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# CHANGES IN LAND USE IN THE WHITE CARPATHIANS

## (Exemplified by the Village Pitín)

## Introduction

Landscape is an active and, at the same time, passive player in both natural processes and those accelerated or caused by man. Through the set of its structural and dynamic qualities, it affects the occurrence of certain phenomena in terms of time and space, and also their course, intensity and eventual implications.

The monitoring and scanning of the surface of the Earth by means of the methods of the Remote Earth Sensing make it possible to obtain information relevant to a wide variety of purposes. First, it is necessary to identify the individual elements and objects in the landscape, to define their spatial interrelations, their own content and functional use. Data obtained in this way are very often made use of to make to make landscape cover or land use maps.

**Fig. 1: Location of the area under examination in the Czech Republic**

The current landscape dynamically changes in space and time. To define and analyze changes taking place in areas extending to hundreds of square kilometres or even more, requires that special methods be adapted. Multitemporal data obtained from the Remote Earth Sensing, that is data covering several horizons of time, must be analysed to identify changes in the land use.

**Fig. 2: The White Carpathians — area under study**

## Characteristics of the Model Area

The model area White Carpathians is formed by the former court districts of Bojkovice and Valašské Klobouky. It covers 533 square kilometres. The surface of the area is filled with downs, uplands and hilly countries of the three units forming the Moravian-Slovakian Carpathians. From the West, they include the Hluk Downs, which pass into the Luhačovice Uplands and reach the highest altitudes in the flat Komonec Hilly Country. The border with Slovakia is skirted by massive flat mountain ridges. The Javorníky Mountains penetrate the model area with the Pulčín Hilly Country. The Chmelov Hilly Country, which is followed, behind the Vlára River Pass, by the Lopeník Hilly Country, is part of the sub-unit White Carpathians. The altitudes range from 500 to 800 m (Fig. 2).

The prevailing part of the area concerned is part of the Morava river basin, with the Olšava river draining it to the Morava river. The northeast part of the area is drained by the Senica river into the Bečva river, while the borderland part is drained by the Vlára river into the Váh river. In comparison with another region examined in one of our previous studies, the White Carpathians, although rising to higher altitudes, are warmer, with the average annual temperatures ranging from 4° C in the borderland mountains to 8.5° C in valleys. They are also more humid, with the annual average precipitation being 600 to 800 mm. The borderland section of the area, which extends from the south roughly to the current boundaries of the districts of Zlín and Vsetín, is part of the White Carpathians Protected Area, which is afforested in part. However, large meadow complexes are typical of it.

## Methods Adopted to Make Land Use Maps

The task was to identify changes in the use of landscape in the area of the White Carpathians on the basis of aerial photographs made in three horizons of time. It was impossible to examine this large area in all its size not only for the reasons of time, but also because of the quality of the individual aerial photographs. Particularly the older ones did not make it possible to interpret the individual spatial elements and to include them in the categories set for the legend. Therefore, it was necessary to select typical areas representing all changes characteristic for the model area of White Carpathians. After the available materials had been studied carefully, the cadaster of the village Pitín was selected for further examination since changes that have taken place in this village in all important aspects of human activity may well represent the whole area under examination.

Aerial photographs at the scale of 1 : 10,000 representing three horizons of time, namely the years 1955, 1971 and 1990 have been evaluated to analyse changes in the land use. First, the 1990 data have been evaluated (Fig. 5). It was necessary to use the topographical 1 : 10,000 — scale map, sheet 25-34-23 of 1992, and to carry out direct

field investigations to reduce inaccuracies in interpreting the individual spatial elements to a minimum.

The information obtained has been processed in the Corel software, which makes it possible to work with scanned aerial photographs, and is also suitable for presenting the results after data had been processed.

Furthermore, the two remaining horizons of time — 1955 and 1971 (Figs. 3 and 4) have been interpreted. In so doing, more accurate data obtained from complementary materials have been used, such as topographical maps, archival records, literature containing further information etc.

A legend has been prepared to make land use maps for the individual time horizons. This legend identifies the basic spatial functional units characteristic for the area under examination:

- *Development* — discontinued development also comprising various kinds of roads; artificial surfaces, green space (lawns, green belts etc.);
- *Forests* — broadleaved and coniferous forests, various types of bushes;
- *Small-scale land tenure* — land used as small plots — small fields, orchards, small gardens;
- *Meadows and floodplains* — land along water courses with prevailing herbal vegetation;
- *Water bodies* — natural or man-made water bodies;
- *Arable land* — large areas of soil used for farming.

At the first sight, the individual categories are to show the most important changes that tookplace during the period under examination. Therefore, the individual categories have not been hierarchized and divided in more detailed groups. However, a certain generalization, namely that required for interpreting changes on this scale, must be taken into consideration. The individual cases will be addressed later on.

The whole area can be subdivided into three relatively homogenous sections:

1. The northwest section — here, the most significant changes are represented by the Bojkovice water reservoir built on the water course Kolelač (the structure was completed in 1966). Originally, meadows, forests and small tenures were found in the flooded area. In the 1970s, meadows could be still found in the immediate vicinity of the water reservoir, while in 1990 these meadows were covered with forest plantations. The boundary of the whole forest complex did not considerably changed during the period under examination. The forests are mixed, with small enclaves of broadleaved forests sporadically occurring in the whole area under examination.
2. The village Pitín is situated in the southern section. Here, it can clearly be seen how the village was growing. Originally, the development was concentrated around the watercourse Olšava, and further, it ran parallel to the main road Bojkovice-Hostěnín. The development started to gradually fill the whole space of the valley skirting the railway line Bojkovice-Slavičín. Houses prevail in the

development, i.d. houses that do not follow each other directly. Also continuous development occurs in some places, this development consisting of buildings used for the purposes of farming and other economic activities.

A mosaic of tiny fields, orchards and small gardens can be found in the immediate vicinity of the development. Earlier, this mosaic fitted in with the overall character of the landscape. Today, the boundaries of these plots used for small-scale farming can be identified absolutely exactly.

Small enclaves of forests that had existed here in the 1950s reduced to a minimum at the present time, forming only isolated groups of a few trees amidst a large area used for farming.

3. The third area to be defined is formed by the middle-section, which lies between the above-mentioned units. Here, the greatest changes have taken place. A completely different exploitation of land has occurred here as a result of collectivisation, in the course of which small-sized plots have been put together to form large spatial units. Originally, small farming areas were used as small fields (the so called *plužina*), gardens, orchards, pastures etc. After having been integrated into large units, they began to be used for the growing of cereals, root-crops etc.

The railway line was always skirted by a tree alley. However, this alley was not recorded in maps until the 1990s when it grew to form several smaller forest units.

*Houses of the village Vyškovec diffused rarely on steep mountain sides as so called "kopanice" belong to typical features of the Bílé Kaerpaty Mts. region* (photo M. Hrádek).

These three above-mentioned areas and their definition completely represent the character of the White Carpathians. In terms of their size and species composition, the forest complexes have not undergone any dramatic changes in the past forty years. Contrary to this, changes that have taken place in the pattern of settlement are much more significant. Settlements used to grow, while the number of isolated farms and scattered hamlets decreased.

As mentioned before, the greatest changes have taken place in the exploitation of agricultural landscape. Small-sized areas are characteristic for the whole area of the White Carpathians. Being formerly used primarily as meadows and pastures, they were integrated, as a result of collectivisation taking place in the 1970s, into large-sized areas used for farming. At the present time, these areas begin to be used as meadows and pastures again.

## Conclusion

In making a chronological series of land use maps, we can evaluate the dynamics of selected phenomena and processes existing in the landscape and differentiate areas in time from the point of view of some phenomena. Photographs taken in various periods of time make it possible to pursue the dynamics of the development of the characteristics of space and its condition, which may be useful for studying the impacts of human activities on landscape and the environment. Land use maps constitute a valuable source of information showing not only the current state of landscape. They make it possible to also obtain quite exact data about the previous land use development in the area under examination. It appears that updating these maps by means of a "rigorous" interpretation of materials obtained from the Remote Earth Sensing may be quite effective, both in terms of time and money.

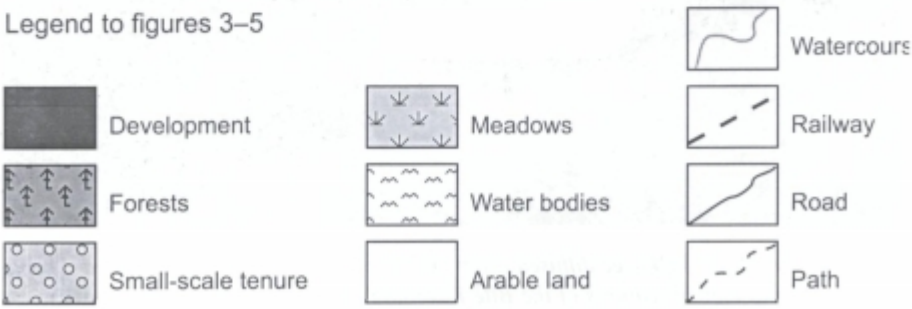


**Fig. 3: Land use in part of the cadaster of the village Pitín (31. 5. 1955)**

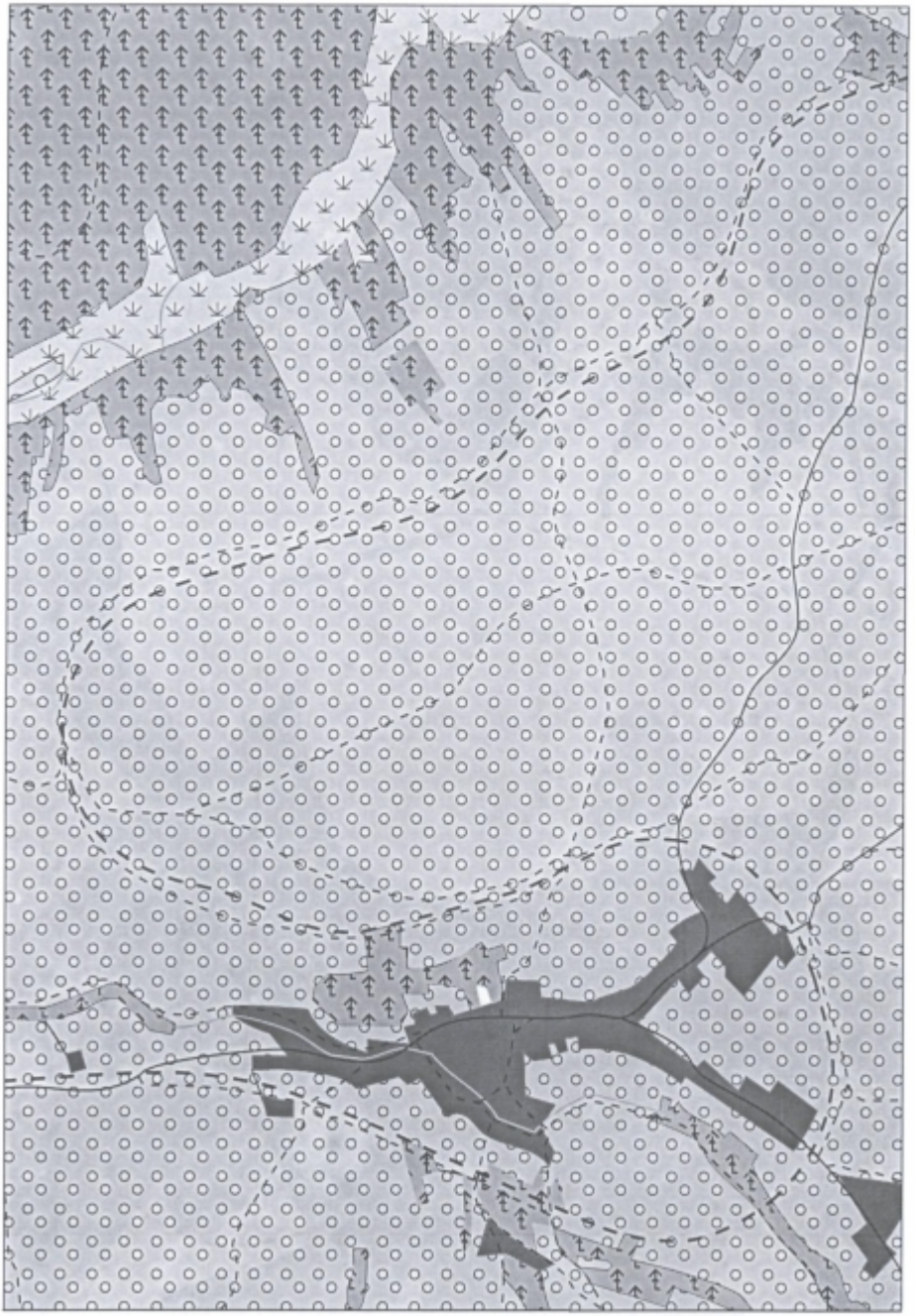
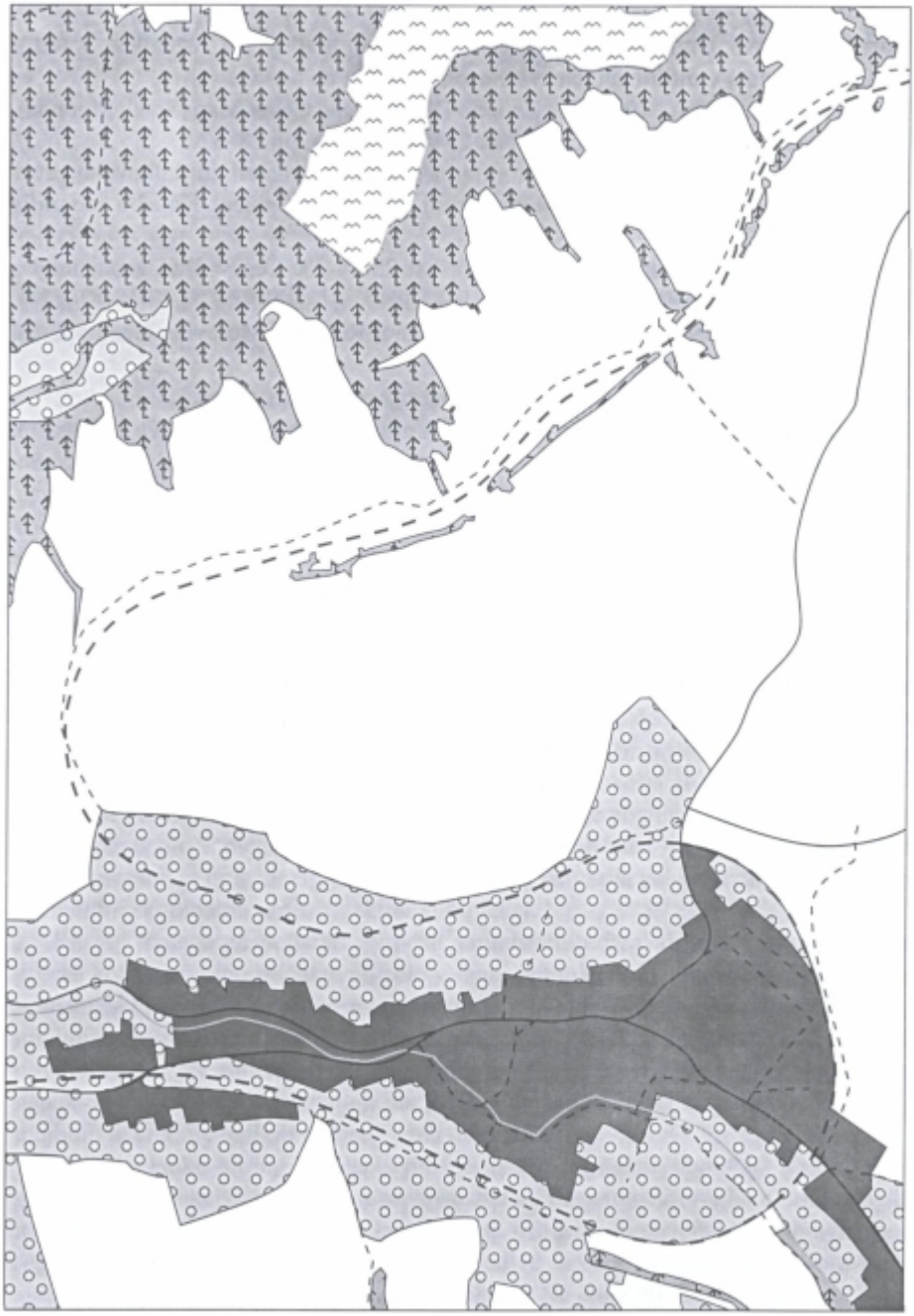


**Fig. 4: Land use in part of the cadaster of the village Pitín (16. 4. 1971)**

**Fig. 5: Land use in part of the cadaster of the village Pitín (12. 7 1990)**



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