

Arable Land Abandonment in the Polish Carpathians

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Fot.1. Previous arable land in the Polish Carpathians, currently abandoned.

SCIENTIFIC PROBLEM

In the second half of the twentieth century on the majority of the Europe area **regress** started in the rural economy and can be observed till today. It affects both the countries of the western and eastern part of the continent. In the seventies and eighties in ten countries of the European Community the arable land area decreased about 6 million hectares, what corresponds to the sixfold farmland area in the Polish Carpathians. In the Middle-East Europe after the rapid increase in the arable land area, which lasted to the forties, the decrease was observed.

In Poland at the beginning of the restructuring period this decrease was significant.

Instead of **general tendency of decrease in the arable land area**, the changes occurring in the rural landscape of Europe in the last decades have a **bipolar character**. On the one hand, they consist in **rural production concentration** in the most productive areas, on the other hand; in the areas marginal for agriculture **the process of rural field abandonment** takes place. It is observed **mainly in the mountains**, for example in the Alps and Carpathians, where as a response to the production intensification tendency the expansion of rural economy was stopped the earliest.

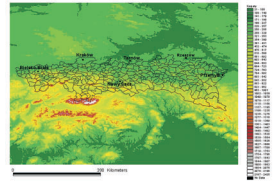


Fig.1. Relief of the Polish Carpathians.

RESEARCH AREA

To the analysis of the directions and degree of **rural landscape changes as a result of agriculture marginalization the Polish Carpathians** were chosen. The total area is 21637 km². In the northern part of the Polish Carpathians occurs a **belt of highlands**, defined as Foothills, which in the south borders to the **higher mountainous part** called Beskidy Mts. The Foothills belt is much narrower in the western part of the Carpathians than in the eastern part, in contrary to the Beskidy Mts., which in the west consist a zone more stretched to the meridian direction than in the east.



Fot.2. Sample rural landscape of the Polish Carpathians, Foothills in front, Beskidy Mts. in background.

SOCIO-ECONOMIC BACKGROUND

The landscape of Carpathians during the centuries was subjected to numerous changes connected with the rural use in this mountain area. These changes were the result of rural production expansion and **intensification periods and periods of agriculture regress and marginalization**.

The rural progress in the Carpathians is connected with the settlement beginnings in the twelfth century. The reclaimed areas stretched primarily in the main river's valleys, than in the Carpathians dales, in the Foothills and in the lowest parts of the Beskidy Mts. Together with the population rate and as a result of economical regress of these areas in the times of farm-hand economy **additional areas in the higher parts of the Beskidy Mts. with the worst and worst natural conditions were cultivated**.

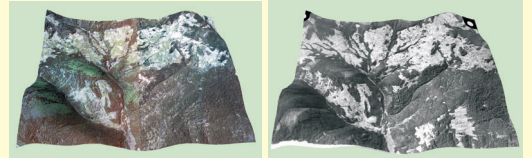


Fig.2. Decrease of the arable land area in a Carpathian Skawiczanka valley observed between 1965-2000.

The increase in the arable land area was impeded in the first half of the twentieth century by **both world wars**. **Even more of the arable land area declined in the sixties and seventies**, what was caused by the increase in urban and reforested areas, particularly in the higher parts of the mountains. In the eighties the economical crisis, stopped the arable land decrease tendency. Their area decreased slightly in the second half of eighties, mainly in the favor of pastures as a result of putting the Resolution in the matter of economical and social activation and agriculture development in the mountain areas, commonly called "**The mountain resolution**", into effect in **1985**.

The beginning of the restructuring process and introduction of the market economy rules at the beginning of the nineties caused that "**The Mountain Resolution**" and the subsidizing system of the rural production in the mountains were no longer in force. Further significant decrease in the arable land area was an effect of these changes. Such a direction of changes in the Carpathians landscape was strengthened by the **Act of the 8th June 2001 about the reforestation of arable land**. This direction depends as well on the aims of the **Common Agricultural Policy of the European Union** after Poland's accession.

AIMS

- **What changes** in arable land use occurred in years 1985-2000 in the Polish Carpathians?
- **Which environmental factors** are important in this process?

MATERIALS

- Main Statistical Office's **statistical data** (1985, 1995, 2000)
- a **digital administration map** (communes of the śląskie, małopolskie and podkarpackie voivodships, which lie within the borders of the Polish Carpathians)
- **digital elevation model** of the Polish Carpathians (1km resolution)

METHODS

- **the percent of arable land area** in the given commune was calculated
- **surface trend method** was used to describe the arable land use changeability

RESULTS

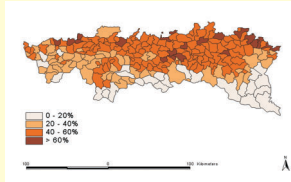


Fig.3. Share of arable area in the land use structure in the Polish Carpathians in 1985.

In 1985

- **the mean arable land share** in the land use structure in the Carpathians - about **42%**,
- **minimum value** - **0,5%**,
- **maximum value** almost **69%**.

In most cases, the arable land share in the communes was no smaller than 20% and no bigger than 60%. In more than a half of all the communes arable lands took 40-60% of the given commune's area.

Generally, there are **two regularities in the spatial dimension** of the arable land share in the land structure in the Carpathians in 1985. This share was **higher and higher going from south to north and from west to east**.

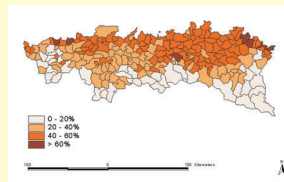


Fig.4. Share of arable area in the land use structure in the Polish Carpathians in 2000.

In 2000

- **the mean arable land share** in the Carpathians - only **37%**,
- **the minimum** below **0,5%**,
- **the maximum** value exceeded slightly **65%**.
- increase in the number of communes in the range 0-20% and 20-40% of arable land
- decrease in the number of communes in the range 40-60% and more than 60%

Meridian and parallel direction of the spatial dimension is typical for the arable land share in the land use structure in the Carpathians in 2000, as well.

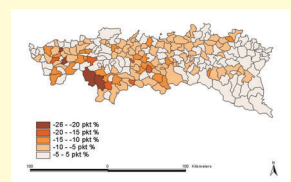


Fig.5. Changes of the arable land share in the land use structure in the Polish Carpathians between 1985 and 2000.

1985 - 2000

In the eastern part of the Carpathians in the majority of the communes the minimal changes were dominant (-5 to 5 percent points).

In the middle part of the mountains the process of arable land reduction was slightly more differentiated. In the majority of the communes the arable land share decreased about 5 to 10 percent points.

The western part of the Carpathians was distinguished by the highest values and the diversity of changes in the arable land area. In the considerable part of the administrative units this decrease was from 5 to 15 percent points.

RESULTS

During the last 15 years of the past century the arable land area in the Carpathians decreased from 798772 ha in 1985 to 685503 ha in 2000, what gives 113269 ha difference. **The decrease took place mainly between 1995 and 2000.**

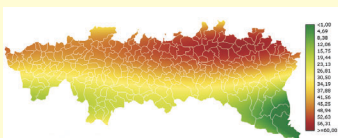


Fig.7. Trend surface for arable area shares in the land use structure in 1985.

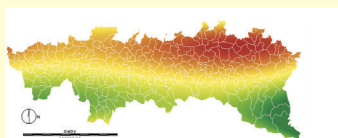


Fig.8. Trend surface for arable area shares in the land use structure in 2000.

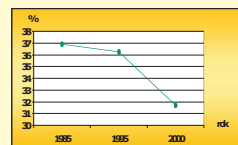


Fig.6. Changes of the average arable land share in the land use structure in the Polish Carpathians in years 1985, 1995 and 2000.

Due to the further **analysis of the spatial dimension of the arable land share changes** in the Carpathians the **surface trend models** for the spatial dimensions of that share in 1985 and 2000 were constructed.

The goodness of fit for the cubic surfaces for the maps with the arable land share in 1985 was 70%, whereas for the map of 2000, 76%.

The analysis of these models let to find that **in 1985 the agriculture marginal zone**, where the arable land share did not exceed 40%, **embraced the southern part of the mountain chain**, whereas in **2000 its range moved generally to the north**, particularly in the northern-west direction.

CONCLUSIONS

The results of the analysis carried out for the Polish Carpathians region indicated **the arable land area decrease** in these mountains in the **last 15 years of the past century**.

The **causative factors** of these changes are the **economical state** and the **national agricultural policy**, whose influence in the Carpathians was evident particularly in the second half of nineties. The rapid decrease of arable land area observed in the study area in that time period was a result of **agricultural policy liberalization** and **socio-economic changes comparing the political transformation**.

Spatial dimension diversity of arable land share changes in the western and eastern part of the Carpathians found during the research may be **caused by different environmental conditions** in both regions (relief and elevation).

In the western part of the Carpathians Beskidy Mts. zone with the mountain landscape reaches further to the north than in the eastern part of the Carpathians, while in the east the range of the Foothills zone is wider in the southern direction. Environmental conditions in the Beskidy Mts. are generally less suitable for agricultural production than in the Foothills. Nevertheless, during the agriculture expansion in the Carpathians, these areas were cultivated as well, even though the majority of them probably never should be cultivated. It is acceptable that **the agriculture in the western part of the Carpathians** with regards to many factors (historical, demographical, cultural and economical) **to a larger degree than in the eastern part developed on the areas unsuitable for the cultivation**. That is why, as a result of political-economical changes, which occurred in Poland in the last 15 years of the past century, **the process of arable land abandonment concerned the western part of the Carpathians to a larger degree**.