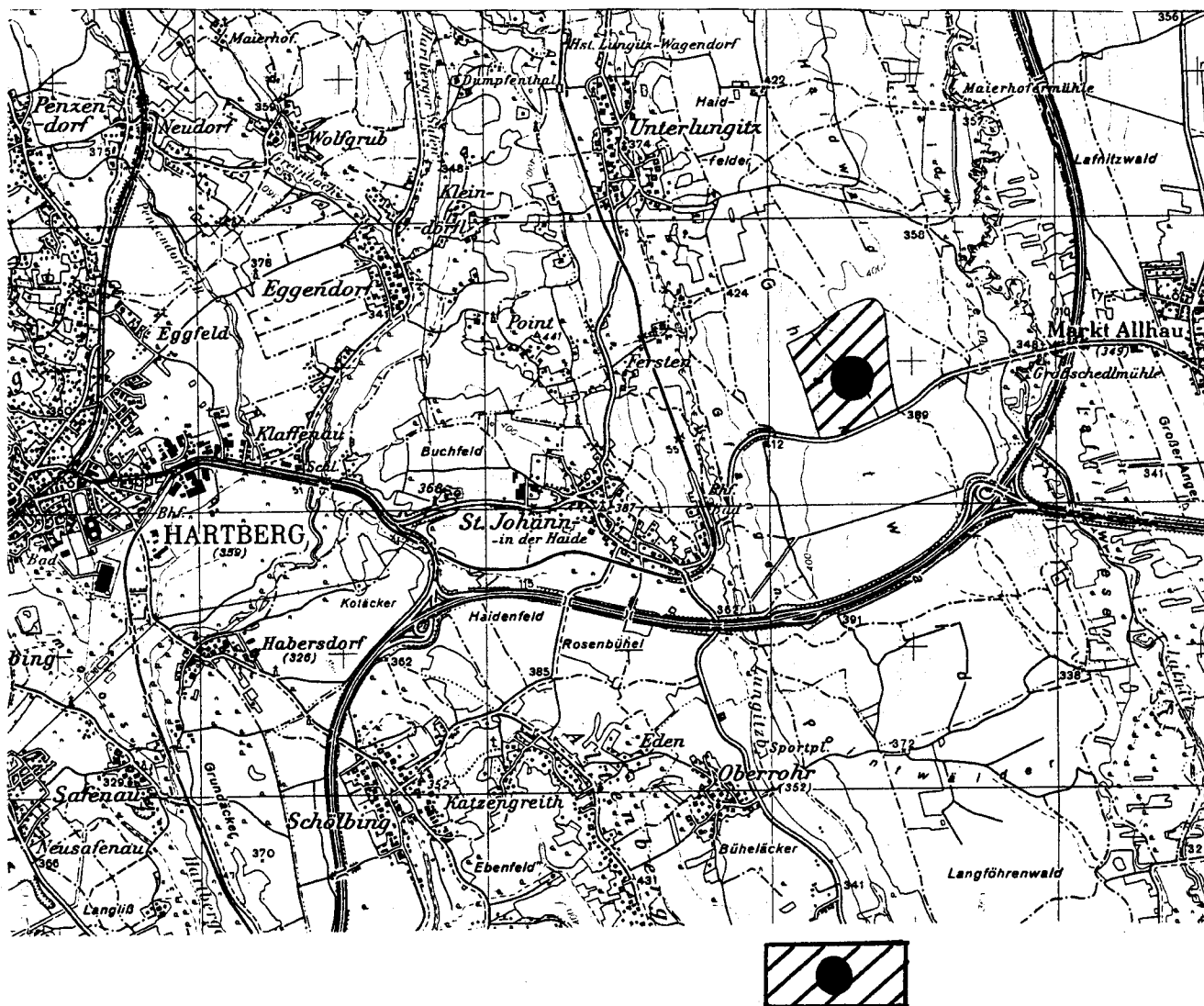


Fig. 3 Site and situation of the Ghartwald waste dump (ÖK 50. Nr. 136)

Social Democrats, however, did not result so much from a general rejection of the idea of a waste dump but from the hopes to make political profit from joining the citizens' opposition against the project. Election results confirmed the correctness of this decision (1985: 4 mandates, 1990: 5 mandates, 1995: 6 mandates). On the other hand the People's Party lost 5 of its former 11 mandates within the same period (cf. Tab. 2).

After this very brief survey of the recent political situation in the commune of St. Johann the following final chapter will be dedicated to some essential results of an empirical study (questionnaire among 237 inhabitants of the commune of St. Johann) to prove the actual acceptance of the Ghartwald waste dump by the population being indirectly or directly affected by that dump.

4. The Acceptance of the Ghartwald Waste Dump by the Local Population

In spring 1997 the authors made an empirical inquiry among 237 adult inhabitants of St. Johann (20 % of all adults) in order to ascertain the acceptance of the Ghartwald waste dump by the local population. The choice of the interviewees followed the principle of a classified random selection. Taking into account the limited space of this paper only some main results of the investigation can be presented. It should be noted that already in 1990 an inquiry concerning the principle opinion of the inhabitants towards the planned installation of a waste dump in the Ghartwald was carried out by the commune's Social Democratic and Green Parties. The two investigations, however, are not comparable as to their goals and structures. The participation in the 1990 inquiry ranged up to 60 % of those entitled to vote (1 208



Fig. 4 Situation and technical equipment of the Ghartwald waste dump, Eastern Styria/Austria

persons). There were 16 % of the valid votes pros and 84 % cons, as to a waste dump.

Of those having been interviewed in 1997 48 % also had taken part in the inquiry of 1990. Since sufficient pre-information of the population is absolutely necessary for achieving good results the interviewees of the 1997 inquiry were asked to evaluate the status of their information before the 1990 inquiry. After all 49 % of those having been consulted thought that they had not been sufficiently pre-informed about the planned waste dump. Most of the information (42 %) was given by the community; 33 % declared that they had been informed by local citizens' initiatives. The information by political parties did not exceed 9 %. The quality of the pre-information was rated sufficient (42 %) by the majority of the population. All together three-fourths (77 %) of the interviewees in 1997 rated the attitude of the 1997 interviewees towards a Ghartwald waste dump more or less negative. This result correlates sufficiently with the actual votes of 1990. The question to the present attitude to the Ghartwald waste dump shows a much greater approval (26 %) than in 1990 (16 %). The number of strict opponents of the dump decreased from 84 % in 1990 to 20 % in 1997. The question which party the interviewees believed capable of solving the community's environmental problems best was answered as follows: 29 % ranked the Social Democrats first, 20 % the Peoples' Party, 13 % the Green Party and 12 % put the Liberate Party in the first place. The good result for the Social Democrats can be attributed to the fact that they have held the mayorship of St. Johann since the election of 1995 when the Social Democrats had gained two mandates in comparison with the election of 1985 and equalled the number of mandates of the Peoples' Party (1995: 6 mandates, 1885: 11 mandates). So, today, one can clearly speak of a mayor's bonus. The amount to which the Social Democrats have established themselves as an environmentally orientated party is expressed even stronger by the fact that 42 % of the adult population declared that they would consider

most the needs and wishes of the people according to the environment compared to 22 % for the Peoples' Party and 12 % for the Green Party. It should be mentioned that 15 % of the interviewees thought that none of the political parties care of the opinion of the population in case of environmental problems.

The next question about the importance of the Ghartwald waste dump for the community of St. Johann was asked with reference to the fact that in Styria there is one „waste dump“ community (Frohnleiten, 1995: 6 841 inhabitants) which could increase its communal income to an astonishing extent. The financial success which Frohnleiten gained from its waste policy marked a significant turning-point in the political and financial evaluation of the waste problem through parts of the community politicians and population in the whole province.

So also in St. Johann the argument of financial success for the community and its inhabitants raised the expectation for a positive future development of the whole community. The population did not take into consideration, however, that in the case of Frohnleiten the community itself operated the waste dump and, therefore, controlled and profited from its incomes whereas in the case of St. Johann the dump is managed by the waste management council of Hartberg. The profit from the waste deposit in St. Johann (1995: per capita tax income: 6 958 ATS; 1 705 inhabitants) can be neglected in comparison with Frohnleiten. The fact that the market town of Frohnleiten ranked 14th with a per capita tax income of 9 298 ATS in 1995 (Steiermärkischer Gemeindebund, 1996) can be mainly attributed to the running of the waste dump. At the peak of the flourishing waste business Frohnleiten was estimated one of the richest communities in the whole country. One should also consider that the ranking of 1995 means that from those 13 communities having still higher tax incomes 10 took the position of district capitals. Thus it is no wonder that in the opinion of the population of St. Johann the community politicians did a bad job in their negotiations for an adequate share in the profits from the waste depositions. More than half of the interviewees of 1997 (55.6 %) were convinced that the Ghartwald waste dump was a financial disadvantage to the community, 54 % classified the quality of life in the community worse than before the establishment of the waste dump, and 76 % attributed a loss of reputation of the community to this fact.

During the inquiry the population was asked whether it felt affected by the operation of the waste deposit. Astonishingly only 20 % of the interviewees gave a positive answer, the main reasons for the nuisance being lorry traffic (58 %), noise (21 %), smells (12 %) and dust (9 %). The amount of the annoyance showed a significant correlation with the distance from the waste dump. Ranging from 30 % of those who felt themselves bothered by the waste dump in their catastrial unit of St. Jo-

hann being closest to the position of the dump and 0 % in the catastral unit of Schölböding being most distant. Almost half of the population (47 %) was convinced that since the Ghartwald waste dump existed it had positively influenced their general attitude to waste and resulted in a greater willingness to separate their own waste, to compost waste or, respectively, to avoid it if possible.

The last point which should be reflected in this paper refers to the question how the interviewees would react if they had to make a decision as a mayor allowing or rejecting a new waste dump in their community. Of the given answers 35 % said that they would absolutely reject. Only 13 % would allow such a project and 52 % would allow it if certain environmental conditions were fulfilled. After all, the almost two thirds (65 %) of positive answers seem to prove that a good management of a waste dump, a successful information policy of the responsible politicians and a strict consideration of environmental directions may alter the prevailing opinion of the population as to the needs and problems of waste deposition taking into consideration that before the establishment of the Ghartwald waste dump 84 % of the adult population of St. Johann had opposed it.

5. Summary

The study tried to give a brief survey on the various problems which may arise from the establishment of regional waste dumps referring to the case study of the

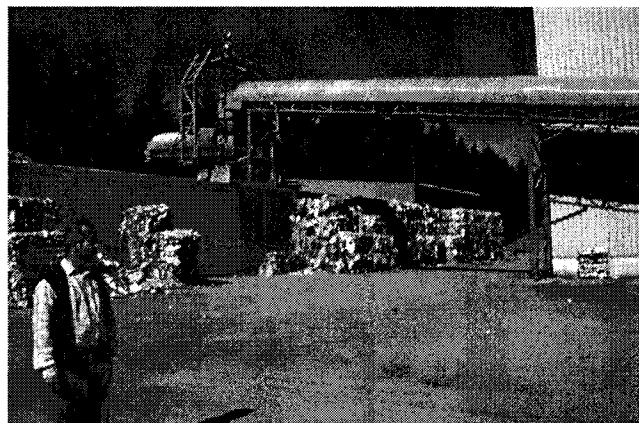


Fig. 5 Waste separation and sorting equipment at the Ghartwald waste dump, Eastern Styria/Austria

Ghartwald waste dump in Eastern Styria. The legal preconditions were discussed as well as the responsibility of the local political decision makers and finally the main results of an empirical inquiry among the population of the community of St. Johann were presented. They revealed a high sensibility of the population in respect to environmental problems and political responsibility.

Acknowledgement

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Reviewer

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THE ZNOJMO DISTRICT LAND COVER MAP (SOUTH MORAVIA)

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Abstract

The land cover map of the Znojmo district which is situated in the South of Moravia (Czech Republic) was worked up on the basis of interpreting a false colour synthesis generated by using the EASI/PACE software. The initial satellite data were obtained by the Landsat TM sensor on 1st August, 1994. Land cover classes were defined by means of the analogue interpretation, which are identical or very similar to the classification system of the Corine-Land Cover EU Project. 16 categories were found in the district on a scale of 1:100 000 that characterize the present land use status in the given area. Practical use of the map consists in a possibility of its application at issuing decisive provisions in the given region.

Shrnutí

Datový soubor pořízený na základě interpretace nepravě barevné syntézy zaznamenává krajinný kryt okresu Znojmo a poskytuje základní informace o charakteru sledovaného území. Mapa krajinného krytu je současně i vhodným podkladem pro podrobnější prostorové analýzy, rozhodovací a plánovací procesy v krajině. Při tvorbě tematické mapy, která zobrazuje kategorie krajinného krytu, bylo postupováno v souladu s metodikou mezinárodního projektu Corine-Land Cover. Použité měřítko mapy 1:100 000 (autorský originál) umožňuje charakterizovat krajinný kryt v širším kontextu celého okresu a je také velmi dobrým ukazatelem aktuálního využívání krajiny.

Key words: land cover, thematic map, remote sensing, Znojmo district

1. Introduction

A thematic map was worked up in the past period of time of the „Znojmo District Land Cover“ on a scale 1:100 000 (author's original) within the solution of the institutional task „Transformation of South Moravia Border Landscape“. The false colour synthesis was used as a basic method at the construction of the map, generated from data of Landsat satellite sensor by using the Version 5.3 EASI/PACE software. The satellite records of 1st August, 1994 were used to work up the land cover.

Monitoring and remote sensing of Earth surface makes it possible to use temporal and spatial dimensions as well as an optimum evaluation of the given area in the sense of spatial context and hence a considerable objectiveness of data acquired through this method. In the case of environmental research of the Earth surface, the sensors installed on satellite carriers record first of all the visible part of landscape material substance, which is defined as a landscape cover on the basis of morphostructural and physiognomic properties. The appearance of land cover objects and elements predetermines at the same time their proper contents or functional use.

Feranec - Ofaheř - Pravda (1996) define the term of land cover as follows: „The land cover represents a materialized projection of natural spatial givens (morpho-positional and bioenergetic) and the present land use, i.e. the landscape which was re-created (cultivated objects) or created (man-made objects) by society or by man.“ It is possible to make a simpler statement that the land cover forms a projection of actually existing objects on the Earth surface, which at the same time predetermine the area use. This applies to objects in the landscape, created or altered by human society. The actually existing land cover categories are a compromise between the natural features of the area and technical possibilities, knowledge and capabilities as well as economic tools of the man at the given time. The relevant informa-

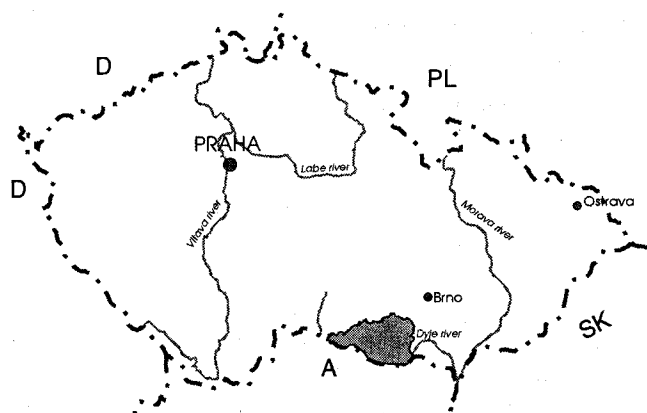


Fig. 1 Map of the Czech Republic with marked area under study

tion on spatial distribution of individual land cover components is rather important for a whole range of decision-making processes which are needed for the general transformation of economy in the Czech Republic. At these decision-making processes, a necessity of preserving landscape units should be taken into account that would be near to the optimum status of natural environment with their organization. At present, the interpretation schemes and land cover thematic maps are one of important database attributes for analyses relating to decision-making and planning.

The land cover characteristic closely relates to data which relate to land use and vice versa. In the case of regional dimension in the area, the expression of the land cover is similar to basic categories of land use. The morpho-structural and physiognomic features usually correspond with the basic functional characteristics and predetermine also the spatial organization of the cultural landscape. The land cover map represents the objects on the Earth surface by their physiognomic features while the land use map shows the same objects by their functional properties. The relevant land cover in the given space is best informed upon by the data acquired from the satellite carriers (e.g. Landsat, SPOT), which are processed and interpreted in the map groundwork. It follows from the above that the methods of remote sensing of Earth are very efficient to monitor the land cover status, i.e. to assess and characterize the spatial distribution of individual landscape components.

At a solution of landscape spatial structure issue a scheme of its description should be set up whose sense would consist in the articulation of the landscape sphere into a hierarchic system. This means to generate a classification scheme of several levels which would correspond to their different resolution capacities. There is a whole range of classification systems at the present, which are very similar to one another in their classification into typological units. It is possible to generalize that nearly all classification systems that make use of remote sensing are more or less based on the U. S. Geological Survey classification system, or on the methodology worked out by the European Union within the project Corine-Land Cover.

2. Methodology of land cover map set up

As stated above, the Landsat TM digital pictorial recording was used to construct the map, which was modified into an analogue form - false colour synthesis. The following step was analogue interpretation of the false colour satellite map, a method used to identify and assess (characterize) objects appearing on pictures. This method is based on the visual analysis of interpretation characteristics by means of which the mapped objects are shown in the pictures. At the same time, the interpretation of false colour synthesis made use of ad-

ditional materials such as topographical maps, maps of preserved areas and aerial photographs. In the case that some land cover categories were impossible to be reliably identified by means of analogue interpretation, the additional and more accurate data were obtained through the direct field research.

3. Characteristics of land cover categories to be found in the Znojmo district area

When setting up the Znojmo district land cover map, we followed out of the Corine-Land Cover methodology which includes a total of 44 land cover units for the scale 1:100 000. Of these 44 categories, 16 were identified in the district of Znojmo, whose definition is as follows:

111 - Continuous urban fabric: the absolutely greatest part of the area is covered with houses. Various types of dwelling houses, various surfaces of roads, pavements and streets as well as other man-made surfaces cover nearly the whole area. Discontinuous areas of vegetation and bare land occur only sporadically (taking the area of less than 20 % within this land cover category).

112 - Discontinuous urban fabric: a considerable part of the area is covered with houses. Dwelling houses, buildings, various kinds of communications and man-made surfaces occur along with areas of vegetation (lawns, green spaces etc.) and bare land. Although these objects do not form extensive continuous areas (ca. 20-40 % within this land cover category), they are important from the viewpoint of their manifestation in the picture.

121 - Industrial or commercial units: areas with man-made surfaces (concrete, asphalt, paving etc.) which hardly have any vegetation and represent a dominant part of the area. The areas contain various non-dwelling buildings and facilities. The category also includes military objects and extensive complexes of farm buildings and facilities.

131 - Mineral extraction sites: areas with surface mining of minerals (quarries, gravel and sand pits) or other mineral raw materials (surface mines).

211 - Non-irrigated arable land: cultivated farmland on which cereals, legumes, fodder and forage crops (e.g. clover), industrial crops, and root crops are grown, including large gardens for growing flowers and vegetables, also in glasshouses and under foil greenhouses. This category also includes fruit-tree nurseries and fallow lands with the exception of pastures, as well as all seasonally irrigated lands in the territory of the Czech Republic.

221 - Vineyards: areas on which grapevine is grown.

222 - Fruit trees and berry plantations: farm areas with fruit trees and shrubs (currants and goose berries) but also hop plantations.

231 - Pastures: areas densely covered with herb vegetation, particularly with grasses which are used for cattle grazing but may also be harvested mechanically. This category includes permanent, temporary and man-made pastures.

241 - Annual crops associated with permanent crops: areas of annual crops on arable land or on the land with permanent grass cover, associated with permanent stands on the same surface.

242 - Complex cultivation patterns: small plots of annual and multiyear crops, pastures and permanent stands, mutually alternated (e.g. small private fields in the rural type of settlement, some garden colonies).

243 - Land principally occupied by agricultural, with significant areas of natural vegetation: cultivated farmland areas with scattered natural vegetation.

311 - Broad-leaved forest: vegetation formations consisting mainly of trees, shrubs and herb vegetation with the dominating position of broad-leaved tree species.

312 - Coniferous forest: vegetation formations consisting mainly of trees, shrubs and herb vegetation with the dominating position of coniferous tree species.

313 - Mixed forest: vegetation formations consisting mainly of trees, shrubs and herb vegetation with no domination of deciduous or coniferous tree species.

324 - Transitional woodland-shrub: forest and bushes: shrub or herb vegetation with scattered trees. This category can also be represented by different developmental phases of the forest.

512 - Water bodies: natural or man-made water areas (ponds, lakes, reservoirs).

A topographical groundwork for the construction of the Znojmo district land cover map was the map of districts of the Czech Republic on a scale 1:100 000 (Znojmo district), which however would not enable an optimum use of the information base acquired from the detailed field research, study of archives or from the remote sensing data due to excessive generalization.

A basis for the set-up of a land cover map consists in transferring areas of individual land cover categories, featured in the false colour synthesis, into the cartographical groundwork. Decisive guidelines at border delineation were colour changes of individual objects as well as all line elements observed in the synthesis including the distinguishable river system and pictures of water areas. The areas of individual objects found in this way are further precised by means of detailed topographical maps and by maps of various thematic contents, possibly also by means of interpreting available aerial photographs. When the groundwork map is then

compared with the obtained areas, a whole range of inaccuracies can be found, especially in the delineation of groundplans of forest stands. Discrepancies exist both in the delineation of seats, road network (e.g. newly built communications do not appear at all in older maps), and bank lines of water areas.

Apart from the above information for the correction, better accuracy and up-dating of classic maps, the featured land cover areas provide a qualitatively new information not included in current maps: a possibility to determine the course of forest species composition borders in forest stands and to classify the agricultural land according to types of management. The number of mutually different land cover categories that can be interpreted from the synthesis depends, by means of the scale, on the resolution capacity of the synthesis, which consequently conditions also the extent of map legend. The total of 16 land cover categories (see above) were interpreted and included in the land cover map, which comply with definitions of the Corine-Land Cover Project.

Nevertheless, some of the above land cover categories could not be classified and defined unambiguously only on the basis of visual interpretation of the satellite picture recording due to the own spectral manifestation which in some cases fuses with other objects (e.g. permanent grass stands with arable land covered with vegetation, orchards and vineyards with bare land or even with broad-leaved forest), which primarily depends on the date of taking the photographs and the course of vegetation growth in the given year. These reasons made the authors to check the correctness of interpreted areas right on the spot. The land cover map set up in this way is of an area character with individual studied phenomena and functional area units featured in colours in the particular area. The choice of mentioned methods for the delineation of particular categories of individual area units in the given conception respects recommendations of the technical committee for mapping of International Geographic Union. The land cover map compiled on the basis of the above procedure makes it possible to up-date the map contents in the area under study to the date of photographing or each year provided that the necessary supporting data are available.

The author's original of the Znojmo district land cover thematic map was further processed in such a way that the individual land cover categories were digitalized and then vectorized using the TOPOLOG software product. From this they will be converted into the ArcView GIS software product which will facilitate other operations with individual layers. The ArcView GIS SW will enable quantification of individual classes, determination of their statistic parameters and their completion with other necessary data including price expression and consequent cartographic processing. Nevertheless, even in this form the Znojmo district land cover

map makes it possible to determine and evaluate significance of some categories. Most intensively used are plain parts of lowlands which can be documented by absolutely dominating agricultural arable land which is accompanied by mainly deciduous forests along the water courses. The mildly undulating parts of lowlands have a greater representation of forests but there are also vineyards and fruit orchards. The entire district of Znojmo is characterized by clearly dominating agricultural categories of land cover together with areas of urbanized landscape. The absolute prevalence of dwelling houses is combined with industrial areas in some larger seats, which particularly applies to the district town of Znojmo. The extensive areas of forest complexes are mainly bound to upland and highland relief types. The deciduous forests occur in the lower and warmer altitudes of the convex relief. Occurrence of the mixed and coniferous forests is rising with the increasing altitude and dropping temperature, which are to a considerable extent modified by anthropogenic activities.

4. Conclusions

The map of Znojmo district land cover categories on a scale 1:100 000 provides localized information which relates to the given administration unit. In the case that a chronological series of these map is set up, it would be possible to assess dynamics of some phenomena and processes in the landscape and to differentiate the territory also from the aspect of some phenomena occurring in time. The land cover map provides valuable information on the relevant status of the land cover. It finds practical application at places where site and planning permits are issued and materialized, and it can also be a suitable basic material for local administration bodies. Land cover maps represent a fundamental database at generating data files for geographical information systems. The GIS and their up-dating by means of rigorously carried out interpretation of remote sensing materials appears to be very effective both from the viewpoint of time and financial aspects.

Note: Regarding technical capacity of the periodical the map is published on a colour two-page spread on a scale 1:200 000.

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Reviewer

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OPINIONS OF INHABITANTS ON THE SOCIAL SITUATION IN THE REGION OF VRANOV NAD DYJÍ - JEMNICE (SW MORAVIA)

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Abstract

The paper deals with an analysis of opinions of local population on some problems related to present transformation of economic and social system. The inquiry which was attended by 710 parents of model region primary school children focused on the following groups of problems: stability of the inquired in the region, their opinions on labour market and economic and social situation in the village or town of their domicile, perception of the state border with Austria, relation to landscape and nature protection. Questions connected with the long-term development in the region were replied by 340 grandparents of the same children. Results indicate opinions of the local population in one of the most peripheral regions in Moravia.

Shrnutí

Příspěvek se věnuje analýze názorů místních obyvatel na některé problémy související se současným stavem transformace ekonomického a sociálního systému. Anketární šetření, kterého se zúčastnilo 710 rodičů žáků základních škol modelového regionu, se zaměřilo na následující okruhy problémů: stabilita dotázaných v regionu, jejich názory na trh práce, na vztah k ochraně přírody a krajiny. Na otázky spojené s dlouhodobějším vývojem v regionu odpovědělo 340 prarodičů těchto žáků. Výsledky ukazují názory místní populace jednoho z nejperifernějších regionů na Moravě.

Key words: marginal regions, public inquiry, social situation, Vranov nad Dyjí, Jemnice

1. Introduction

A public inquiry was made among the local population together with the regional geographical research in the model region of Vranov nad Dyjí - Jemnice (see Vaishar, A. - Špes, M. et al., 1997; Vaishar, A. et al., 1997; Koutný, R. - Vaishar, A., 1997). The survey made use of cooperation with all schools in the area under study, i.e. eight complete primary schools (Bítov, Lubnice, Šumná, Vranov nad Dyjí, Budkov, Jemnice, Police, Dešná), six primary schools with only several classes (Horní Břečkov, Starý Petřín, Štítary, Mladoňovice, Třebelovice, Budiškovice) and the Town Gymnasium in Jemnice. The schools distributed questionnaires to pupils' parents.

The questionnaires included 52 questions for pupils' parents and other 13 questions for their grandparents should they live in the area under study. Individual parts of the questionnaire focused the issue of household stability in the region, position on the labour market including entrepreneurial activities, opinions concerning the development of present situation in the domicile village or town, relations to neighbouring Austria, protection of

nature, landscape and environment as well as relations to the information on respondents.

Distributed were 1 350 questionnaires of which 710 were returned filled, which represents a return rate of over 52 %. In addition, the questions were replied by 340 grandparents, which means that the authors had available opinions from 1 050 households representing 18.15 % of all households in the region.

The questions were replied by 53.5 % men and 44.8 % women (the rest being respondents who either did not reply the given question on sex or their reply was not unambiguous - they for example mentioned several options). In terms of age structure, young people up to 30 years of age represented 4.36 % of the inquired group, persons from 30 to 39 represented 31.9 % of respondents, citizens between 40 and 59 years of age made 17.61 % of the group, and persons over 60 years 1.27 % of the cases. However, the last mentioned category was well represented in the part of the questionnaire meant for grandparents. The group of respondents was composed of 10.35 % persons with primary education, 50.99 % persons with professional

skills, 24.93 % persons with complete secondary education, and 3.86 % university graduates. The structure of the responding group differs from the population structure in the model region especially in the item of age. Particularly low representation is that of the category up to 30 years. It is interesting that the percentage of respondents with complete secondary education and university graduates (28.79 %) was significantly lower than the total percentage of these inhabitants in the area (40.13 %).

The structure of respondents corresponds with the used methodology of cooperating with schools. This kind of collaboration is practically the only possibility of how to gain replies from a statistically very significant percentage of households in actual time and with minimum expenses. However, when interpreting the results, one has to bear in mind the age structure of the inquired. The age category of persons in the first half of economically productive age with school children includes relatively stabilized people who usually have their professions, families, flats. On the other hand, unlike in older people, they are immediately concerned with the considerations about prospects of the region since it is their own prospects that can possibly be influenced by them in a positive way. This is why their opinions are taken for most important from the viewpoint of conclusions for future prospects of the region, which was the goal of the task.

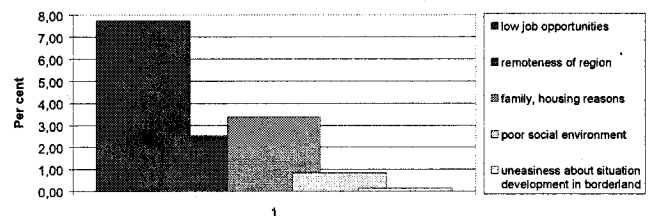
The paper includes only the most general conclusions and a brief commentary. In fact, the results would be sufficient for several contributions that would evaluate opinions of local inhabitants from different points of view and in different context. A similar method has been adopted to prepare public inquiries in other model areas - Bojkovice/Valašské Klobouky and Kunštát, which will provide a possibility of regional and temporal comparison. Since it should not be forgotten that the survey in the region of Vranov nad Dyjí/Jemnice was made before the so called Czech government packages of provisions came into force to help at the curing of Czech economy in the first half of 1997, a step by which the government admitted a complicated economic situation of the country. The provisions have influenced the market, labour, standard of living as well as some other aspects important for the opinions of the population. However, the mentioned provisions were already in force at the time of processing results, and it is possible to assume that some opinions would have been more pessimistic.

2. Stability of respondents in the region

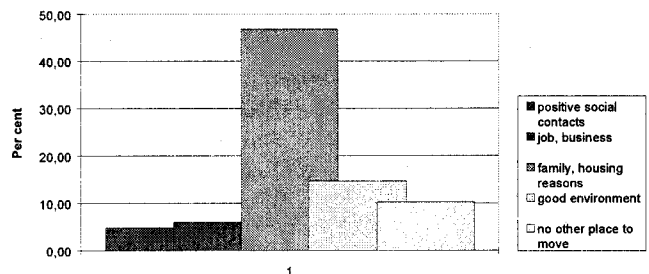
More than a half of the inquired (57.4 %) moved into the region after 1950. 42.7 % families claim that at least one of the married couple has been living in the region since he/she was born. The respondents are stabilized in the region in the sense that 60.1 % of them definitely

would not move out of the region and 27.2 % would rather not moved out. The reason to stay in the region is the family background or housing reasons in 56.7 % of the cases and nice surroundings and good environment in 17.8 %. Of persons decided to move or admitting the emigration possibility, 52.9 % complain of scarce opportunities to find jobs and 23.1 % mention either family problems or housing reasons for emigration. The results of the survey confirmed a generally known fact that the Czech population is very little mobile and has a strong link to the flat, accentuated in the rural environment by private property of houses.

Prevailing motives for emigration from the region



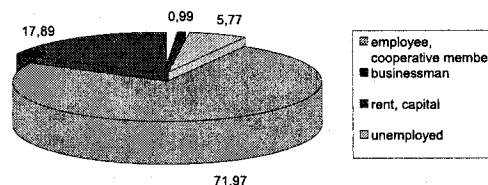
Prevailing motives for staying in the region



3. Labour market

The respondents included 72.0 % cooperative members and employees, 17.9 % entrepreneurs, 5.8 % unemployed at least 2 months at the time of survey, and 1 % persons living on rent or capital.

What is your social status?



A nearly half of the inquired persons (49.0 %) changed their jobs after 1990; 56.9 % of them claim that the change was made voluntarily. This can be confirmed by opinions in the following table, indicating that a change to the worse applies to only a hardly quarter of them. This means that nearly a half of the population have improved their situation in market economy when changing the job.



Aerial photograph of the Institute of Experimental Botany, AS CR in the town of Olomouc after the passage of flood wave

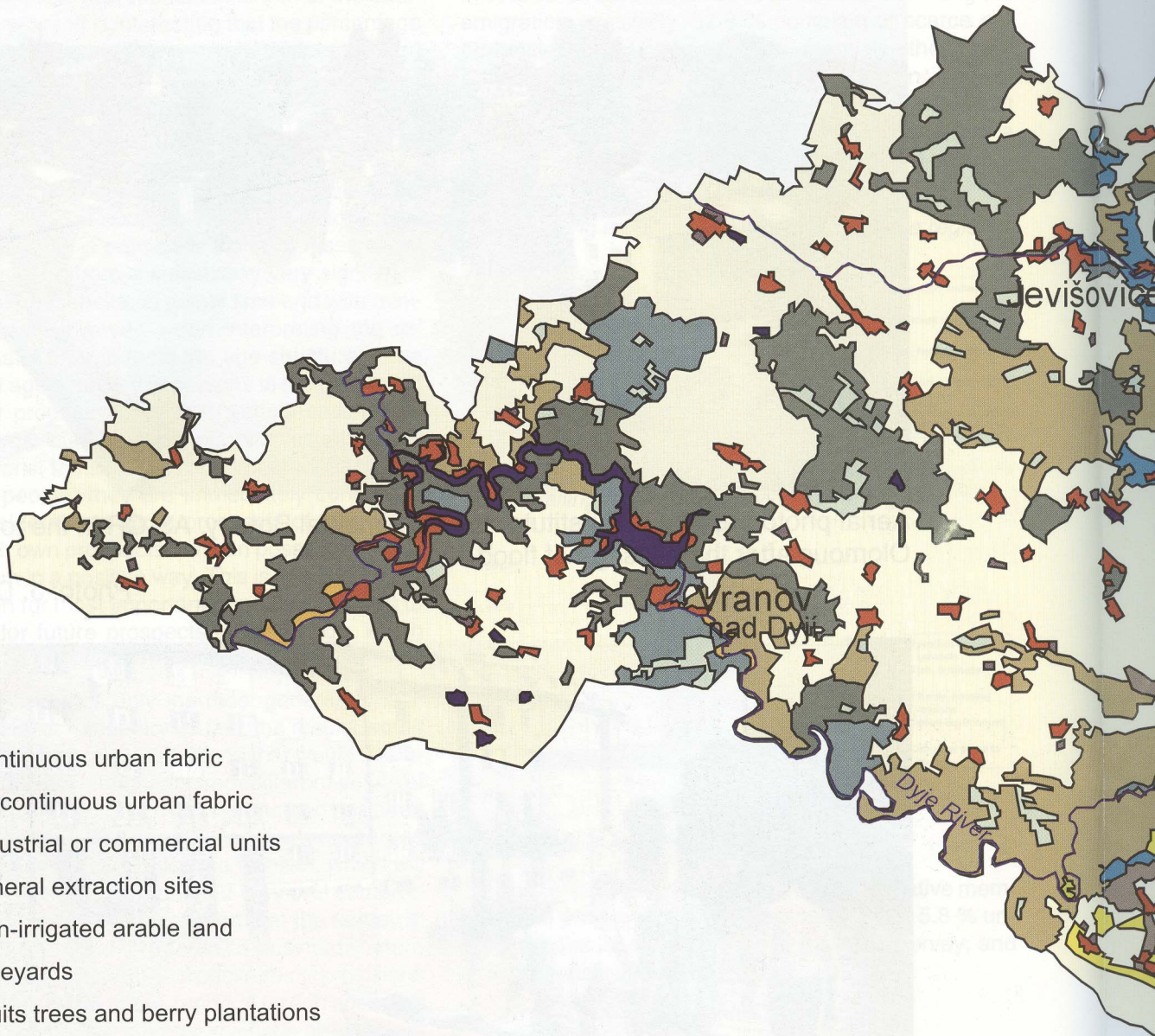
Photo: J. Doležel




















For a short time water got as close as to the very limits of historical town centre in Olomouc. (Thursday, 10 July 1997)

Photo: M. Vysoudil

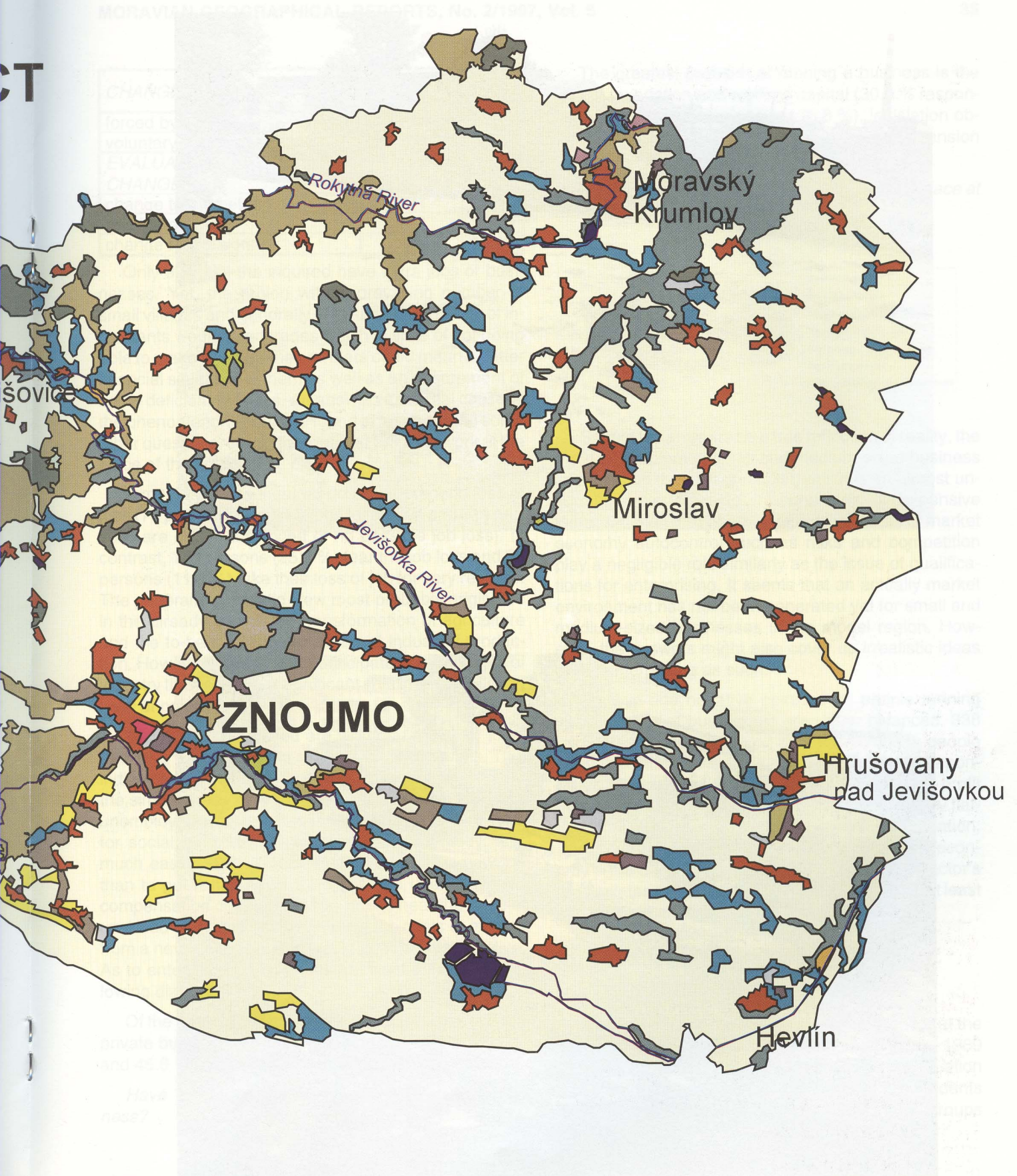
LAND COVER OF ZNOJMO DISTRICT



Legend

-  Continuous urban fabric
-  Discontinuous urban fabric
-  Industrial or commercial units
-  Mineral extraction sites
-  Non-irrigated arable land
-  Vineyards
-  Fruits trees and berry plantations
-  Pastures
-  Annual crops associated with permanent crops
-  Complex cultivation patterns
-  Land principally occupied by agriculture, with significant areas of natural vegetation
-  Broad-leaved forest
-  Coniferous forest
-  Mixed forest
-  Transitional woodland-shrub
-  Water bodies
-  Stream courses





Authors: V. Nováček, A. Petrová

© Institute of Geonics, Branch Brno (1997)



The Svitava River water level on the weir in Brno-Husovice on Wednesday, 9 July 1997 as compared with the normal a month after flood - in August 1997

Photos: J. Karásek

Illustrations to the report on disastrous floods in July 1997

CHANGE OF JOB	RESPONDENTS	%
forced by losing job	163	46.84
voluntary	198	56.90
EVALUATION OF THE CHANGE		
change to the better	171	49.14
no change	132	37.93
change to the worse	84	24.13

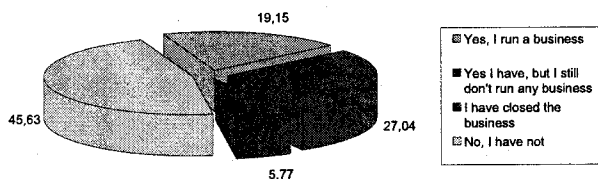
Only 9.3 % of the inquired have extra jobs or businesses. Yet, the region with a prevailing number of small villages and generally low purchasing power of inhabitants would need trades which in spite of not being able to make living for their runners could mean a better financial situation for them as well as an ensurement of some deficient services. An answer to the real cause of the phenomenon should be found in responses to some other questions. 382 of the inquired (53.8 %) work at the place of their domicile.

A majority of the inquired do not apprehend loss of jobs (79 persons have their jobs for certain and 314 persons are rather convinced of no possible job loss). In contrast, 178 persons (25.1 %) fear the job loss and 79 persons (11.1 %) take their loss of job for very realistic. The generally optimistic view most probably originates in the already completed transformation of agriculture and the to-be-made restructuring of industrial production. However, it may be the anticipated restructuring of industry that will bring a significant shift in the population level of opinion.

26.5 % of the inquired are willing to move for jobs, and 19.0 % are willing to start private businesses. This indicates that the majority of the population would take the simplest way of registering at the Labour Office for unemployment compensation contributions and later for social benefits. Reasons are several: firstly, it is much easier in the Czech Republic to find a new job than to get a flat. Apart from this, the unemployment compensation contribution has got so near the price of unskilled work that after detracting the costs of moving from a new wage, the step would appear little effective. As to enterprising, responses are illustrated in the following diagramme:

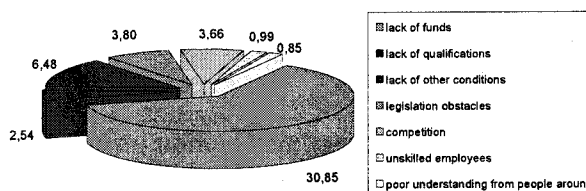
Of the total number of respondents, 19.2 % have run private businesses, 5.8 % ceased to run the business, and 45.6 % have never considered to run a business.

Have you ever considered an independent business?



The greatest problem at running a business is the lack of foundation and working capital (30.9 % respondents), lack of other conditions (6.8 %), legislation obstacles (3.8 %), competition and risk apprehension (3.7 %), and insufficient qualifications (2.5 %).

What are the major problems that you had to face at running or preparing your business?



Should the answers be a true reflection of reality, the greatest problem of small and medium-sized business seems to be the lack of capital, which is an almost unsurmountable obstacle in conditions of expensive loans. On the other hand, common problems of market economy autocontrol such as risks and competition play a negligible role similarly as the issue of qualifications for enterprising. It seems that an actually market environment has not been generated yet for small and medium-sized businesses in the model region. However, the answers might also cover up unrealistic ideas about enterprising as such.

Positive and negative opinions on people running various kinds of businesses are rather balanced. 338 respondents are convinced that the business people bring benefits also to their municipalities, 327 respondents assume that the entrepreneurs strive for profit cost what it may. The answers reflect a not exactly flattering view of entrepreneurs in a part of population, which corresponds to the initial stage of market economy in the Czech Republic where a marked contractor's profit relates to a considerable extent to illegal or at least non-ethical behaviour.

4. Situation in residential municipalities

Nearly a third of the inquired are convinced that the situation in the village has not changed since 1989 (32.1 %). 35.1 % of inhabitants believe that the situation has changed to the better, and 31 % of respondents think that it was a change to the worse. All three groups are more or less in the balance.

Has general situation in your village changed since 1989?

OPINION	RESPONDENTS	%
It has definitely changed to the better	52	7.32
It has rather changed to the better	197	27.75
It has not changed at all	228	32.11
It has rather changed to the worse	141	19.86
It has definitely changed to the worse	79	11.13

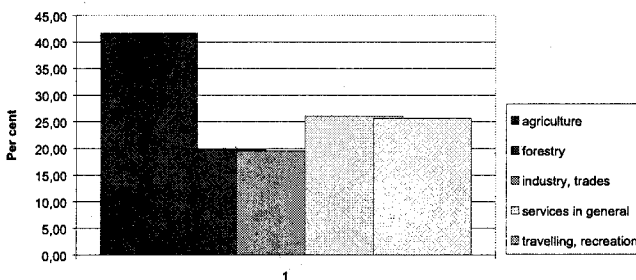
The opinion about prospects of future prosperity in the village included 57.3 % negative answers and only 38.9 % positive responses. This indicates that the future prospects are viewed a bit worse than is the so far evaluation of the transformation period with negative visions prevailing.

What would be your evaluation of prospects of future prosperity in your municipality?

OPTION	RESPONDENTS	%
Very good prospects	29	4.08
Rather good prospects	247	34.79
Rather bad prospects	317	44.65
Very bad prospects	90	12.68

Agriculture is considered to be the most prospective sphere of economy, in which 41.7 % of the inquired can see their future. This well corresponds with the historical view of namely the Jemnice part of the region. Services that are still far below the demand and travelling exhibit a great support (26.1 % and 25.6 %, resp.), particularly in the context of advantageous conditions near the Vranov dam lake.

What are the industries in which you could see possibilities of future prospects in your village?



Only a small percentage of respondents are satisfied with transport. Nearly two thirds of them consider the traffic and public transport situations much worse. This is a consequence of closing non-effective coach lines of mass transport, which may be added to in a very close future also by the liquidation of the regional railway between Moravské Budějovice and Jemnice. On the other hand, however, the demand for mass railway transport has dropped both due to the increasing motor

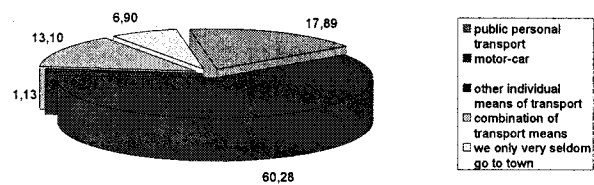
car transport and due to the reduced commutation from villages to towns.

What is your evaluation of traffic connection from your village to the nearest town as compared to 1990?

OPTION	RESPONDENTS	%
Better connection	4	0.56
No considerable change	54	7.61
Rather worse connection	204	28.73
Definitely worse connection	435	61.27

As many as 60.3 % of the inquired use cars while only 17.9 % make use of public transport. The deviation is generated by the process itself since the increasing use of individual cars leads to the reduction of public personal transport, which again rises the need of other inhabitants to use cars. The part of population entirely dependent on public transport may perceive the trend in a rather negative way. 77.9 % of respondents own cars.

What means of transport do you use most to go to the nearest town?



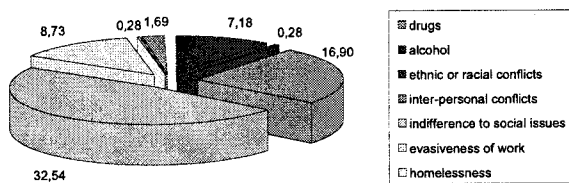
As to content with the network of shopping facilities, the only satisfying network is that of food shops (some 70 %). Discontent prevails with industrial goods and with services in particular. In addition to transformation problems it shows that a great number of villages do not have enough residents for independent shops of classic type to be effective since their operating costs would be too high. However, with the exception of the above minimum number of persons with extra jobs, other forms are not developed in the region.

Are you satisfied with the network of shops in your village?

SHOP	VERY SATISFIELD		RATHER SATISFIELD		RATHER UNSATISFIELD		UNSATISFIELD	
		%		%		%		%
food products	105	14.8	380	53.5	124	17.4	71	10
industrial goods	27	3.8	195	27.4	152	21.4	264	37.1
services	10	1.4	104	14.7	154	21.7	364	51.3

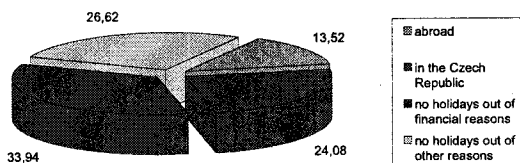
Extreme indifference to social issues and inter-personal conflicts are the most striking negative social phenomena in the region under study. Dangerous socio-pathological phenomena such as alcoholism, drugs, racism or homelessness are only very seldom mentioned in this rural environment.

Are there any increasing negative social phenomena in your village?



The not too favourable economic situation of the inquired can be documented by the fact that 60.6 % of families had no holidays in 1996 the reason for 33.9 % of them being lack of finance.

Where did you go for holidays in 1996?



5. Perception of the border with Austria

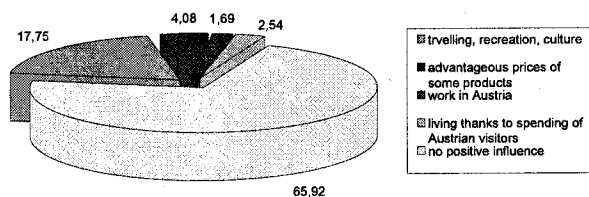
The majority of inhabitants in the region perceive the opened border with Austria as a positive phenomenon. Yet, there are some objections on the part of more than a fifth of them:

What would be your evaluation of opening the Austrian border after 1989?

OPTION	RESPONDENTS	%
definitely positive	198	27.89
rather positive	329	46.34
rather negative	134	18.87
definitely negative	24	3.38

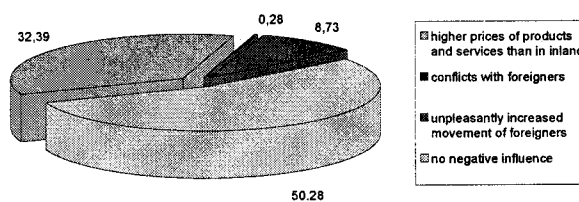
Although the majority of population in the region is convinced about a generally positive effect of the opened border, two thirds do not find any positive influence on their own lives or on the life of their families. The majority of the rest can see concrete benefits rather in the generally cultural and recreational level. Only slightly more than 8 % of the inquired can see a concrete contribution in factors relating to the improvement of their economic situation.

What was a positive influence of the opened border for your family?



Similarly, the question about a concrete negative impact of opening the state border was replied in a negative way by more than a half of respondents. A third of them is annoyed by increased prices of products and services because prices in the borderland zone responded to the higher purchasing power of Austrian visitors by a considerable increase. It is well possible that a considerable portion of people with the negative valuation of the opened border meant exactly this circumstance. A not quite negligible part of respondents complain to be annoyed by the movement of foreigners. These inhabitants of the model area apparently prefer a quiet way of living and this was a reason for them to settle in the peripheral region.

What was a negative influence of the opened border for your family?



The respondents had on average two visits in Austria in 1996 with 115 (16.2 %), 62 (8.73 %) and 32 (4.52 %) persons mentioning one, two and three visits in Austria, respectively. 21 inquired persons (2.96 %) had over ten visits in Austria. It is obvious that the hunger to visit our neighbours in the South, which showed so intensively at the beginning of the 90's, has gradually dwindled away. It is also necessary to bear in mind that the mobility of average population in rural environment is apparently limited to the closest surroundings.

One of possible barriers to a more intensive contact might also be insufficient knowledge of German language as indicated by the following table:

Do you speak German?

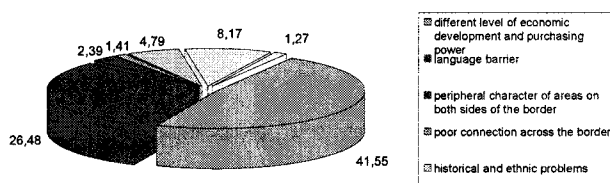
DEGREE OF KNOWLEDGE	RESPONDENTS	%
well	14	1.97
can make myself understood	167	23.52
only a little	117	16.48
no I don't	391	55.07

42 respondents (5.92 %) regularly watch Austrian TV programmes, 8 respondents (1.13 %) follow Austrian radio broadcast, and 5 respondents (0.7 %) read Austrian newspapers. A number of them had a positive answer to the question whether they have some personal friends in Austria (131 respondents - 18.45 %). The results indicate that direct information about the neighbouring country is rather scarce in the borderland and mediated information does not necessarily have to always be quite true.

The main barrier to further development of across-the-border relations for more than 40 % respondents is

the different level of economic standard and purchasing power. Yet, a great many of so far economic forms of cooperation on the Czech part of the border are based exactly on this reality, which reflects in good prosperity of Czech tradesmen and entrepreneurs in services as well as above-average income of Czech persons employed legally or illegally in Austria. Economic cooperation on the border is nearly always based on different prices and shopping advantages, work or investments in the neighbouring country. However, the problem consists in the fact that these differences are too big and the situation too one-sided. Another greater third of the population perceive the barrier in two closely related problems: insufficient knowledge of language and hence insufficient knowledge of the partner. Historical and ethnic problems such as fascism, war etc. amount to mere 5 % as it can be clearly seen from the following table. Other barrier types are statistically negligible.

What do you consider barriers for the development of relations with Austria?



The absolutely prevailing majority of respondents do not fear any worsening relations with Austria due to trends requesting financial compensation for the evacuation of German population after World War II. Nevertheless, a nearly quarter of the population admits the possibility.

Do you assume that there are trends from the Austrian side of the border to claim financial compensations for evacuation after World War II?

OPTION	RESPONDENTS	%
definitely yes	34	4.79
rather yes	128	18.03
rather not	401	56.48
definitely not	103	14.51

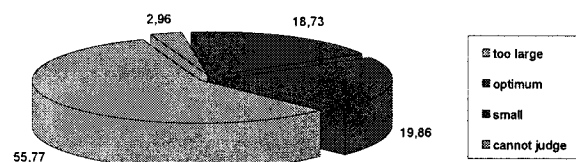
The majority of inquired has a neutral relation to Austrians this relating to both people in Austria (60.14 %) and visitors from Austria (57.32 %). As to the issue of relations towards the people in Austria, 22.96 % of respondents have a rather good experience. As to the issue of relations towards the visitors, there are 20.99 % responses in this category, but as many as 11.55 % of the inquired have a rather bad experience with the visitors. In terms of a mutual relation between the negative and the positive experience, it apparently reflects a low number of personal visits made by inhabitants of the Czech borderland in the neighbouring country. While some Czech citizens may have a personal negative experience with Austrians arriving in the Moravian border-

land, a personal experience with Austrians in Austria is almost entirely missing in some Czech citizens.

6. Relations to landscape and nature protection

396 respondents cannot judge whether the area of territories under large-scale protection in the Czech Republic is sufficient. 141 respondents take the area for insufficient, 133 respondents assume that the protected areas are at their optimum size, and only 21 persons claim that they are too large.

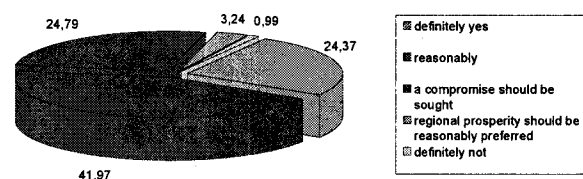
Do you assume the area of territories under large-scale protection in the Czech Republic sufficient?



Nearly 42 % of respondents consider that nature protection should be reasonably preferred to concerns of regional prosperity and a quarter of the inquired are convinced that nature protection should definitely be preferred. Another quarter assume that a compromise should be sought. Only 4.23 % of respondents prefer region prosperity to nature protection.

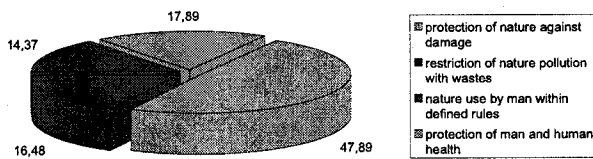
It might seem that the inhabitants of the Moravian borderland very clearly prefer a one-sided protectionist view. However, the evaluation of these opinions does not have an unambiguous character. If a certain portion of inhabitants moved in or stay in the region exactly for the above-average values of natural environment, the view would be well understandable. There are doubts, however, that the view in fact applies to only a smaller part of respondents. Much more probable can be the explanation that the people often answer in this way on the basis of „ecological“ propaganda of media without connecting the region prosperity with their own. A complex conception of environment is very little forced in by the media. The population opinions stand in a contrast with opinions of local authorities, which signal existing conflicts between the protection of nature, landscape and architectural monuments on the one hand and regional prosperity on the other.

Do you assume that nature protection should be preferred to concerns of regional prosperity?



The presumption of protectionist approach is supported by the structure of answers to the following question. Nearly a half of the inquired understand the protection of environment as a protection of nature against damage. For other respondents the protection of environment represents restriction of nature pollution with wastes. Constructive opinions at seeking compromises are advocated by only a fairly small part of population.

What is your understanding of environment protection?



14.51 % of respondents take an active and permanent part in the protection of environment, 64.93 % take part occasionally, and 16.48 % do not take part in the environment protection.

The structure of answers to questions relating to the perception of environment showed that although the majority of people are not entirely indifferent to the issue of environment, their activities are not channelled in a correct direction. The protectionist view is most probably expected to get into conflict with the regional economy with worsened economic conditions. However, much more serious seems the fact that the view has no internal capacity of finding a realistic solution to the relation between the society and the nature.

7. Opinions of grandparents on development in village and region

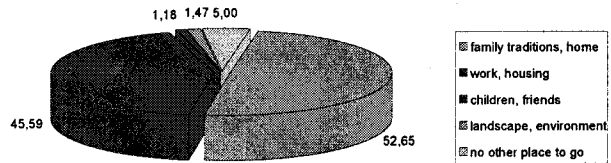
The questionnaire section meant for grandparents was replied to 340 persons. Most of them moved into the region before 1945. People move less with the increasing age and this was the reason to have only 11.76 % of respondents who settled in the region after 1960.

When did you come to the region?

PERIOD	RESPONDENTS	%
before 1945	171	50.29
1945-1948	64	18.82
1949-1960	64	18.82
after 1960	40	11.76

254 respondents (74.71 %) claim even their forefathers to live in the region. More than a half of respondents stay in the region due to family traditions the feel of home being very much important to them. Other more than 45 % remained here because they could get jobs and housing in the region.

Why have you stayed in the region?



Positive and negative valuation of changes in 1968 and 1989 is nearly balanced with negative views of both periods slightly prevailing. It would be considerable complex to interpret the opinion structure notwithstanding the fact that the authors would have to go into politics. We would definitely not presume that all respondents with the negative attitude to the 1968 and 1989 changes necessarily admire the hard-line socialism. We take into account a certain nostalgia of older people who tend to value their past in a more positive way as it relates to their young days and activities, to results of their work. Yet, the explanation cannot be sufficient. The changes of 1989 meant quite logically harder conditions for the older generation in particular, as well as worse conditions for marginal regions. It has been confirmed that the start of market economy in our conditions was inevitably connected with non-ethical and illegal enrichment of especially morally unscrupulous individuals, which showed well even in this region under study. There is no explanation to be found for the prevailing negative valuation of the development in 1968. Nevertheless, we should perhaps take into account a possibility that the question and its formulation were misunderstood.

What is your valuation of changes in your region, related to important periods of time?

YEAR	POSITIVE VALUATION		NEGATIVE VALUATION	
	respondents	%	respondents	%
1968	116	34.12	142	41.76
1989	139	40.88	170	50.00

The best valuation of landscape and environment at the time before World War II is no surprise. Much more surprising is the fact that nearly 39 % of respondents consider the period of socialism to be most favourable for the situation in their region. As to other items, the respondents find the greatest assets in the period of ending socialism, quite understandably for better public transport conditions, but also in terms of general prosperity in the region. The period after 1990 is best valued for good networks of shopping centres and services, which might relate to a successful course of small privatization. Even in this case, however, the end period of socialism has a better valuation.

In which period do you consider the situation best?

	til 1938		1945-48		1950-60	
		%		%		%
landscape and environment	84	24.7	26	7.7	67	19.8
economic prosperity of region	18	5.3	10	2.9	17	5.0
status of village (houses, roads)	8	2.4	7	2.1	17	5.0
network of shops and services	11	3.2	7	2.1	15	4.4
public transport	3	0.9	0	0	13	3.8

	1960-90		after 1990	
		%		%
landscape and environment	65	19.1	33	9.7
economic prosperity of region	189	55.6	30	8.8
status of village (houses, roads)	168	49.4	68	20.0
network of shops and services	132	38.8	104	30.6
public transport	238	70.0	16	4.7

Most of respondents are afraid of the development after 1990 out of mainly economic reasons while only approx. a fifth of them assume that the situation has improved for the generation under study. Nearly two thirds of the inquired fear that their grandchildren will probably have to look for jobs out of the region. The percentage of citizens who believe that prospects of their grandchildren improved in the Vranov/Jemnice region after 1990 does not reach 10 %.

Are you afraid of the development after 1990?

	RESPONDENTS	%
No, the situation has improved for my generation	74	21.76
Yes, mainly due to economic reasons	249	73.24
Yes, mainly due to political reasons	32	9.41

What is your valuation of future possibilities for your grand children to find a job?

	RESPONDENTS	%
Their prospects in the region are better than before 1990	31	9.12
Their prospects in the region are worse than before 1990	110	32.35
There are no prospects for them in the region; they will have to look elsewhere	218	64.12

Only a fifth of respondents value prospects of their region better than before 1990. More than a third of them cannot see any particular change in prospects of their village after 1990, while nearly a half assume that the prospects are worse. It should be mentioned that in fact it is not the valuation of the so far development but rather the valuation of confidence in social changes occurring in the region in the direction of the future.

What is your valuation of future prospects in your village?

	RESPONDENTS	%
Prospects are better than before 1990	71	20.88
Prospects are more or less same as before 1990	125	36.76
Prospects are worse than before 1990	163	47.94

The preceding answers may reflect the fact that marginal regions used to get more than was their production in the process of socialist re-distribution of funds. This is the reason why their situation might subjectively appear worse than in the previous era. On the top of it, the generation of today's grandparents of primary school pupils represents a rather passive group of consumers of resources and means on which they depend. This might be another reason for them to value the present situation as worse than before 1989. This should be a stimulation for politics from both government and opposition parties in order to find an answer to the question of what can be offered to marginal regions in this situation. In other words: it is the highest time to start forcing in actual regional policy in the Czech Republic.

As to the relations with the neighbouring Austria, most of answers have a rather neutral tuning:

What is your valuation of relations with villages and inhabitants of Austria after 1990?

	RESPONDENTS	%
Relations are very good	51	15.00
Relations are both good and bad	153	45.00
Relations are scarce or none	138	40.59
Relations are rather bad	12	3.53

8. Regional differentiation of results

The respondents were divided into three groups: municipalities of the former judicial district of Vranov nad Dyjí (259 answers), municipalities of the former judicial district of Jemnice (225 answers), and the town of Jemnice itself (198 answers). Remaining 28 respondents did not mention the address of their domicile.

Most stabilized is the population of Jemnice district (49.3 % moved in the district after 1950). In the Vranov district and the town of Jemnice the percentage of newly settled persons is 60 %. In the case of Jemnice, this is due to industrialization and concentration of housing estates. The population of Vranov district is little stable due to the exchange of inhabitants after World War II. It can be said that the population of Vranov district has not been stabilized till present. While there are only some 6.5 % of inquired who want to move out of the region in the Jemnice district and in the town of Jemnice, as

many as 18.5 % of respondents in the Vranov district consider the possibility.

Although the percentage of people who changed their jobs after 1989 ranges around 50 % in all subregions, in Jemnice the majority of people changed their jobs voluntarily, while in the Vranov district it was mainly a forced loss of job. This well corresponds with other data. 30.3 % of respondents from Jemnice claim to win a better job while the same feeling have only 22 % of respondents from the Vranov district. As many as 38.6 % of respondents in the Vranov district fear to lose jobs. Only 15.1 % of respondents from the Vranov district are willing to start a kind of private business when possibly losing their jobs (22.2 % in Jemnice). 35.9 %, 22.7 % and 19.6 % are willing to move out of the Vranov district, town of Jemnice and Jemnice district, respectively. The population of rural Jemnice district is most stabilized also thanks to a persisting relation of local population to soil and native land. This is perhaps the reason why the highest percentage (22.2 %) of entrepreneurs can be found in the Jemnice district. The situation of Vranov district is entirely different in this respect: 15.8 % respondents run their own businesses, 47.1 % respondents have never considered a possibility of enterprising, and 8.5 % respondents closed their businesses. The lower standard of living in the Vranov district can be documented by the percentage of families with a car (73.4 %) while in other two subregions it is over 83 %, or the percentage of respondents with no holidays in 1995 due to financial reasons (44.4 %; Jemnice district 32 %, Jemnice town 23 %).

The inhabitants of Jemnice district claim most often that the situation in their municipality changed to the better after 1989 (41.3 %). In the Vranov district the opinion is shared by 34.8 % respondents. In contrast, the highest percentage of people who claim that the situation changed to the worse is in the town of Jemnice (39.4 %). Future prospects are seen black in Jemnice town (66.7 %), the Vranov and Jemnice districts have 56.8 % and 49.3 % pessimists. It seems that the finding goes not entirely in step with objective prospects and is rather based on subjective ideas of individuals. Possibilities of Jemnice town for future prosperity are seen in services (47.0 %) and industry or trades (45.0 %). The future of Jemnice district is unambiguously seen in agriculture (68.9 %), and that of Vranov district in travelling (46.7 %) and agriculture (34.8 %). This is in harmony with general economic characteristics of individual subregions in the model area.

Two thirds of population in both rural subregions complain of worsened public transport connection after 1990. The situation seems to be much worse in the Vranov district since a greater part of population is depending on public transport (24.3 %). In this subregion, 8.9 % respondents claim to visit town only on rare occasions. The Vranov district is thus the most isolated part of the model region. Satisfaction with the network of food

shops exceeds 90 % in Jemnice and ranges about 60 % in the country. An even greater difference between the town and the village shows in satisfaction with the network of shops selling industrial goods (Jemnice 62.6 %, Vranov district 24.7 %, Jemnice district 13.8 %) and with the network of service shops (Jemnice 36.4 %, Jemnice district 9.3 %, Vranov district 8.1 %). This well corresponds with terrain surveys and their findings that some villages in the Jemnice district entirely miss any social facilities, and villages in the Vranov district often have a grocery shop as the only facility.

Opening of border is best perceived in Jemnice (84.6 %) while 31.3 % of respondents in the Vranov district value the change as negative. The population itself cannot tell any positive benefits from the border opening (Vranov district 72.6 %, Jemnice 65.7 %, Jemnice district 62.2 %). 23.2 %, 22.2 % and only 11.2 % of respondents from Jemnice, Jemnice district and Vranov district, resp. travel across the border for knowledge and recreation. 61 % of respondents in the Vranov district complain of prices increased due to the opened border while the same problem annoys less than 20 % of respondents in the Jemnice district and in the town of Jemnice. The Vranov district has the least percentages of Austrian TV viewers and Austrian radio broadcast listeners. 26.3 % of respondents in the Vranov district fear requests for financial compensation of evacuation after World War II, while there are only 23.1 % and 19.2 % respondents with similar fears in the Jemnice district and Jemnice. It appears that the assets from opening of the Austrian border are perceived less with the decreasing distance of the border itself. However, the differences in the answers may also result from different social characteristics of population in the individual subregions.

A similar situation is that in evaluation of questions concerning nature protection. In the Vranov district whose part is located in the Podyjí National Park (Dyje Basin) there is a lower percentage of people considering that nature protection should be preferred to interests of region prosperity (37.8 % or 45 %) and a higher percentage of those who are willing to seek compromises between nature protection and region prosperity (30.5 % or 22 %). This indicates that the subregion with a protected landscape area directly in its territory has a much more dispassionate relation to nature protection than the more distant subregions. This also documents -mildly said- imperfectnesses of Czech regional policy which cannot compensate to regions losses arisen in consequence of taking upon functions that are important for the whole country such as functioning of the state border, large-scale nature protection etc.

9. Differentiation of results according to education of respondents

It is logical that people with primary education are more stabilized in the model region than those with

higher education who exhibit a higher mobility. Alarming is the fact that as many as 14.3 % of university graduates consider a possibility of leaving the region. A difference can be seen in motivation for leaving or staying. While the university graduates perceive the region remoteness as a marked barrier, family and housing links are more important for the people with primary education. Great problems with finding a job have people with secondary education and skilled workers. It is embarrassing at the first sight that the good environment is an argument for staying in 24.7 % inhabitants with primary education and in merely 15.7 % university graduates. However, it will follow further on that great differences exist between the two groups in understanding the environment and its relation to prosperity. The university graduates surprisingly also mention good job opportunities in the region (20 %).

Another logical fact is that prevailing among respondent university graduates are employees (74.3 %) and entrepreneurs (25.7 %) whose opportunities of assertion are good. There are no unemployed in this category. The rate of unemployment among respondents with secondary education, skilled workers and people with primary education is 1.7 %, 6.9 % and 13.0 %, respectively. The greatest percentage of employees have secondary education and university graduates prevail among entrepreneurs. Although an approximately half of respondents in all categories changed their jobs after 1990, the university graduates claim most often a voluntary change. The rate of forced change of job increases with the decreasing education. This relates to numbers of people claiming a change to the better (university graduates 30 %, persons with secondary education about 25 %, persons with primary education 10 %). 60 % of university graduates, 47 % of persons with secondary education, 42 % skilled workers and 39 % persons with primary education do not fear of losing their jobs. The relation to private business improves with the increasing education.

Satisfaction with the existing development in the village as well as views of future prosperity decrease with the increasing education and with only one exception. The so far development is taken for positive by 40 % of university graduates, but only by 30.5 % of citizens with secondary education and 34.8 % skilled workers. Answers to the group of questions about satisfaction with various kinds of social facilities are influenced by the fact that with the increasing education the number of respondents incapable of serious valuation of the situation drops. Also the opened border with Austria is perceived in a more positive way with the increasing education. University graduates are the most frequent visitors to Austria (25.7 %) and persons with secondary education most frequently working in Austria (4 %). The more positive relation to the Austrian neighbour may among other follow out of the fact that the capability of making oneself understood in German increases with

the increasing education as well as the capacity to follow the Austrian media. The increased prices are unpleasant for all categories and the people with lower education are inclined to be more annoyed by the increased movement of foreigners.

Differences in opinions on the relationship between nature protection and regional prosperity vary with the education. The greatest number of people which are convinced of the optimum size of protected landscape areas in the Czech Republic can be found among university graduates (35.7 %) while people with the lower education were usually unable to give any answer. The majority of respondents agreed that the issue of nature protection should be preferred to regional prosperity. The only difference consists in the fact that the university graduates would rather advocate the formulation „to reasonable measure“ while an opinion is growing in categories with lower education that nature protection should be definitely preferred to regional prosperity. The majority of respondents understand protection of environment as a protection of nature against pollution. Protection of environment as a use of nature by man within defined rules is mostly understood by the majority of university graduates (28.6 %) while protection of man and human health is preferred by people with primary education (24.7 %). It appears that the differences between individual education groups do not exist in the sense of whether it is necessary to protect the environment but rather in the concept of this protection. The people with higher education comprehend the protection of environment in a more complex and constructive way while the people with primary education tend to see a one-sided issue. The relation to environment protection can also be illustrated by the structure of active share in these activities where the highest percentage in university graduates (22.9 %) exhibits a steady drop with the decreasing education down to 11.7 % in people with primary education.

Many answers show considerable variations according to education of respondents. There are obviously two factors that play important roles: People with higher education have objectively better conditions on the labour market a better standard of living and naturally a better possibility to find assertion in society. However, there are many subjective differences in the comprehension of problems as well as in the capacity of answering some more complicated questions. People with higher education tend to be more critical to some problems and on the other hand, they can assess the problems in a more objective way and in the wider context.

The issue of stabilization of people with university and secondary education in the region appears to be an alarming factor. It shows that these people are those who are most ready to emigrate. And it is also the secondary educated people and skilled workers who feel a lack of assertion. It is necessary to realize that when

speaking about the stabilization of inhabitants and seats, the issue of quality of this population is a secondary one. People with secondary and higher education represent local elite circles which are capable of influencing the development in the village and thus assisting to retain the remaining population. The other way round, the exodus of educated people, which threatens the villages at present for example in the connexion with restrictions of teacher's jobs and efforts aimed at a so called effectivization of school network, will probably result in a general cultural and social decline of the village in the long run and finally in an economic collapse and exodus of other population categories.

10. Conclusions

The above results of public inquiry depict the opinion level of population in one of the most remote areas of the Czech Republic. Let us bear in mind that they represent opinions not reality which might be entirely different. This is confirmed by results from steered interviews

with mayors or other councillors in all 49 municipalities of the region as well as by other sources. Nevertheless, the opinions of citizens must be taken seriously in the democratic society and worked with.

The problems of life in the region reflect the objective situation which is given by the remoteness of the region under study. Another aspect of the situation is the concrete policy of the state which has so far devoted too little attention to marginal regions and which would urgently need new conceptions in many a sphere. The last but not least important factor is the activity of citizens themselves, who are often not too much prepared to accommodate to new conditions and to influence their local authorities in this direction.

It would be interesting to repeat the survey several years later since the dynamics of further development in politics and economy is considerable in the Czech Republic and individual changes can markedly affect not only the real state of things but also the opinion of population on it.

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Disastrous floods in Moravia and Silesia in July 1997

(A preliminary report on their causes, course and losses)

Jan MUNZAR - Stanislav ONDRÁČEK - Jana TÁBORSKÁ

1. Introduction

Natural disasters occurring on our planet have been considered by the majority of Czech population something that practically never concerns Central Europe. Yet - in July 1997, a period of continuous regional precipitations occurred on approximately 1/3 of the territory of the Czech Republic from 4th-9th July, during which the average daily air temperature ranged up to 4 °C below normal. Hardly anybody could escape this extremely unfavourable weather of culminating summer (reminding by the way the summer monsoon in Asia) since the afflicted territory had a total of over $3 \cdot 10^9$ cubic meters rain water fallen down within this short time period. The worst situation was experienced by inhabitants from the immediate vicinity of the river Odra, river Morava and its tributaries. The floods caused a disaster of extraordinary impact on the territories of Moravia, Silesia and eastern Bohemia (Fig. 1), which had no similarity to compare with in the 20th century, and most probably in the preceding 400 years.

The paper aims at presenting a preliminary but fairly comprehensive information of this natural disaster both from meteorological and hydrological point of view, and from the viewpoint of its time progression and resulting losses. In the conclusion, questions are being discussed whether it was really necessary for nearly 50 people to decease, and whether the enormous material losses could not have been lesser should there have been no improper anthropogenic interventions into the Czech landscape, particularly during the last 50 years.

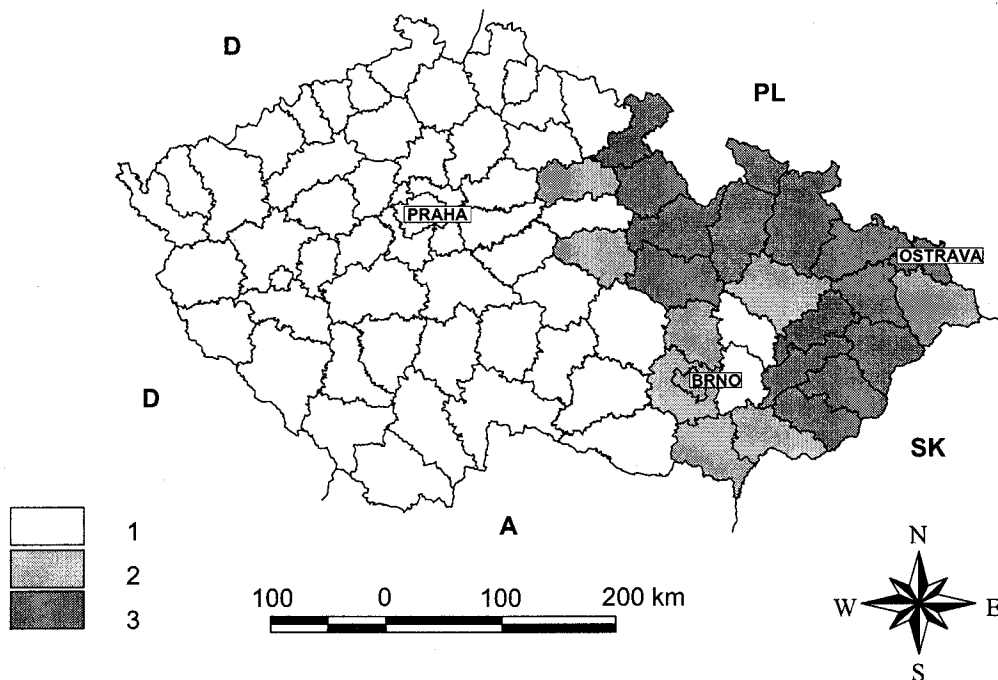


Fig. 1 Floods on the territory of the Czech Republic in July 1997 (1 – districts not affected by floods, 2 – districts a little affected by floods, 3 – districts the most affected by floods)

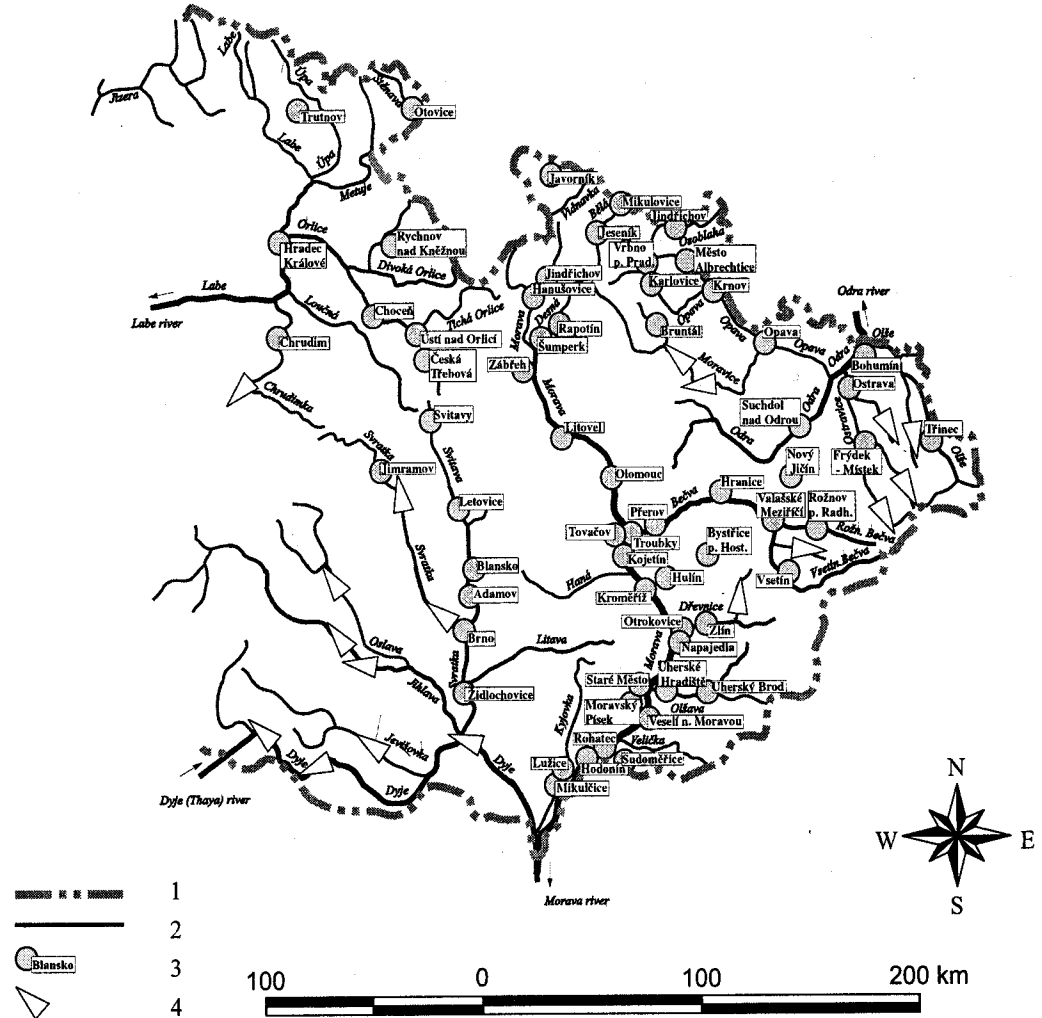


Fig. 2 The settlements with important influence by floods in Moravia, Silesia and Eastern Bohemia (1 – state border, 2 – watercourses, 3 – towns and villages affected, 4 – water reservoirs)

2. Meteorological aspects

A waved cold front passed over the Czech Republic from the SW to NE direction on Friday, 4th July 1997, which manifested by thunderstorms and abundant precipitations on nearly the entire territory. A low-pressure depression arised above the northern Italy on Saturday, 5th July, which progressed towards the NE above the eastern Poland and Silesia, where it dwelled until 9th July. Its rear end was characterized of a strong northern to north-eastern flow. Together with a windward effect on the northern slopes of Jeseníky Mts., Moravskoslezské Beskydy Mts., Krkonoše Mts. and Orlické Mts. conditions were created in these areas for extremely heavy regional rains of lasting character (referred to as „Landregen“ in German meteorological literature).

The record daily totals

Under the above weather situation (which is well known in the old technical literature as the Vb situation - according to W. J. van BEBBER - that is often a cause to great floods) the precipitation records came in no time. The first of them was recorded at the station of Lysá hora Mt. (1317 m, 49°33' N, 18°27' E) which had 234 mm rain from the morning of 6th July until the morning of 7th July 1997. The daily total precipitations became a new absolute daily maximum record from the very beginning of observations carried out at the station exactly a hundred years ago - in July 1897. The hitherto station record of precipitations per 24 hours (212 mm) of 21st August, 1972 was beaten by 22 mm. However, the Lysá hora Mt. station was not the only one to report the total precipitations over

200 mm on 6th July, 1997: the station of Šance - dam measured as much as 230 mm, Rejvíz 214 mm and Frenštát pod Radhoštěm 206 mm (Tab.1).

It was mere 7 mm that the Lysá hora Mt. missed with its this year's record to get over the highest daily total precipitations in the Czech Republic in the 20th century at all: 240 mm at the station of Stará Červená Voda (345 m), situated 10 km North of the district town of Jeseník on 9th July 1903. Even at that time it was not only a „point“ maximum, since on the same day, the Rejvíz station, Bělá pod Pradědem-Domašov and the town of Jeseník reported 221 mm, 218 mm and 200 mm, respectively (Šamaj et al., 1983). To illustrate consequences of the then heavy rains it is worth mentioning that during the resulting flood the water level in the streets of Jeseník reached 152 cm and the river of Bělá which normally has the level of some 100 cm, reached as much as 598 cm! Four town bridges of existing five gave up to the wild water with the fifth one being under water more than 30 hours. Four houses were completely damaged and at least four other ones were half-damaged (Zeman, 1961).

Tab. 1 Daily total precipitations on some stations of northern Moravia and Silesia in the period from 4th-8th July 1997 (Source: Czech Hydrometeorological Institute, 1997a)

Station	Altitude [m]	Daily rainfall [mm]					
		4	5	6	7	8	Σ 4-8
Praděd (Mt.)	1490	11	88	106	139	110	454
Lysá hora (Mt.)	1317	15	61	234	105	171	586
Rejvíz	757	34	84	214	145	36	513
Kunčice	658	14	71	176	146	28	437
Bělá p. P. - Domašov	547	16	101	156	131	35	439
Šance dam	445	15	66	230	99	207	617
Frenštát p. R.	401	10	83	206	91	101	491

The absolute daily maximum, i.e. the so far greatest total daily precipitations on the territory of Czech Republic since the beginning of instrumental measurements was 345 mm. The enormous precipitations were accidentally measured in northern Bohemia (the Jizerské hory Mts. station of Nová Louka /Neuwiese/ near Bedřichov - alt. 780 m) exactly a hundred years ago, on 29th July 1897 (Munzar, 1972). It means that - in comparison with this 24 hours total precipitations- the Czech Republic had in the extreme case by 105 mm less rainfall in the 20th century. It means in fact, that if the measurements were accidentally started a bit later, for example from 1901, we could have hardly admitted a chance of such a high daily total rainfall as in 1897 when processing the observed values by means of mathematic statistics. With the exception of the Alpine area this high value has not been surmounted in Central Europe ever since (Kakos, 1997). It should be regretted that after the original station of Nová Louka - famous by its rainfall record of summer 1897 - has been closed, we can never find out what has been the rainfall total of this locality this year.

Since the cause of the record precipitations from the end of the 19th century was again the mentioned situation Vb, it should be added that the regional rainfalls from the end of July 1897 affected mainly northern Bohemia and were fortunately less abundant in Moravia and Silesia. For example, the stations of Bělá pod Pradědem-Domašov (559 m), Radhošť Mt. and Lysá hora Mt. (holding this year's record) had daily totals of 138 mm, 115 mm and mere 53 mm, respectively on 29th July 1897 (Ergebnisse, 1897; Rodovský, 1997). Remarkable is the fact that the Červená Voda station which became six years later a holder of a so far not beaten national record of the 20th century reported on the same day an unbelievably low total rainfall of 13 mm.

Anyhow, let's go back to the present. Although the largest daily total precipitations were a domain of northern Moravia and Silesia, it was also Central and southern Moravia that were afflicted with heavy regional rains. For example, on the day of the above mentioned station record on the Lysá hora Mt. (6 July, 1997), the stations of Fryšták and Zlín

had 96 mm and 94 mm, respectively. The normally dry southern Moravia had identical rainfalls of 42 mm at the stations in Velké Pavlovice and Strážnice, which means that in one day the two localities reached 66 % and 54 % of monthly normal, resp.

The record 4-day totals

Another example of enormous precipitations concerns 4-day totals. A record 602 mm was measured this year at the gauging station Šance near waterworks on the Ostravice River during 5th-8th July, 1997! Before, the 4-day totals at all stations in the Czech Republic over the last 120 years were max. 451 mm (Nová Louka, 27th-31st July, 1897). If we compare the total with the values measured this July, the difference would be great - some 150 mm. And this is why the recent floods become an extreme (Kakos, 1997).

The 4-day record measured a hundred years ago has however not been exceeded at the only one mentioned station but at three more: the Lysá hora Mt., Frenštát pod Radhoštěm, and Rejvíz had 571 mm, 481 mm and 479 mm, respectively. Let us add for a better illustration that in the mentioned four days the gauging stations of Šance or Lysá hora Mt. had much greater rainfalls than usually measured in the capital of Prague in the whole year.

The second wave of rainfall

When it stopped raining on 9th July, 1997 and water level started to stabilize in rivers and water streams, nobody could guess that the rainfall allocated to the afflicted areas was not exhausted yet and the second portion would come as early as in the same month. In the period from 18th - 22nd July, a very similar meteorological situation arised over Central Europe as ten days ago, synoptic maps being almost identical with the only possible difference in dates. A deep depression, connected with the frontal system, dwelled over the Carpathians, which was only very slowly filled and retreating towards the East. Thanks to the NE flow again, the windward effect showed on the slopes of Krkonoše Mts., Jizerské hory Mts., Jeseníky Mts. and in the Moravskoslezské Beskydy Mts.. However, the greatest total rainfalls affected the north of Bohemia this time, although the precipitations measured in Moravia and Silesia were not negligible. The largest 24 hour totals were those of 18th July (Labská bouda 134 mm, Mísečky 89 mm). The largest 24 hour total rainfalls of 19th July were measured on the stations at Pec pod Sněžkou (117 mm), Labská bouda (105 mm) and Lysá hora Mt. (79 mm). Four day totals for 18-22 July, 1997 were greatest in the stations of Labská bouda (292 mm) and Pec pod Sněžkou (191 mm). In Moravia and Silesia, the Lysá hora Mt. station reached „mere“ 172 mm and the Rejvíz station 162 mm (CHMI, 1997a). Thanks to these facts, the levels and discharges of Moravian streams were fortunately far from reaching the values from the beginning of July 1997.

Extreme character of rainfalls in July 1997

The unusually rainy month of July 1997 can be documented by comparison with long-term normals. If the Lysá hora Mt. had 597 mm rain from 3rd to 9th July, it was 283 % of its monthly normal and 43 % of its annual normal. The July total of the same station (813 mm) represents 385 % of its monthly normal. The 602 mm rainfall on the Šance station for the period between 5th-8th July means that the station had about 75 % rainfall of its annual average in these four days. The month of July 1997 became most abundant in precipitations also in the European context. The territory of Czech Republic had on average 214 mm (240 % of the normal), of which Bohemia got only 172 mm (200 % of the normal), while Moravia and Silesia measured the average of 298 mm (314 % of the normal). Variations in individual localities were sometimes greater than 500 %: e.g. the Rejvíz station had a monthly total of 720 mm which represents 522% of its monthly normal (CHMI, 1997b).

The usually dry southern Moravia was not left behind either. For example, the July total rainfalls of the station in Dyjákovice means 371 % of its long-term monthly normal. With its 221 mm of the July total the Velké Pavlovice station had 316 % of its station normal (CHMI, 1997c). This shows that the extreme rain precipitations were a matter of the whole Moravia.

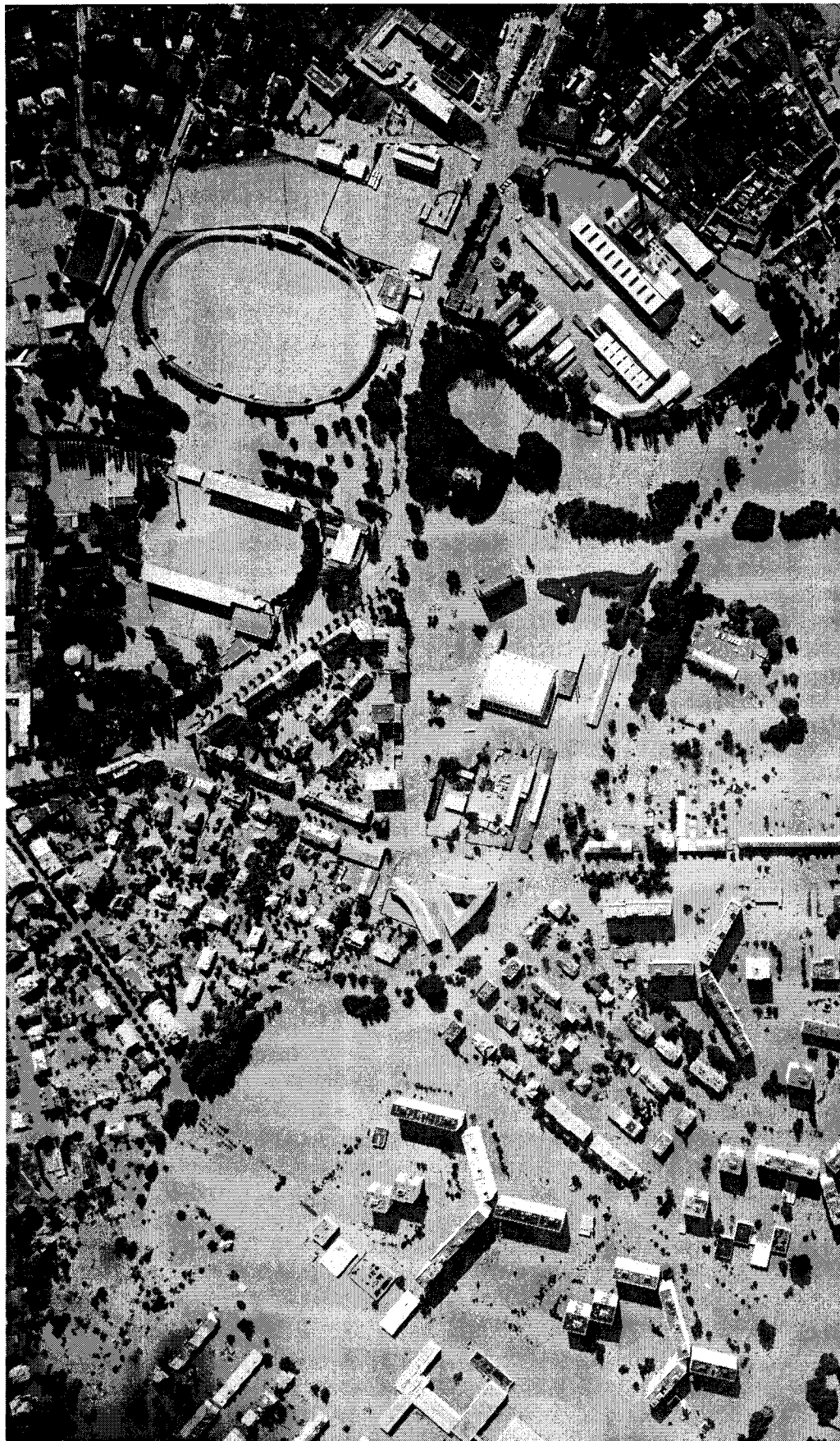


Fig. 3 Aerial photograph of a part of flooded Olomouc down town on Wednesday, 9 July 1997 at 16.42 o'clock on a scale 1:7 000. Two flooded sports grounds can be seen in the left upper corner

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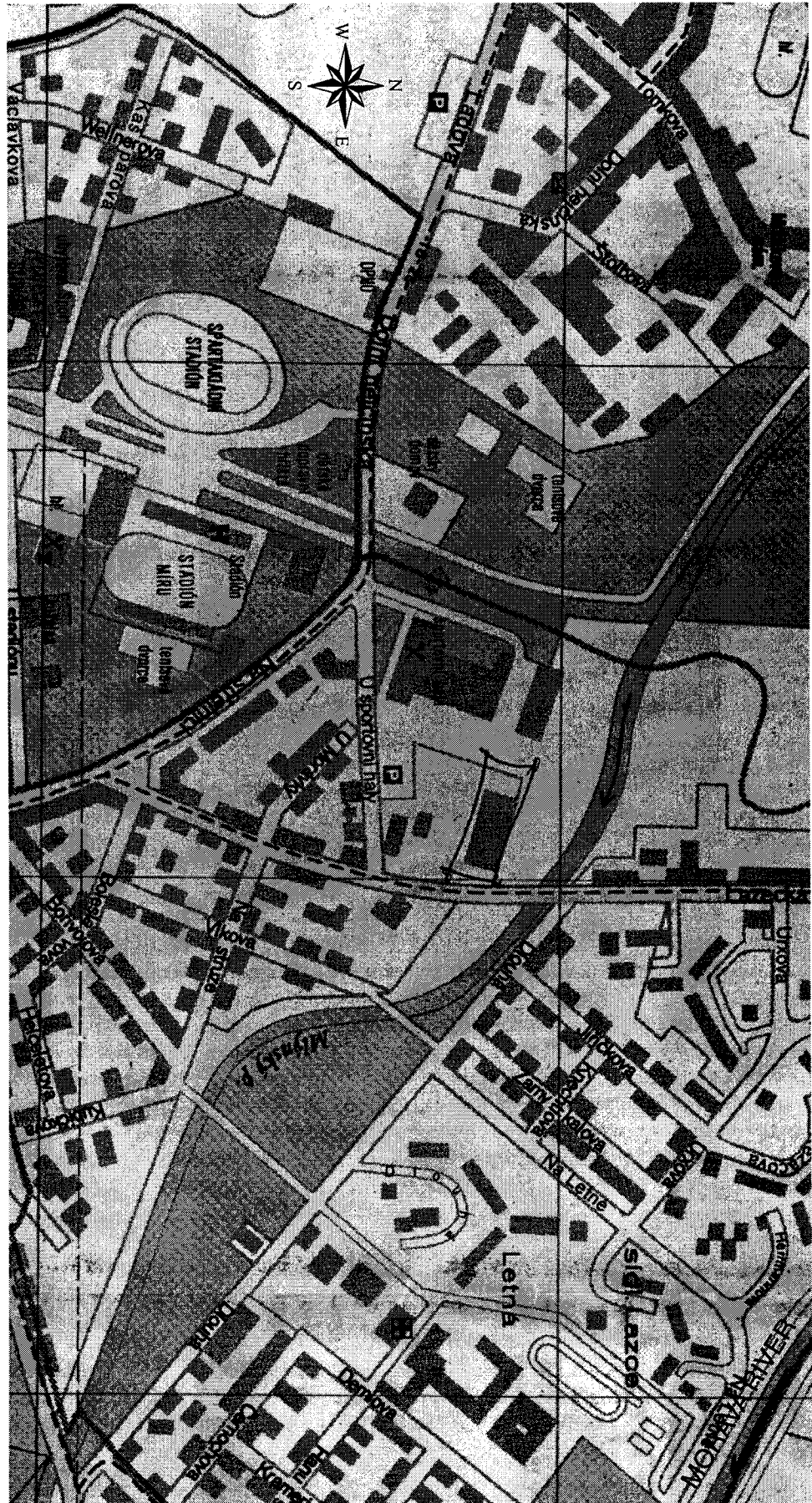


Fig. 4 A section from the town of Olomouc with a delineated area depicted in the previous aerial photograph

3. Hydrological aspects

The summer floods on streams in the natural conditions of Czech Republic can be divided approximately into two types. Relatively frequent are the so called flash floods, destructive floods whose duration is short since they are induced by intensive thunderstorm rains lasting several tens minutes or hours. As a rule, the rains like these affect only limited areas and thus the flash floods usually occur on small streams with water catchment area of up to 100 square kilometers (Hrádek - Ondráček, 1995). Less frequent are floods induced by long lasting rains, which usually affect more extensive territories. This was the case of floods in July 1997.

The extreme runoff and maximum peak discharge records

The atmospheric precipitations measured in the eastern part of the Czech Republic from 4th-9th July 1997 were of an absolutely extreme character. The extreme character mainly due to the fact that the rainfalls were of high intensity, very long duration time, and unusually large area extent at the same time. It is obvious that the extraordinary atmospheric precipitations which fell on the territory saturated with previous rains induced such an extra runoff.

Maximum peak flood discharges on many streams reached values of hundred year flood discharges and even higher, i.e. values that can be repeated on average once in a hundred and more years (Tab. 2).

Tab. 2 Maximum peak discharge values of floods in July 1997 as compared with hundred year flood discharge values and mean discharge values (Kakos, 1997)

Stream	Station	Max. peak discharge July 1997 [m ³ .s ⁻¹]	100-yr flood discharge [m ³ .s ⁻¹]	Mean discharge [m ³ .s ⁻¹]
Elbe	Labská	235	200	2
Opava	Opava	394	361	6
Ostravice	Ostrava	1 240	1 120	14
Odra	Bohumín	2 030	1 590	42
Desná	Šumperk	172	127	4
Bečva	Dluhonice	770	685	17
Morava	Strážnice	820	725	58

The very extreme character of the above values follows from their comparison with mean discharges which seem to be unbelievably low. An example can be the Morava River with its 100-year flood discharge of 725 m³.sec⁻¹ near the town of Strážnice, which represents approximately a 12 times greater value than that of the mean discharge. The discharge was 14 times greater during this year's floods. The Bečva River at Dluhonice has an even greater difference: the 100-year flood discharge of 685 m³.sec⁻¹ represents a value which is 40 times greater than the mean discharge, this year's maximum peak discharge representing an even 45 times greater value. The Opava River in the town of Opava has a 100-year flood discharge which represents a value that is even 60 times greater than that of the mean discharge (this year's floods had a max. peak discharge 65 times greater).

The flood in July 1997 as compared with some most severe floods in Moravia and Silesia in the 20th century

Although a detailed hydrological assessment of the flood from July 1997 is only to be made, the so far knowledge indicates that it was the most extensive and disastrous flood of the 20th century. Moravia and Silesia were affected by several heavy floods during the last hundred years the greatest of them being for example the floods in July 1903, July 1919 and September 1938 (Kříž et al., 1964; Čermák et al., 1970; etc.).

The so far greatest discharges recorded in the Odra River on gauging stations Ostrava-Svinov, Ostrava-Přívov and Bohumín and in the Opava River on the stations Krnov and Děhylov were measured during the floods in July 1903 (Bohumín

1500 m³.sec⁻¹ on 11th July 1903, Děhylov 450 m³.sec⁻¹ on 11th July 1903). The floods in July 1919 made the Bečva River reach the so far greatest recorded discharge on the stations Vsetín, Jarcová, Teplice nad Bečvou and Dluhonice (discharge of 620 m³.sec⁻¹ in Dluhonice, 10th July 1919). The so far greatest discharges recorded in the Morava River on the stations Moravičany, Olomouc and Kroměříž, in the Moštěnka River on the station Prusy and in the Dřevnice River on the station Zlín were measured during the floods in September 1938 (Kroměříž 725 m³.sec⁻¹ on 3rd September 1938, Zlín 275 m³.sec⁻¹ on 2nd September 1938).

During the floods in July 1997 most of the highest discharges in water courses of the affected area recorded so far have been surpassed. Among the floods that affected Moravia and Silesia in this century up to now none has been featured by an area extent and, at the same time, by such a long duration of peak discharges, as this one of July 1997.

The fast progressing flood

Regarding the fact that the rains were abundant and long lasting the floods progressed relatively fast depending on the size of catchment area. In small catchment areas of several tens of square kilometers in size the floods occurred as early as after the very first day of the heavy rains. After two days of steady rains the flood waves on streams reached places with the water catchment area of about several hundred square kilometers, and after three days places with the catchment area of more than a thousand square kilometers. The flood wave on the Morava River progressed from the Jeseníky Mts. (spring montane areas in northern Moravia) to the South of Moravia, the Břeclav district where the Morava River leaves the Czech territory, in about 8 days.

The flood waves clashing on streams

A characteristic feature of the floods in July 1997 was also simultaneous clashing (interference) of flood waves on main streams with flood waves on tributaries, which was mainly caused by the rainfalls affecting a huge area at the same moment. Particularly disastrous and heavy were the floods at river junctions - the fact that cost villages situated in the close vicinity of large river joints a lot. This was the case of the town of Krnov on the confluence of Opava River and Opavice River, the village of Troubky on the confluence of Morava River and Bečva River, the town of Otrokovice on the Morava River and Dřevnice River junction, and also the town of Ostrava situated in the area of an important hydrological joint formed on the confluence of big rivers of Odra, Opava and Ostravice.

Inundations in central and lower courses of the Morava River

The floods in July 1997 represented such a mighty water flush for the area on the central and lower course of river Morava that stream banks, protection dikes and communication embankments were broken open which resulted in extensive inundations of water into areas along the water course, several kilometers in width. This gave rise to vast lakes in which water declined only very slowly and large areas were thus flooded a fairly long time, at some places as long as several weeks. The extensive inundations in the region of Otrokovice were contributed by ill-judged human activities when the bank of Morava was broken through above the town of Otrokovice, most probably as a result of irresponsible mining of river gravel sands that got too close to the water course.

4. The course of floods: Chronology of events from 4th-29th July, 1997

Friday, 4th July 1997: Czech Hydrometeorological Institute (CHMI) issued first warnings about rush rains, over Moravia and Silesia in particular, sending them out to district councils. However, the first warnings were hardly taken seriously by the population.

Saturday, 5th July 1997: The rains appeared to be continual.

Sunday, 6th July 1997: The heavy rains lasted. Flood activity of degree II to III was gradually announced in the North of Moravia. This applied to the entire town districts of Jeseník and Bruntál, to the town of Ostrava on the rivers Odra and Ostravice, and also to several villages at the foothills of the Beskydy Mts. and in the district of Nový Jičín, which

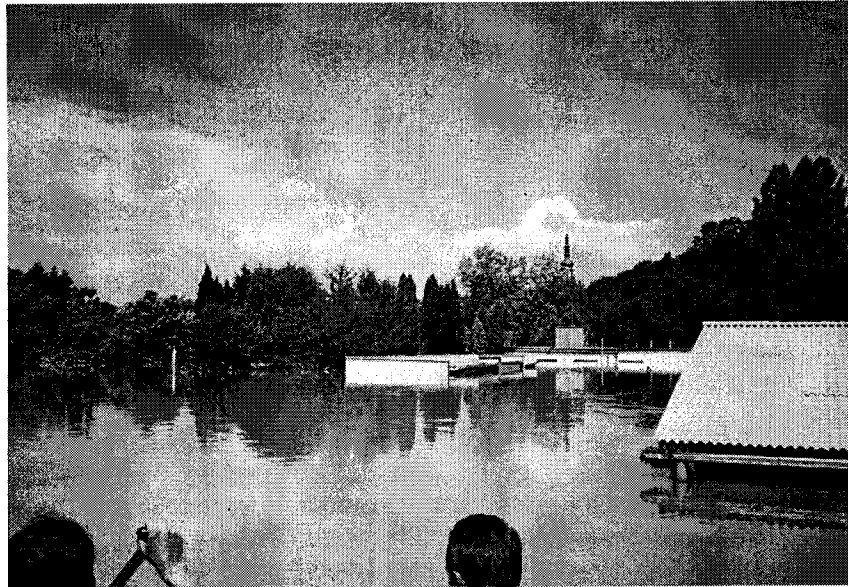


Fig. 5 Three photographs illustrate a gradual drop of water level and emerging buildings with the laboratories of the Institute of Experimental Botany, AS CR, Branch Olomouc, Photos: J. Doležel

were flooded and had to be evacuated. Some roads were blocked. A similar situation could be seen in the catchment area of Bečva River and in the Kroměříž district. Crisis headquarters and crews were organized and district flood committees began to operate.

Monday, 7th July 1997: The heavy rains went on and on. The worst situation was in the districts of Jeseník, Bruntál and Šumperk from where severe floods were reported (people tried to escape the water on roofs of their houses). State of emergency was announced for the rivers Opava and Opavice. The river Odra flooded approximately a third of the town of Ostrava and approximately a half of the Nový Jičín district area. The most afflicted towns in southern Moravia were Otrokovice, Zlín and Hulín. The river Morava flooded surroundings of the towns of Kroměříž and Uherský Ostroh. Flooded were also the lowest parts of the town of Veselí nad Moravou, and the town of Hodonín began to get ready for the flood wave. Nearly all districts in the catchment of Morava River and Odra River (with the exception of the Dyje River) announced the state of emergency - and the river levels went steadily up. Following rivers overflowed in eastern Bohemia: upper course of Elbe, Úpa, Stěnova, Tichá Orlice, Třebovka, Smědá and Jizera. The floods affected the districts of Trutnov, Náchod, Semily, Ústí nad Orlicí, Svitavy, Rychnov nad Kněžnou, the eastern part of the Krkonoše Mts. was cut off.

An international express train from Vienna to Warsaw derailed near the town of Suchdol nad Odrou on Monday close before 13.00 o'clock due to the bridge undermined by water. Thirty persons suffered injuries with seven of them being taken in the hospital. The floods claimed the first victims. Rescuers began to speak of a disaster. The central crisis flood committee started its work.

Tuesday, 8th July 1997: The steady rains continued. The flood wave progressed from the North to the South. However, the rivers still grew up. The situation worsened in the entire region of the Jeseníky Mts., tens of towns and villages suffer, many of them being completely cut-off the world. Evacuation of flooded places took place in the towns of Opava, Ostrava, Bohumín and in the district of Nový Jičín. Flooded were also some villages in the districts of Olomouc and Vsetín. Towns and villages situated below the confluence of Morava River and Bečva River were gradually evacuated and a similar situation could be seen in Otrokovice, Hulín, Veselí nad Moravou and surrounding villages. The evacuation was necessary also in the district of Uherské Hradiště. The river Svratka got out of its banks in the village of Židlochovice. People had to be evacuated in the districts of Ústí nad Orlicí and Rychnov nad Kněžnou. Railway traffic had to be stopped in the Ostrava region. The railway connection between Prague and Ostrava was interrupted due to the blocked railway track from the town of Choceň to the town of Bohumín. 14 international express trains between the Czech Republic and Slovakia were cancelled until recall. Some parts of Moravia started to suffer from the lack of bread and pastries. The first deliveries of humanitarian aid started to arrive. The Polish town of Klodzko was flooded with water. Records informed of eleven drowned persons.

Wednesday, 9th July 1997: It stopped raining in all areas in the afternoon. However, the flood wave exceeded the 100-year discharge in most of the cases. The towns of Jeseník, Krnov and Přerov were isolated already two days. The towns of Opava and Ostrava continued in the evacuation but the rivers apparently declined. The river Morava flooded the towns of Olomouc and Kroměříž, the population was evacuated. In the town of Otrokovice, the dike broke open under the pressure of another flood wave. The evacuation took place also in the town of Veselí nad Moravou. A dike breakage threatened in the town of Hodonín. Water grew up in the village of Lanžhot and the last existing railway connection with Slovakia was endangered. The Svitava River overflow in the towns of Letovice, Blansko and Adamov. Flooded were also some parts of the town of Brno. Many seats, particularly the town of Olomouc, were cut off electricity and gas. Nearly 70 thousand telephone lines were out of operation. In eastern Bohemia, the highest degree of flood activity was announced on the rivers Tichá Orlice, Divoká Orlice, Chrudimka and on the upper course of the Elbe. In contrast, the level of Úpa River declined. In the town of Hradec Králové the dike above the town broke through and water flooded the downtown - even here the state of emergency had to be announced. There were 13 drowned persons reported to the date, many people are missed.

Thursday, 10th July 1997: The water declined in the North of Moravia, the floods expanded to central Moravia. The districts of Jeseník and Bruntál still had some villages cut off. Parts of towns Opava, Ostrava and Olomouc remained under water. The evacuation was still going on in the town of Bohumín, in villages on the river junction of Morava and Bečva, in the Kroměříž and Uherské Hradiště districts. Joined flood waves of Morava River and Bečva River hit the town of Otrokovice and its surroundings early in the morning - the left-bank dike of the Morava River was broken through and so was the recreation reservoir at Štěrковиště. People were evacuated to the town of Zlín. In eastern Bohemia, the rivers returned back to their beds. The flood degree III lasted only in the region of Ústí nad

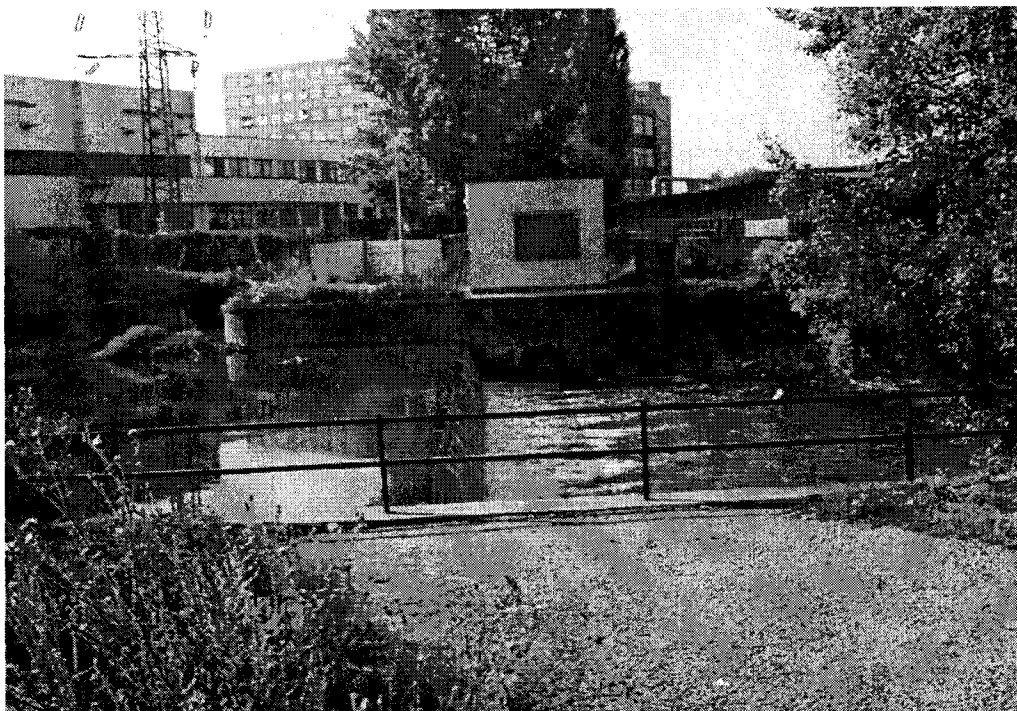
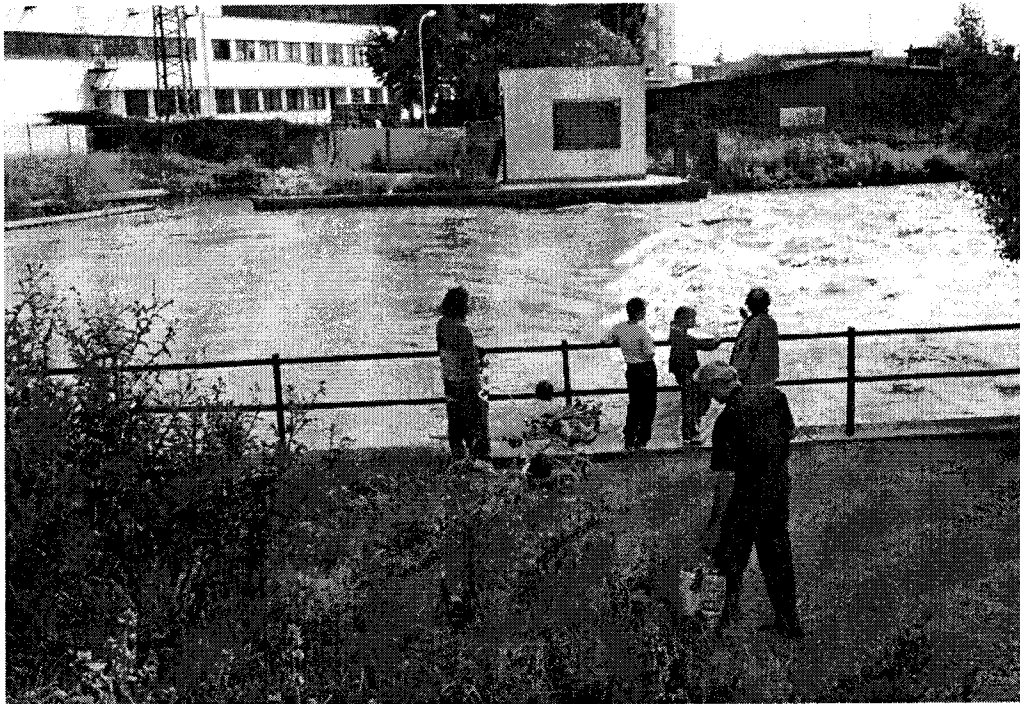


Fig. 6 The Svitava River water level on the weir in Brno-Husovice on Wednesday, 9th July 1997 as compared with the normal a month after the flood - in August 1997, Photos: J. Karásek

Orlicí. News spoke of 18 drowned persons. The danger of floods was reported also from Poland.

Friday, 11th July 1997: Opava, Ostrava and Bohumín were still partly flooded. In Kroměříž, water declined but only to the 100-year discharge. Water decline was expected also in Otrokovice. In the town of Uherské Hradiště the flood broke open dikes on the Morava River and some ten thousand people had to be evacuated. In the town of Veselí nad Moravou and in the town of Hodonín the flood wave arrival was still waited for. The flood victims grew to 23.

Saturday, 12th July - Sunday, 13th July 1997: The flood activity degree III was still in force for the rivers Odra and Opava. River levels in the districts of Frýdek-Místek, Nový Jičín and Přerov approached their normal values. The levels of rivers in the Vsetín district declined. The marked water decline could also be seen in the districts of Kroměříž and Zlín. Water slowly declined also in the town of Otrokovice. The town of Uherské Hradiště was flooded from Friday to Saturday, the local hospital was evacuated. Flooded was also the town of Staré Město. The towns of Moravský Písek, Veselí nad Moravou and Bzenec were flooded on Saturday. On Sunday, the evacuation began of 7 000 inhabitants from the town of Hodonín where the state of emergency was announced. The town of Břeclav started to prepare for the flood, which was not so far affected thanks to channelling the water into floodplain forests. All water courses in the Elbe catchment area had levels dropping. The number of victims grew to 32. The floods afflicted also the Polish town Wrocław where the dike on the river Odra broke through. Poland reported 28 victims.

Monday, 14th July 1997: Water declined in Kroměříž and Uherské Hradiště. Moravský Písek, Veselí nad Moravou and Rohatec were still under water. The town of Hodonín had a third of population evacuated. The water reservoir at Plumlov prevented the floods come to the district of Prostějov. 38 victims.

Tuesday, 15th July 1997: The river Morava declined near Strážnice and Hodonín. The dike on the river Morava at village Lužice near the town of Hodonín broke through, water spread on meadows flooding also the southern part of Hodonín, entering two oil wells in the Lužice cadaster and forcing the oil out of them which was mainly brought downstream. The village of Lanžhot remained the only border crossing to Slovakia for lorry transport. The floods had 43 victims so far and 4 persons were missing.

Wednesday, 16th July 1997: The water was slowly leaving the town of Otrokovice. The level near Hodonín was dropping as well but the danger still existed. However, the inhabitants started to return back to their homes. Yet, the level of Kyjovka River was growing steadily, putting into danger the villages of Kostice, Tvrdonice and Lanžhot. A lake came into existence between the rivers Kyjovka and Morava south of Hodonín. The number of victims was 44. The flood wave on the river Odra headed from Poland towards the town of Frankfurt an Oder in Germany. Poland had 43 victims and 3 missing persons to the date, 86 towns were under water. The flood activity degree III was announced on the lower course of the river Morava in Slovakia.

Thursday, 17th July 1997: Meteorological forecasts spoke of further abundant rains during the weekend, water managers started to release water from dam reservoirs. The flood danger in Hodonín still lasted. In Germany, the river Oder (Odra) was being relieved through flooding polders, the Polish side of the border had to evacuate. The border crossing between Germany and Poland in the town of Frankfurt an Oder was closed. Czech Police announced 46 killed, Poland had 48 victims to the date.

Friday, 18th July 1997: The central flood committee residing in Olomouc had planned to close its activities. However, due to the meteorological prognoses which spurred on circumspection, a decision was made to prolong the work. It began to rain again during the day. Water managers further lowered the water level in dam reservoirs.

Saturday, 19th July 1997: It is raining heavily over the entire area of Moravia and Silesia, the maximum rainfall values moved to Bohemia and SW Poland, though. Small mountain rivers in the Krkonoše Mts. overflow their banks and evacuation of inhabitants was inevitable. Flood activities of various degrees were again announced in many Moravian towns and villages. Repairs had to be stopped.

Sunday, 20th July 1997: In the night before Sunday, the flood activity degree II was again announced in the village of Troubky, the so far most afflicted village in the Czech Republic. The degree III - state of emergency was announced by the district flood committee in the town of Přerov. The level of the river Oder (Odra) in Germany was stabilized. Nevertheless, the river still presented a danger to its surroundings.

Monday, 21st July 1997: The second evacuation in 14 days had to be made in the town of Otrokovice. The railway track on which the international express train from the town of Vienna to the town of Warsaw derailed on 7th July was made passable again.

Thursday, 24th July 1997: The central flood committee dissolved its crisis headquarters. Flood protection and liquidation of losses stopped to be coordinated from the center. Flocks of mosquitoes began to be a disaster for the flooded areas. The 48 victims killed during the floods were commemorated by a minute silence in the whole Czech Republic at 12.00 o'clock.

Tuesday, 29th July 1997: State of emergency was cancelled in the last district of the Czech Republic - Břeclav.

5. A brief summary of losses

The latest official estimates of in numbers expressible losses due to the July floods speak of 60 billion CZK, i.e. nearly 2 billion USD. Let's try to make a brief summary:

- 538 towns and villages were affected in 34 districts of the Czech Republic. 49 persons were killed (the last victim was found as late as a month after beginning of the floods).
- The most afflicted locality was most probably the village of Troubky (Přerov district) with the population of 2 070, where 9 persons were killed. The village is situated on the river junction of Morava and Bečva where hundred year waters from both floods met in a synchronized way and were summed up which is a case not remembered by historical records. In addition, the peak maximum occurred at night when people were sleeping. Of 625 houses in the village more than 200 were taken down by water and 4 streets were totally levelled with ground - i.e. 1/3. Other houses were damaged and irreparable, 20 000 heads of poultry were drowned, etc.
- 2 151 flats were destroyed, 5 652 flats became uninhabitable for a long period of time, other more than 11 000 flats were damaged, some 10 000 persons had merely provisional accommodation after having been evacuated.
- 25 railway bridges were totally destroyed, 946 km of railway tracks and 13 railway stations were seriously damaged.
- 51 road bridges and 12 km of roads were totally destroyed, 580 km of roads were severely damaged. Some 2 000 km of roads were impassable.
- 100 000 telephone stations were either totally destroyed or temporarily put out of operation.
- Approximately 100 000 hectares of farming land of the total area of 4.2 million ha in the country, i.e. some 2.5 % were flooded. However, in some submontane regions this was as much as 1/3 of the farming land acreage. In addition to immediate losses on this year's crop, thousands tons of arable land were washed away.
- Drowned animals were as follows: 291 heads of cattle, 2 928 pigs, 20 horses, 200 000 heads of poultry, 5 652 fur animals, 31 232 small animals, etc.

Losses inexpressible in numbers form a separate chapter, which means that the final list cannot be considered closed to the date of working out this paper. Here we should find losses due to contaminated sources of drinking water and losses due to interrupted water supply, impacts of land slides (120 land slides occurred only in the district of Vsetín where houses, roads and civil networks have been breaking until now). Many of destroyed enterprises and establishments cease to exist which results in job losses, markedly reduced tax payment and the like.

It should be noted that the published figures cannot express all since there are hundreds and thousands of human fates, life decisions and reconciliations with irreplaceable losses, in some cases also permanent mental psychological effects in people immediately afflicted by the floods.

The category of the difficult-to-assess losses will undoubtedly also include losses suffered by Czech science due to total flooding of groundfloor buildings belonging to the Olomouc branch of the Institute of Experimental Botany, CR Academy of Science. Although efforts of workers to rescue at least the most valuable articles were great, the unexpected flood paralyzed both the Laboratory of Molecular Cytogenetics and Cytometry and the Laboratory of In Vitro Genetic Manipulations, the first mentioned being one of two laboratories in the world successfully dealing with the issue of inherited information in plants with target orientation on the most important commercial crop - cereals. Similarly, the second laboratory which is specialized in cloning plants to obtain quickly the genetically pure individuals for breeding has been internationally recognized for generating a respectable gene databank.

When the water declined (see photo documentation by Jaroslav Doležel), elementary ruination could be stated at the first detailed inspection of the workplace a week after peak flood. Deputy director Jan Krekule compared the flood results to a bomb explosion as he experienced the last war air-raid in February 1945. At that time, the floors were also full of glass, etc. but the present sticky coat of mud was missing. The omnipresent water did not save even the pride of the Institute - flow cytometer FACS Vantage enabling fast analysis and classification of chromosomes. It was only a valuable gene bank of banana trees that has survived in the glasshouse. This was all that was left of the gene databank. Tens of thousand pollen embryos grown in glass were taken away by water forever, the rest of them were covered with fungi. What can be expressed in numbers is only the purchasing price of cytometer - 7.5 million CZK (ca. 220 000 USD), and possibly prices of other laboratory equipments and instrumentation. Months and years of wasted research can never be expressed in numbers. What has been left is the concern about reconstruction and a permanent memento how very easily the TV viewer of action situations can appear right in their middle (Krekule, 1997).

6. The issue of the share of anthropogenic factors in the course of floods and losses (man-made impact)

Although the atmospheric precipitations which induced the floods in July 1997 were of an extreme character, it must be mentioned in connection with this national disaster, at least very briefly, that it is many times man himself who can worsen the course of floods and flood losses by his ill-judged interventions in the landscape. Extensive negative measures in the landscape were made mainly in the second half of the 20th century and relate to socialist intensification of agricultural production. Improper land treatment methods, systematic large-scale drainage of farming land, improper reconstructions of river channels, disastrous devastation of forests by air pollution with no analogy to be found in the country's history - these are examples of interventions in the landscape, which undoubtedly resulted in lower retention and retardation capacities of the landscape, thus accelerating water runoff from the fallen rain. To a certain extent, these interventions changed the regime of rivers in such a way that the maximum peak discharge is greater at the time of floods, and in the dry period the low discharge is much lower than it could have been under the unchanged natural condition (Munzar - Ondráček, 1995).

Sober estimates made by the Agency of Nature and Landscape Protection indicate that some 4 000 kilometers of greenery along streams, 3 600 hectares of scattered greenery (individually growing trees and shrubs - game refuges) and 240 000 hectares of balks which were ploughed disappeared in the interest of creating large „kolkhoz“ tracts of land only in the period 1960-1990. The accelerated runoff is also contributed to by the low permeable soil of fields, which was compacted by the heavy farm machinery for many years, not speaking of straightened and paved hundreds of kilometers of stream and river beds. The socialist era ceased to use the so called heaven eyes, i.e. flatulence ponds which were in the past filled only with abundant rainfalls and served to retardation of a part of flood water in the given landscape. They were gradually silted up with mud and their sluice-gates gave up to the tooth of time.

The degree of flood emergency in the town of Kroměříž could have been lower should a system of old underground drainage galleries have been still existing whose mainte-

nance ended with the decline of their last warden. An attempt at their use failed due to time shortage and lack of sufficient knowledge about their function and handling procedures. The bank of river Morava above Otrokovice could most probably have been saved as well if the locality were not used for mining gravel sands by the Gründer method. In spite of the fact that the Water Law prescribed the minimum distance from the stream to be 200 m, the mining was made as close to the river as at 50 m. Another example can be losses on houses in the village of Troubky, which could have been lower should the houses in the most endangered part of the village have not been built exclusively of unburnt bricks - adobes. This year's water defeated both the old houses that were made all of clay bricks, and those with later extensions for the „young“ built of burnt bricks on the flimsy groundfloor. Those who remember in Troubky also point out on impacts due to improperly ploughed areas of the then permanent grassland in the close vicinity of water courses.

A fact of no lesser importance, which participated on the size of losses, was the location of buildings too close to water courses, in inundation areas which are naturally flooded - to a different extent and different frequency. The objects situated in this way are then flooded as a rule under extreme rainfall and runoff conditions and situations (e.g. in Ostrava-Nová Ves, the neighbourhood unit „Bahňák“ /marsh/ in Otrokovice), and often entirely deteriorate. The debris from destroyed structures (warehouses, garages, rabbit-hutches, sheds and fences) usually forms unwanted barriers on bridges, weirs, flood-gates as well as in unkept parts of river beds, which can further rise the water level. The barriers can break through in the course of the flood and thus cause other discharge waves which can only hardly be predicted.

The flood protection in the great majority of seats is far from being what it was supposed to be. It appears that not even the capital of Prague is prepared to take the 100-year discharge. Should similar hydrometeorological conditions occur at present as those during the flood of September 1890, the level of river Moldau would increase by 1 m higher than at that time due to the changed profile, legal and illegal constructions in the inundation area, regardless of the Moldau cascade, and a considerable part of the historical Prague center would be flooded (Munzar, 1995). The important towns affected by this year's floods such as Olomouc, Kroměříž, Otrokovice, Uherské Hradiště, Ostrava and Opava deserve to build such a complex of protective elements that would provide a sufficient protection for these seats from at least the hundred-year flood discharges.

A chronological survey of historical floods on the rivers Morava and Odra with concrete consequences could be a good contribution for a seriously made assessment of long-term interactions between floods on the one hand and man, his seats and landscape on the other hand. The recent attempts made so far include a catalogue of historical floods on the lower course of the river Ohře with loss records since 1359 in Bohemia (Munzar - Pařez, 1997).

7. Conclusion

The events of July 1997 in Moravia and Silesia can be compared to the war front passage since results of natural disasters differ only little from those of a military expedition of an aggressor - fallen bridges, ruined homes, paralyzed production facilities and people crying over having lost all what they had, even their nearest.

Fortunately, human solidarity showed similarly as after the war. Those who closely escaped the flood themselves helped the flooded out neighbours and various forms of assistance were provided also by people from more distant regions of the country, who were saved by the flood. Appreciable examples of borderland cooperation appeared soon. When the gas main in the territory of Jeseník district was damaged by the flood, the town of Javorník was suddenly without bread, pastry and milk because the local bakery was heated by gas and supplies from the district town were impossible due to the damaged bridge in the village of Žulová. The difficult situation was cured both thanks to the new border crossing to Poland near the village of Bílý Potok (opened after political change in November 1989), and the initiative of private tradesmen who quickly replaced the missing

food articles by importing them from the nearby Polish village of Paczkow. On the other hand, when water sources got contaminated in Paczkow shortly afterwards, Polish citizens were coming to Javorník for drinking water.

The natural disasters never come in handy. However, this year's disastrous floods paralyze the Czech economy at the time of its recession and budget savings. An old proverb says that the bad luck arrives on horse and leaves on foot. It will take several years to cure losses after the disaster that took several days. These remedial steps should not mean a mere restoration of the original infrastructure, houses and production facilities. It is desirable to attempt at a renewal of sound landscape management along with a start of sustainable development for the next millennium. All this could be contributed to by an actually complex analysis of the issue worked out by experts in relevant disciplines and professions including the CR Academy of Sciences and universities.

This region of Central Europe has always suffered with floods and it can be expected that the floods will occur here in the future again. Big floods cannot be prevented. As it was the case of this year's ones which resulted from extremely abundant and long-lasting regional rains on the territory of several thousand square kilometers and which simultaneously affected the catchment areas of Odra and Morava. Nevertheless, it is possible to have a better protection and thus reduce the danger and losses. Severity of this year's flood disaster imposes a duty on both government authorities and individuals to mobilize all powers available in order to minimize future losses. This means to draft and gradually implement a scientifically substantiated yet financially feasible system of flood protection.

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Two Important Geomorphological Conferences in Europe in 1996-1997

Mojmír HRÁDEK - Karel KIRCHNER

There were two important geomorphological conferences held by International Association of Geomorphologists - IAG in the course of the last two years: the European Regional Geomorphological Conference was held in Budapest, Hungary from 9th-12th April, 1996, and the 4th International Conference on Geomorphology took place in Bologna in the term 28th August-3rd September 1997. Both events do deserve attention of Czech geomorphologists since they inform of the present situation in geomorphology and characterize new trends of research in this discipline.

The Conference in Budapest was organized by geomorphologists from the Geographical Research Institute of Hungarian Academy of Sciences and was of a rather chamber character in terms of its extent. Its topic concerned the links between geomorphology and the occurring changes of environment in Europe, particularly in Central European countries. A brief account about the Conference was presented by Červinka (1996) and this is the reason why the submitted paper attempts at a closer organization of thematic verbal presentations and posters.

The opening ceremony in the house of Presidium of Hungarian Academy of Sciences in Budapest was followed by presentations of major plenary papers. Professor Márton



Fig. 1 The opening ceremony of the 4th International Conference on Geomorphology was held in the ancient assembly hall of the University of Bologna, Santa Lucia Hall. Members of the former Executive Committee (from the left): by the speaker's counter Prof. Olav Slaymaker (Canada) - Vice-President and new President of IAG, Prof. Mario Panizza (Italy) - new Vice-President, Prof. Denys Brunsten (UK) - resigning member of the Committee, Dr. Robert Allison (UK) - resigning Secretary, Prof. Victor R. Baker (U.S.A.) - resigning treasurer, Prof. Avijit Gupta (Singapore) - resigning publicity officer, Prof. Takasuke Suzuki (Japan) - member of Committee.

Photo: M. Hrádek

Pécsi took responsibility for an introductory survey of the development of planation surfaces, controlled by tectonic and erosion cycles. A specific topic was the suggestion of tectonic evolution of inner Carpathian and outer Carpathian basins in the Miocene. Great attention was given to the paper of Victor R. Baker from the U.S.A., concerning the importance of research into natural risks, especially floods „Geomorphology and global habitability of the Earth“.

The workshop in thematically oriented sections took place in Veszprém near the Balaton Lake. Contributions presented at the Workshop can be summarized into following blocks:

1 Fluvial geomorphology, rivers under anthropogenic impact. The majority of papers dealt with the dynamics of alluvial plain development, dependence of fluvial form development on climatic changes, study of fluvial sediment chemistry, river channel reconstructions, changes of river bed parameters due to economic activities, prognosing of relief changes in consequence of disastrous floods. Very interesting was for example the paper presented by J. Hagedorn, dealing with the development of floodplains of smaller rivers in Lower Saxony.

2 Geomorphological risks and soil erosion. There were many papers in this thematic block, which concentrated on the issue of slope instability and slope processes for example in Central Italy, flysch Carpathians, Central Germany, problems of mapping slope deformations, and GIS applications. Interesting within the topic of soil erosion were papers presenting the recent knowledge about soil erosion on agricultural terraces of mountainous areas in Israel and Peru (M. Inbar) or about the relation between soil erosion and surface runoff or wind erosion forecasting possibilities.

3 The Quaternary landscape development, global climatic changes, recent geomorphological processes. The thematic block included a wide range of papers dealing with the dynamics of Quaternary relief evolution, paleoecological assessment of loesses and their granulometry, changes of natural conditions on the Pleistocene-Holocene border, climatic changes and land use, regional features of global climatic changes in Hungary, fluctuation of sea level in North China in the late Glacial. Periglacial and cryogenic processes were assessed from the viewpoint of both the past and the present within the scope of recent geomorphological processes, and the role of fault tectonics in Hungary was pointed out.

4 Geomorphological and geoecological mapping, nature protection and environment protection, geomorphology and development. The contents of sessions was tackled by contributions of mostly Hungarian authors, which dealt with the protection of natural and anthropogenic landscapes, geomorphological risks of environment, application of geomorphological mapping at finding solutions to environmental problems and use of remote sensing materials for geomorphological mapping. Attention was paid also to geomorphological aspects as related to regional planning and possibilities of environmental management.

Short blocks were devoted to karst geomorphology (contributions on the issue of karst areas in Hungary), volcanic forms (planation surfaces on volcanites, basic features of Miocene pyroclastics in Hungary).

A day excursion was organized for conference participants in the area of Balaton Lake and Bakony Mts., prepared by Prof. Pécsi and his team.

The regional conference was attended by more than a hundred of experts from 25 countries. The majority of participants came from Europe. The home environment and its advantages were fully used by Hungarian geomorphologists whose attendance was higher than 65 participants with a very high percentage of young specialists not only from Budapest. Poland and Rumania also had quite numerous representations. In contrast, there were only four experts from the Czech Republic, who took part in the Conference: Pavel Červinka and Vít Vilímek from the Department of Physical Geography and Geoecology, Faculty of Natural Sciences, Charles' University Prague, and Mojmír Hrádek and Karel Kirchner from the Institute of Geonics, Czech Academy of Sciences, Branch Brno - who had oral presentations in sections. It is possible to state that the Conference in Vesz-

prém has fulfilled its purpose and that the Central European geomorphological issue has been successfully presented.

The fourth International Geomorphological Conference, organized by International Association of Geomorphologists jointly with the Italian national group of physical geography and geomorphology - Gruppo Nazionale Geografia Fisica e Geomorfologia del Consiglio Nazionale delle Ricerche was held in Bologna, the town with the oldest European university founded in 1119, after Manchester (UK), Frankfurt a. M. (Germany) and Hamilton (Canada) from 28th August-4th September, 1997. There were only two representatives from the Czech Republic in the Conference - M. Hrádek and K. Kirchner from the Institute of Geonics, Czech Academy of Sciences - who presented results of their grant projects in sections of applied and tectonic geomorphology in the form of posters and were given an opportunity of learning the standard, extent and scope of geomorphological research currently made in Europe and in the world.

With the exception of opening and closing ceremonies in the ancient Santa Lucia Hall, the fourth International Geomorphological Conference in Bologna was held in the facilities of the Institute of Physics, University of Bologna and it was officially attended by 969 experts from 67 countries. Due to this huge number of participants, the meeting was split into sections and symposia where the majority of presentations had to be made by posters. Only a minor part of them were featured as verbal presentations during introductory parts of the meeting in sections and symposia, with only a few key topics of theoretical geomorphology presented by prominent experts such as Castiglioni, Ollier, Starkel, Netto having been chosen for plenary presentations which made the programme more colourful each afternoon before the opening of section workshops. This made the scientific presentation very dynamic with each section or symposium having only presentations of fundamental scientific or regional significance (chosen by organizers' good will). Main discussions took place around the posters which linked up with the morning and afternoon workshops. The section meetings and symposia were held at the same time, which made it rather difficult to take part in all. A useful guide were well equipped Proceedings of

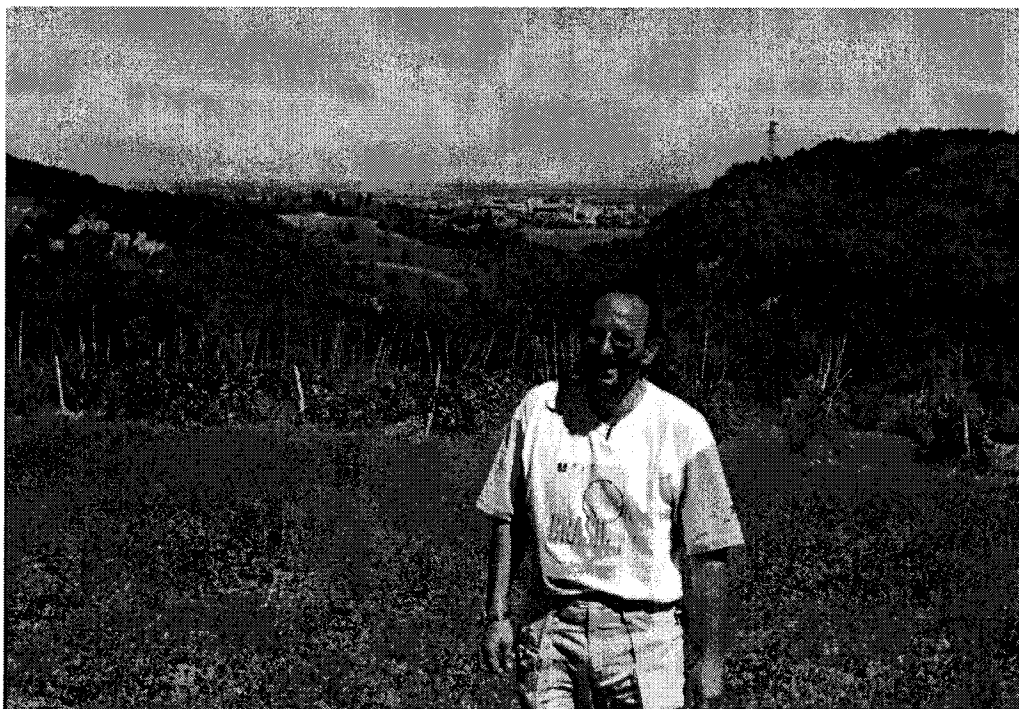


Fig. 2 Prof. Carlo Forti from Bologna - Secretary General of the 4th International Conference IAG at providing an explication on gypsum karst during the excursion into Bologna surroundings. Behind Prof. Forti there is a blind valley with cave entrances, the town of Bologna in the background, situated on the edge of Po Lowland.

Photo: M. Hrádek

Conference Abstracts. There were only one-day excursions organized during the session, fully covered by participants, which included trips of either historical or geographical orientation (Bologna surroundings, the Po Lowland, the Apennines). A greater number of these excursions held before and after the Conference were however too expensive for participants from Central Europe.

Conference workshops were held in sections of glacial, arid and semi-arid, fluvial, tectonic, litoral and submarine, tropical, periglacial, karst, theoretical and applied geomorphology and included a whole range of geomorphological topics and regions. Symposia were rather devoted to global geomorphological issues: Geomorphology and assessment of environment, Methods and tools in geomorphology, Geomorphology and global changes, Management of land-slide areas, Weathering and soils, Geomorphology and global tectonics, Antarctic geomorphology, Intensity and frequency of phenomena in geomorphology. A certain disadvantage of the section of applied geomorphology was its diversity which was also given by the attendance of experts in many different disciplines. It would perhaps been better to add these contributions to the discipline on which they were based, for example applications of tectonic geomorphology to tectonic geomorphology etc.

Another event held within the scope of the Conference was the 28th Binghampton Symposium „Changing the face of the Earth - Engineering Geomorphology“, a Workshop of young geomorphologists and a round table on geomorphological hazards and European strategies. In addition to planned meetings, there were also ad hoc meetings of regional geomorphological configurations (e.g. a workshop of geomorphologists of Latin America, a meeting of Carpathian-Balkan Geomorphological Committee).

The Conference confirmed the leading position of English and American geomorphology both in terms of professional scope and regional coverage. The domestic Italian geomorphology whose technical base Gruppo Nazionale Geografia Fisica e Geomorfologia has as many as 300 members and ranks with the strongest in Europe after the British Geomorphological Group presented itself with a high professional standard, wide engagement and practical applications. A traditionally high exact level of knowledge was presented by Japanese participants - organizers of the next 5th International Conference on Geomorphology in 2001, but also French and German participants, and surprisingly also experts from Brazil and Poland. Due to the already mentioned high Conference fees the Russian representation was very low.

The positive trend of increasing high professional skills in young generation where university graduates from western universities and their post-graduate students play a leading role was a pleasant finding for all Conference participants. It appears that exactness of approaches (laboratory research, field measurements, process modelling, methods of dating, use of computers, etc.) to investigated phenomena becomes a matter of course for these young experts.

The Conference elected a new I.A.G. Committee with Olav Slaymaker (Canada) at the head, who took turn after Dietrich Barsch (Germany). Estimation of Italian geomorphology was electing Mario Panizza the IAG vice-president. Piotr Migon from the University of Wroclaw (Poland) became a Secretary, which was also meant as an esteem of Polish geomorphology. Victor Baker was replaced by B. Dumas (France) in his function of treasurer. Ms. Christine Embleton-Hamann from Vienna was elected a Committee Member for publication activities. Honorary fellowship for long-term scientific activity in geomorphology was conferred to Anders Rapp (Sweden), Denis Brunsten (UK) and Luna B. Leopold (U.S.A.).

Conclusions from the two conferences are not too encouraging for Czech geomorphology since its backwardness is too visible even at the Central European level - behind Poland, Hungary and even Rumania. Should we compare for example the number of Czech geomorphologists engaged at the 1994 IGU Regional Conference in Prague with comparable Hungarians at the 1996 Conference in Budapest and Veszprém, the result would be certainly crushing. As to the scope and standard of research, the long period of one-sided orientation to the issue of regionalization had to show as well. Czech geomorphologists should start looking for ways out of this ridiculous situation.

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The 2nd MORAVIAN GEOGRAPHICAL CONFERENCE CONGEO '97 Rural Geography and Environment held in Valtice, 15-19 September 1997

Vítězslav NOVÁČEK - Antonín VAISHAR

The second Moravian Geographical Conference CONGEO '97 was held in Valtice, a picturesque South Moravian town, in Mid-September 1997. The venue was a cosy environment of Hotel Apollon which could provide all necessary background services. The Conference included an exhibition of several tens of colour aerial photographs as an illustration of the character of South Moravian rural landscape. Main organizer of the Conference was the Brno branch of the Institute of Geonics, CR Academy of Sciences in collaboration with the association Geokonfin. The carrier topic of the Conference was the issue of the present rural landscape and its relationship to environment. Technical scope of the Conference whose name was „Rural Geography and Environment“ included following groups of problems:

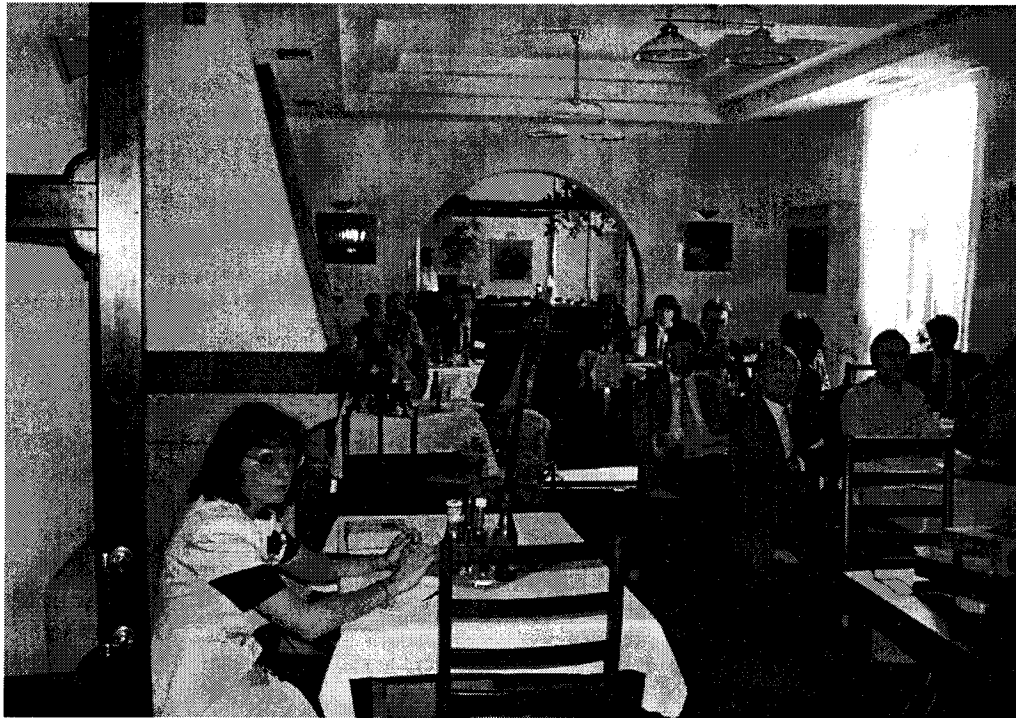
- natural and social environment in rural regions,
- cultural landscape and sustainability,
- marginality and demographic degradation,
- environmental perception in rural space,
- new prosperity for rural regions, etc.

CONGEO '97 was a successful follow-up event to the 1st Moravian Geographical Conference held in Brno in September 1995. The second Moravian Geographical Conference was attended by 38 official participants of whom 24 arrived from foreign countries. Represented were 14 European countries. The technical part of the Conference lasted two days and included 22 papers presented in four thematic groups and two posters. The individual thematic groups were as follows:

- I General problems of rural regions (moderated by A. Vaishar)
- II Regional problems of rural areas (moderated by M. Werner)
- III Problems of landscape protection and ecology of rural areas (moderated by R. Kulikowski)
- IV National problem of rural areas (moderated by H. Goverde)

The third day of the Conference was devoted to an excursion which led the participants to the rural landscape of South Moravia. They were given a possibility to visit the town of Mikulov and its surroundings, the biosphere preserve of Pálava, they climbed the highest point of the Pavlovské vrchy (Hills) from where they could see the waterwork of Nové Mlýny, they also visited the chateau park in Lednice and experienced the atmosphere of a wine cellar in Valtice. The last conference day was reserved for bilateral contacts and meetings.

The informal and active attitude of Conference participants clearly showed the working character of the event at which all attentively listened to the presented papers and lively responded to technical questions in the discussion after each contribution. Advantage for the Conference participants was the fact that along with other Conference materials they were also given the Conference Proceedings. Thus, they could get familiar with the papers in advance and react in the discussion well prepared. As stated at closing the Conference, the participants not only presented results of their own scientific work and were informed of similar works in many European countries, but they were also given an opportunity to learn the landscape, seats and people of South Moravia as well as to establish new personal contacts.



The 2nd Moravian Geographical Conference CONGEO '97 was a subject of interest to communication media of which some brought forth even some detailed information. According to judgement of particularly foreign participants, the Conference was professionally organized and its conclusions will be a valuable contribution for newly proposed ways of managing the rural space. In conclusion, all Conference participants were invited to attend the Third Moravian Geographical Conference **Regional Prosperity and Sustainability** that is going to be held in September 1999. Detailed information about CONGEO '99 will a.o. be available on the Internet address http://www.site.cas.cz/UGN/G_congeo.HTM from the beginning of summer 1998.

Note:

The Conference Proceedings of CONGEO '97 „RURAL GEOGRAPHY AND ENVIRONMENT“ (ISBN 80-901844-2-1) are available from the editorial office of this periodical at CZK 380.00.

International symposium Frohnleiten '97

Pavína HLAVINKOVÁ

An international symposium „Changes in approaching the issue of communal wastes and environment protection in Central and East Europe after political changes of the 90's“ was held in an Austrian town of Frohnleiten, 2-4 October 1997. The Symposium was organized by the Institute of Applied Geography, University of Graz, and sponsored by a range of companies and government institutions.

The event was attended by 19 speakers from 7 countries of Central and East Europe. The representatives arrived from Germany (K. Birkholz - Potsdam), Czech Republic (P. Hlavinková, A. Vaishar - Brno), Slovakia (L. Miklós - Zvolen), Hungary (I. Fazekas, A. Kerényi, Z. Pinczes - Debrecen), Slovenia (D. Plut - Ljubljana, V. Premzl - Maribor), Croatia (Z. Milanovic - Zagreb), and from Austria (W. Fischer, W. Sulzer, W. Zsilincsar from the University of Graz, P. Gottlieb, G. Jägerhuber, H. Pammer, H. Roth, W. Sattler and J. Uszar from various companies and government institutions engaged in waste strategies).

In his introductory speech Prof. W. Zsilincsar mentioned an often insufficient valuation of scientific work made by geographers in the area of waste management and an actual significance of their work and contribution not only to the issue of waste and communal strategies.

Papers presented at the Symposium concerned the following groups of topics:

- Legislation of waste management,
- Development of waste management after political changes,
- Political responsibility in waste management,
- Relation of citizens to waste management,
- Separation of communal wastes,

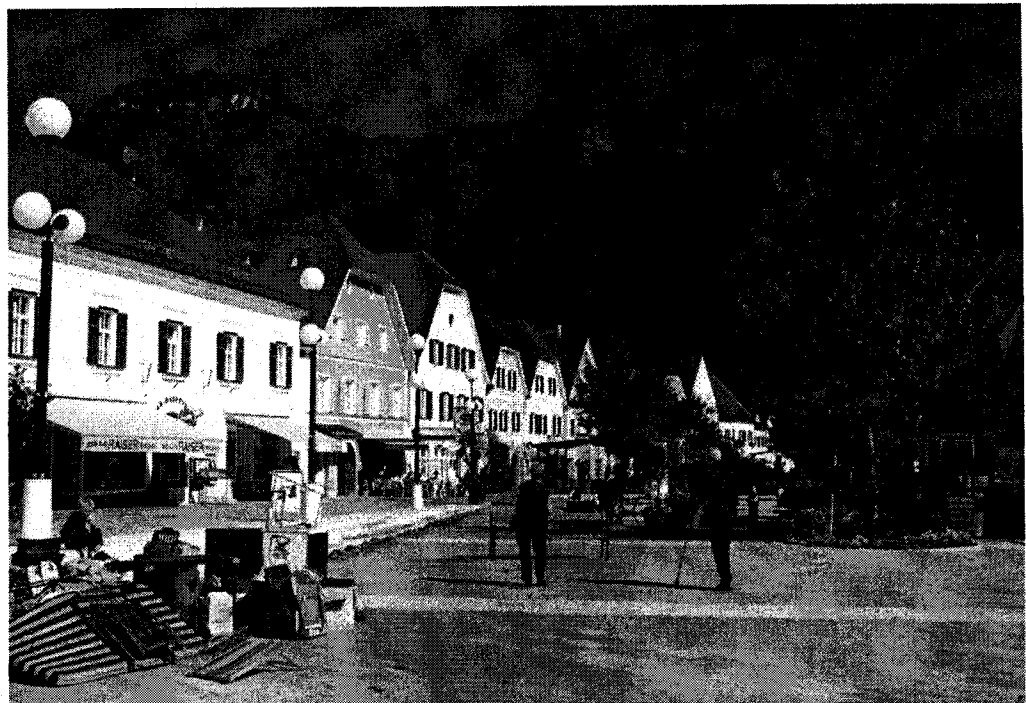


Fig. 1 The spa town of Frohnleiten has the population of 5 094 and belongs to the district of Graz-Province. It is situated in a deeply incised valley of Mur River some 30 km North of Graz - the capital of Styria. Photo: P. Hlavinková

- Waste removal,
- Dumps and conflicts with environment,
- Role of mass media in waste management,
- Contribution of science.

Experts from Brno came up with their paper „The present situation in waste management in the Czech Republic“. In addition, W. Fischer pointed out in his contribution that a bilateral project between the Institute of Geonics, Academy of Sciences of the Czech Republic and the Institute of Applied Geography, University of Graz had been started to handle the issue of „Registration and evaluation of former dumps and loads in surroundings of Brno“.

The Symposium was closed with emphasizing the importance of mutual cooperation between individual countries of Central and East Europe and the necessity of sharing new experience and knowledge.

The thematically unique Symposium ended with an excursion to the largest dump of communal wastes in Austrian Styria.

The town of Frohnleiten is one of Styrian municipalities with the highest annual income. It is the dump of communal wastes operated by the municipality, which represents the highest income of several tens of million shillings per year. Based on this example it is possible to claim that a well organized and controlled dump of communal wastes can represent a sound economic activity of the municipality.

However, representatives from Frohnleiten are aware of the fact that their giant dump cannot be operated forever. This was the reason for them to lay - by building two factories from dump operation receipts (a cardboard factory recycling old paper and a factory for manufacture of dumping machines such as crushers, machines for compaction of dumped wastes etc. which are directly tested in the local dump) - foundations for a new future development of their municipality. The dump earnings are also used to raise their municipality to a higher level including the promotion of children and young people by subsidizing schools and educational events as well as old people by funding the construction of a sanatorium.



Fig. 2 The largest dump in Austrian Styria (22.64 ha) is situated on the edge of Frohnleiten cadastral area. The remaining capacity of the dump is some 2.1 mil. m³ - which is a maximum of 15-20 years of operation provided that the existing annual amount of wastes will be maintained or reduced (175 000 m³). Photo: P. Hlavinková



Water flooded vast lowland areas in the Olomouc district, stretching far from the Morava River. Temporary lakes came into existence on fields before harvest in one of the most fertile plains in the Czech Republic. (Saturday, 12 July 1997)

Photos: V. Galgonek

Illustrations to the report on disastrous floods in July 1997



It was not only people who had problems in the flooded town centre of Olomouc. (Wednesday, 9 July 1997)

Photo: V. Galgonek



Destroyed railway near the station of Loučná nad Desnou under mined with water during the culminating flood. (Sunday, 20 July 1997)

Photo: V. Galgonek