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Development of Land Use Structure in the Otava River Basin in 1845–1948–1990

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1. Introduction

There are many approaches to landscape changes assessment and we categorise them into four different groups. The first, geoecological approach, focuses on the land structure assessment and classifies land into various categories in terms of their geoecological quality and in terms of structure, quantity, size, links and relations of existing small areas. This approach requires a demanding field and assessment work involving maps and visual documents and offers often only very limited areas, where investigation of long-term area developments is or was realized (Lipský, Kupková etc.). The second approach draws on visual or digitalised records of air and satellite photos and despite resolution problems of records made in various periods and with various techniques, it allows, at least in some categories, for comparison of landscape (in CR) in periods of 50–70 years (Feranec, Oťahel 1992, 2001 etc.). The third approach works with cartographic materials of various scales and permits land use comparison in periods of hundred years or longer. It requires thorough fieldwork involving particularly small-scale maps. The fourth approach is based on statistical data on the land use structure acquired from land registers or their supporting maps (this is the case of the Czech Republic, Austria and Slovenia that use maps of a Franciscan register, Gabrovec, Krausmann, Pokorný, Jeleček, Bičík etc.) or draws on secondary data obtained through grid-based digitalisation of scale differentiated map (Himiyama 1994, 2001, etc.). However, in practice, many studies combine all of the above-mentioned approaches because such a combination seems to provide the most valuable results of landscape changes assessment.

Several projects of the Czech Science Foundation performed in the Faculty of Science of the Charles University in 1994–2003 applied a combination of the fourth and third approach (only in selected model areas), which resulted in a very original land use database. They used values from eight area categories collected from 1845 to

2000 enabling them to analyse individual and overall structural trends and to search for general causes. The database provides a wide range of original supporting material for the assessment of nature-society relations in the given period and its employment in other research projects facilitates assessment of individual driving factors. In this perspective, the Czech research of long-term changes in land use is praised on a global scale for its originality thank to detailed underlying materials and original methodology (Himiyama et al. 2001, 2002, Bičík et al. 2001 etc.).

Changes in the overall agricultural activities (in relation to the agricultural land use category structure) are significant and quite specific in comparison with neighbouring countries. A paper by Haberle, Krausmann et. al. (2003) on agricultural changes in Austria predicts intensification of globalisation and "social metabolism" (it is economic and social modernisation of the Society) effects on the Czech agriculture and the whole landscape after the accession to the EU, and further changes in land use.

2. The Database and Methodology

Currently, a database made in the GIS environment provides data on area use applicable to eight main and three summary categories. They comprise arable land, permanent cultures, meadows, pastures (forming jointly the summary category of ALR), forest areas (summary category), and other areas (the third summary category – built-up, water and rest areas). Data applicable to approximately 13 000 cadastral areas in 1845, 1948, 1990 and partially in 2000 were transformed into basic territorial units (BTUs) pursuant to the principle of data comparability (we allow for maximally 1% differences in the overall acreage between individual years). Approximately 65% of BTUs are formed by original cadastres where changes in the overall acreage were lower than 1%. Remaining cadastres were merged so that the condition of only 1% acreage changes was met. This procedure resulted in 9200 BTUs of comparable characteristics (and not full 9000 for the period 1990–2000). In the Otava river basin, there are 601 cadastral areas and 491 BTUs comparable in all monitored time periods.

The main aim of the research is to monitor the scope of selected categories that could significantly affect runoff and overall natural conditions of the Otava river basin by their acreage changes. We focus on the categories of ALR, arable land, forest areas and the change index reflecting intensity of changes in studied territorial units (the index refers to areas that change categories due to their transformation), and the typology of area structural developments. The macrostructure is assessed on the basis of six types taking into account growth or reduction in three summary categories – ALP, forests and other areas. We describe development tendencies (growth or reduction) of four ALR categories, which gives us 16 possible types of structural development.

The paper provides explanation and assessment of category dynamics and overall structural changes. Tables and cartograms provide specific information on acreage developments within each category and on the total area structure in individual partial river basins needed for further assessment. Conclusions draw on

data specified in tables and summarize the key results of assessment and overall structural changes.

Since the data employed apply to whole cadastres, or in other words, to individual BTUs made of cadastres (when their total acreage between individual periods exceeded 1%), river basins were delimited by attributing whole BTUs into river basins where such BTUs prevailed. Therefore, the overall river basin acreage may differ from results obtained by exact calculations.

3. Development of Selected Area Categories in the Otava River Basin

3.1. Selection of Relevant Categories

The main objective of the research is to assess long-term changes in area use and their impact on the river basin runoff conditions. We believe that not all of the categories are relevant in this respect and that the main emphasis should be put on those represented by the highest percentage in the given location. This applies mainly to ALR and its two subcategories – a) arable land and b) pastures and meadows (accounted together). The fourth ALR category included in the database, permanent cultures, comprises mainly gardens and rarely also orchards. There are no vineyards or hop-fields in the studied river basin. Gardens are on the rise in the whole country and in all regions of any natural conditions, but they still account only for about 1% of the BTUs acreage and therefore it isn't relevant to analyse their impact.

To the contrary, forest areas have considerable effects on runoff conditions and forests quality is the key factor in this respect. However, the database only comprises data of statistically recorded forest areas, but doesn't specify the barren land percentage, vegetation age, or species composition. We would like to stress that the state of forests is currently in many respects much better than at the beginning of the monitored period, which may contradict prevailing opinions. Forests currently cover the highest percentage of the Czech territory (approximately 34%) in comparison with historical data of past 170 years.

Built-up, water and other areas are not worth studying. Water areas are relatively stable and account only for a negligible percentage of most BTUs acreage. On the other hand, built-up and other areas show the most dynamic developments in the vast majority of BTUs. Despite a dynamic progress of their scope in rural areas, its pattern is mostly very similar.

Besides scope developments of selected categories, we also assess the overall area structure according to three comprehensive indicators. The change index shows the scope of territorial units affected by changes in use categories. The more significant changes in acreage of all eight monitored categories, the higher the change index value (on the scale from 0 to 100). The second method of synthesis is the typology of changes in the area summary structure (ALR, forests, other areas). The third one is the typology of changes in ALR structure. It allows us to distinguish six, respectively sixteen types, occurrence of which differs in individual periods and regions.

Agricultural Land

In 1990, agricultural land distribution in the Otava river basin depended strongly on the height above the sea level and slope. In mountainous and submontane BTUs, agricultural land mostly accounted for less than 30% and in the vast majority of BTUs it was represented by a negligible percentage. To the contrary, BTUs located at 600 m above the sea level and lower in zones of milder slopes were in 1990 covered by ALR on 50% of their acreage, although agricultural land was spread evenly and didn't show significant territorial concentration. In some BTUs it accounted for 50–60% or even 80% of acreage, particularly in the northern part of the Blanice river basin, and in the midstream and downstream areas of the Otava river basin (approximately from Horažďovice). Such a state is typical for all peripheral mountainous areas of the Czech Republic except the Czech-Moravian Highlands.

Variations in the ARL scope in the periods of 1845–1948–1990–2000 were very different. The scope of ARL was growing till the 80s of the 19th century, which affected the first monitored period, and then started to decline. Therefore it isn't surprising that almost the whole hundred-year period (1845–1948) was marked by big microregional differences in the monitored location. Tens of BTUs showed ALR rise up to 5%, some of them even up to 10%. However, it concerned relatively small ALR areas in the highest Šumava mountainous parts where overall changes may involve only units of hectares. It is also important that the vast majority of BTUs in this period were marked by ARL decline (more than 80%), in higher and slope zones by 5–10%, in other locations by 10–20% or exceptionally even more.

Under the communist regime (1948–1990), the ALR development in Czechia was characterised by a 20% reduction in comparison with the state in 1948. Therefore it isn't surprising that almost half of BTUs in the studied area showed a reduction of 30–100%! Such a significant decline was concentrated mainly in areas located higher than 600 m above the sea level and in the western part of the Otava river basin. To summarise, the scope of ALR in the Otava river basin was reduced approximately by 40%. Such findings fall in line with results applicable to the whole Czech Republic (Bičík, Kupková 2002).

To the contrary, with respect to categories of higher prices/fertility, the ALR share was growing and the overall ALR decline in individual years was slower. In the highest price/fertility category (above 9 CZK/m^2), ALR accounted for 86, 86, and 80%!!! We can assume that the whole Otava river basin underwent the same developments, i.e. that ALR acreage declined most rapidly in the BTUs of the lowest ALR official price. Such findings are somewhat in conflict with the general picture of inefficiencies under the totalitarian regime. At least the results of ALR development prove otherwise.

After1990, the process of ALR development was influenced by restitution and privatisation processes, by introduction of market prices, and elimination of the former system of subsidies. Agricultural management started to pursue different patterns, intensity of agricultural activities dropped, and the structure underwent significant changes. It should be stressed that the Otava river basin was affected by

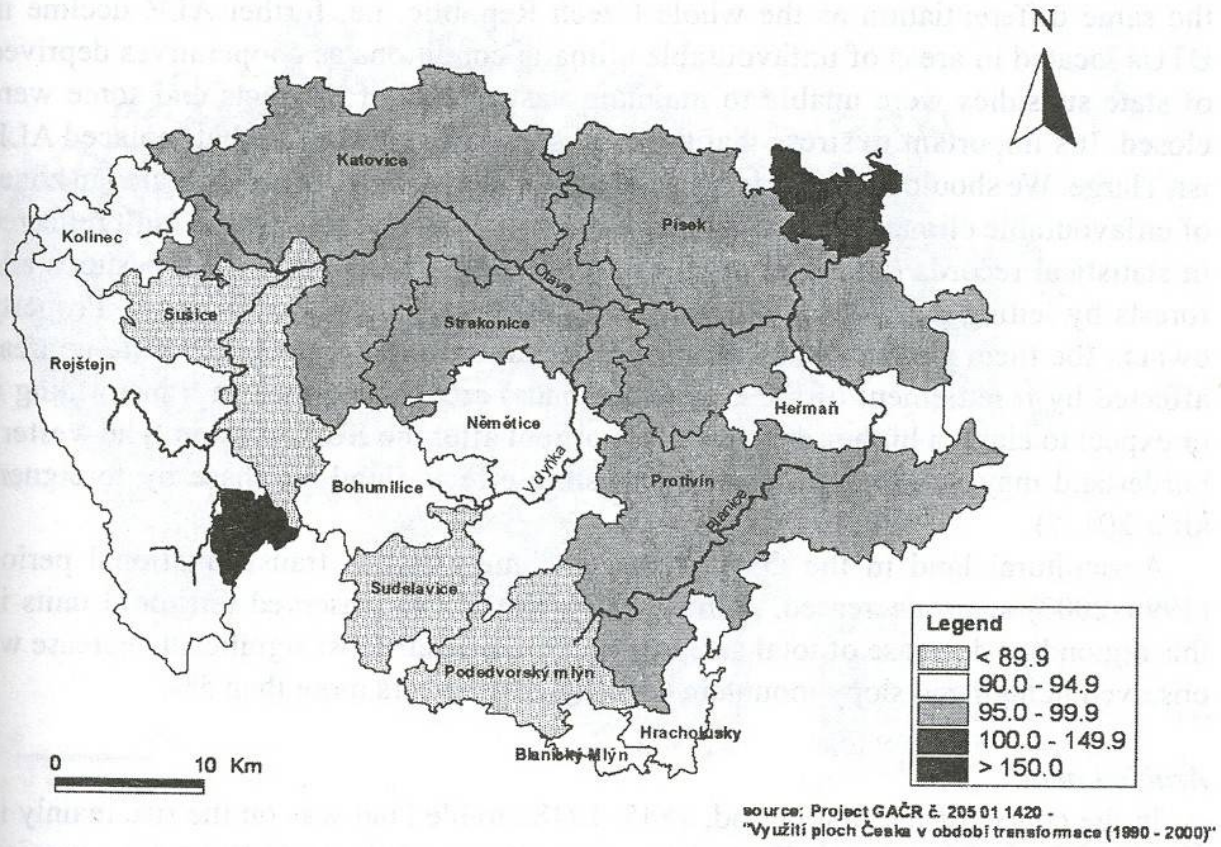


Fig. 1 Development of agricultural land 1845–1948

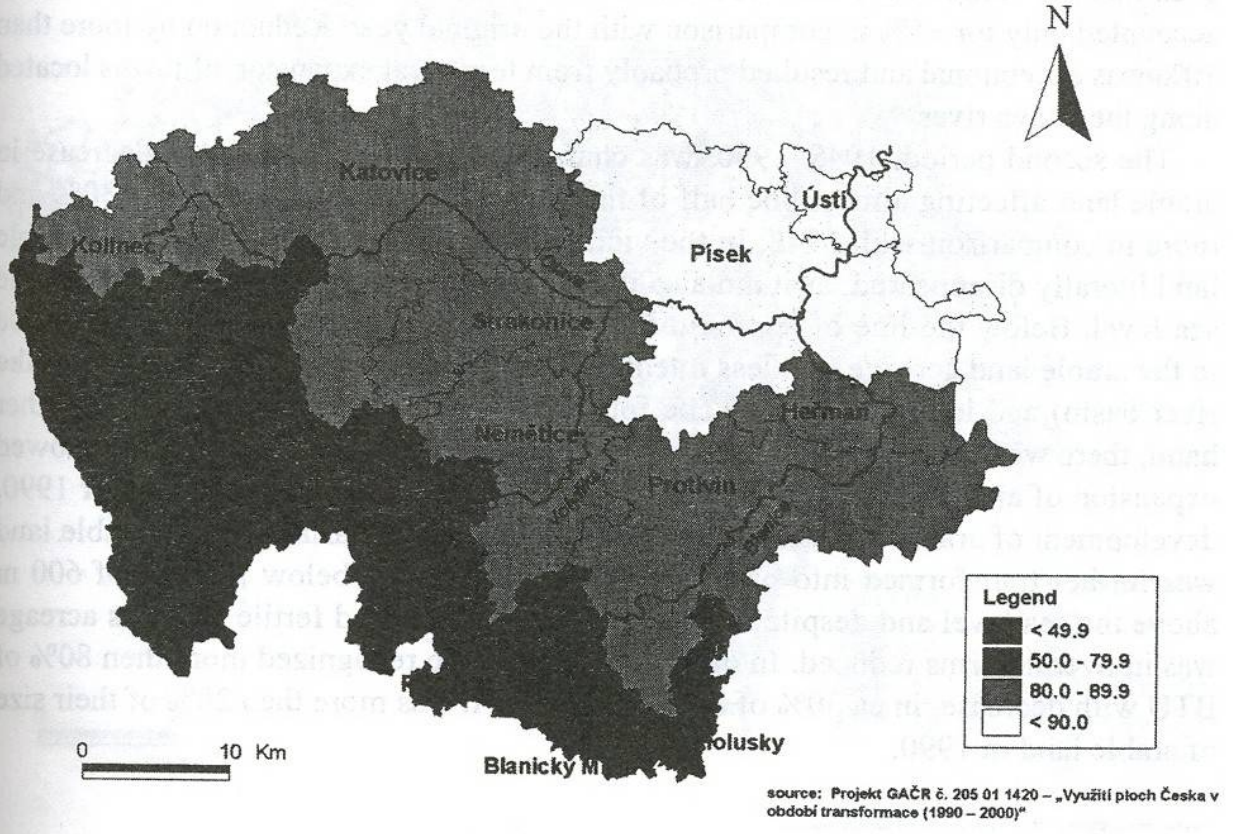


Fig. 2 Development of agricultural land 1948–1990

the same differentiation as the whole Czech Republic, i.e. further ALR decline in BTUs located in areas of unfavourable climatic conditions as cooperatives deprived of state subsidies were unable to maintain vast ranges of products and some were closed. It's important to stress that the total scope of forest areas that replaced ALR isn't large. We should also take into account that extensive ALR areas located in zones of unfavourable climate are undergoing a structural transformation that isn't reflected in statistical records (transformation of arable land into meadows and pastures and forests by letting it the land fallow without informing geodetical survey). Property owners (be them persons who regained their land in restitution or the state in areas affected by resettlement of the Czech Germans) aren't interested in transforming it or expect to claim a high price for its sale or rent after the EU accession. The western borderland may be affected by other possible effects (land purchase by foreigners after 2012?).

Agricultural land in the Otava river catchment in the transformational period (1990–2000) again decreased. Almost ninety percent of observed territorial units in this region had decrease of total size in agricultural land. Most significant decrease we observed in high and slopy mountain territory, in ten years more than 5%.

Arable Land

In the course of the first period, 1845–1948, arable land was on the rise mainly in Šumava mountainous areas due to late colonisation and the need to feed its growing population until the end of the 19th century from local sources, i.e. also in areas 900 m high above the sea level. Arable land therefore expanded in the highest areas by 20% or even more in comparison with the state in 1845. In lower areas, arable land variations accounted only for ±5% in comparison with the original year. Reduction by more than 10% was exceptional and resulted probably from territorial expansion of towns located along the Otava river.

The second period, 1948–1990, was characterised by a considerable decrease in arable land affecting almost one half of the river basin and accounting for 30% and more in comparison with 1948. In the vicinity of the iron curtain in Šumava, arable land literally disappeared, as it did also in areas located higher than 800 m above the sea level. Below the line of approximately 600 m above the sea level, the decrease in the arable land acreage was less intensive and reached 10–20% (in one fifth of the river basin) and less than 10% in one fourth of the Otava river basin. On the other hand, there were also small enclaves in the northern and eastern regions that showed expansion of arable land (approximately 5% of the river basin acreage). After 1990, development of arable land size was similar as in the totalitarian period. Arable land was further transformed into pastures and meadows even below the line of 600 m above the sea level and despite its preservation in lower and fertile areas its acreage was in overall terms reduced. In observed territory we recognized more then 80% of BTU with decrease, in ca 30% of decreasing units it was more then 20% of their size of arable land in 1990.

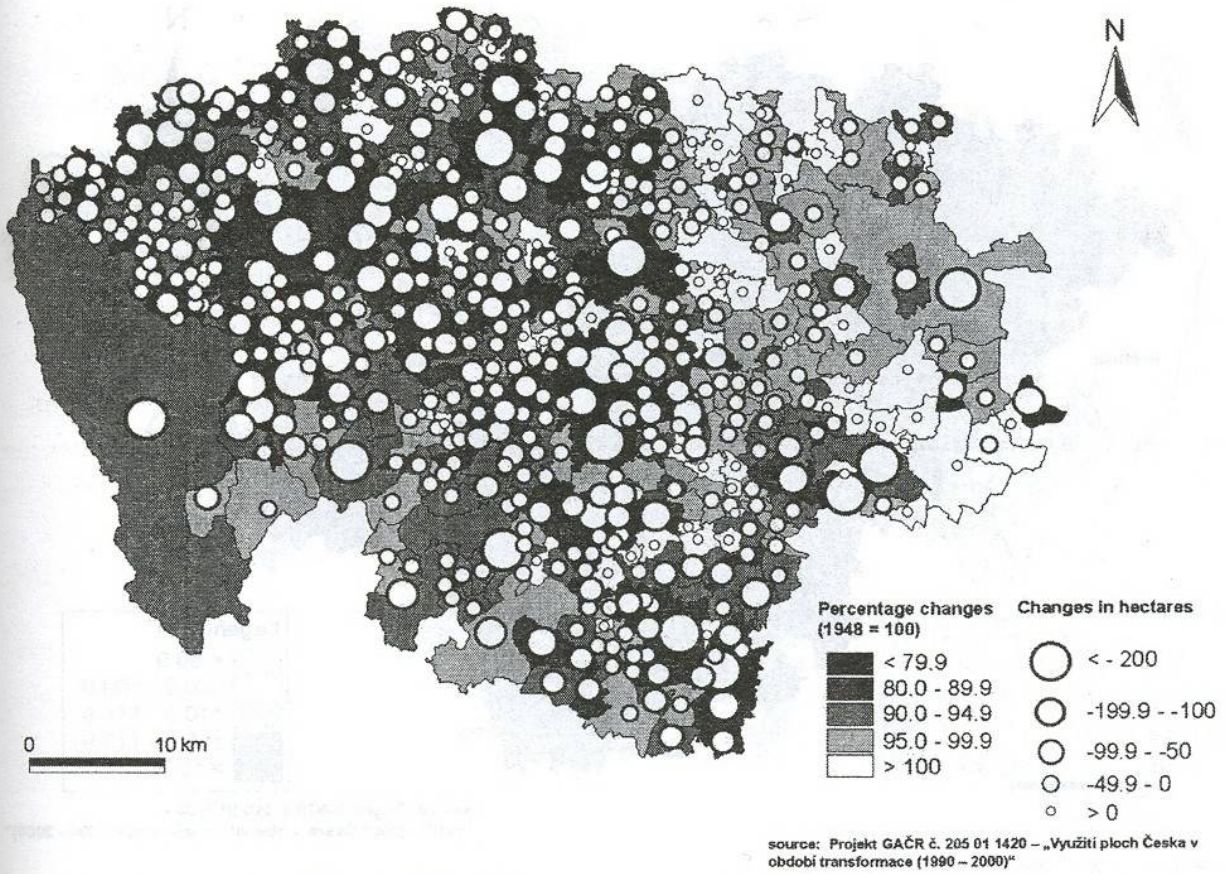


Fig. 3 Development of arable land 1948–1990

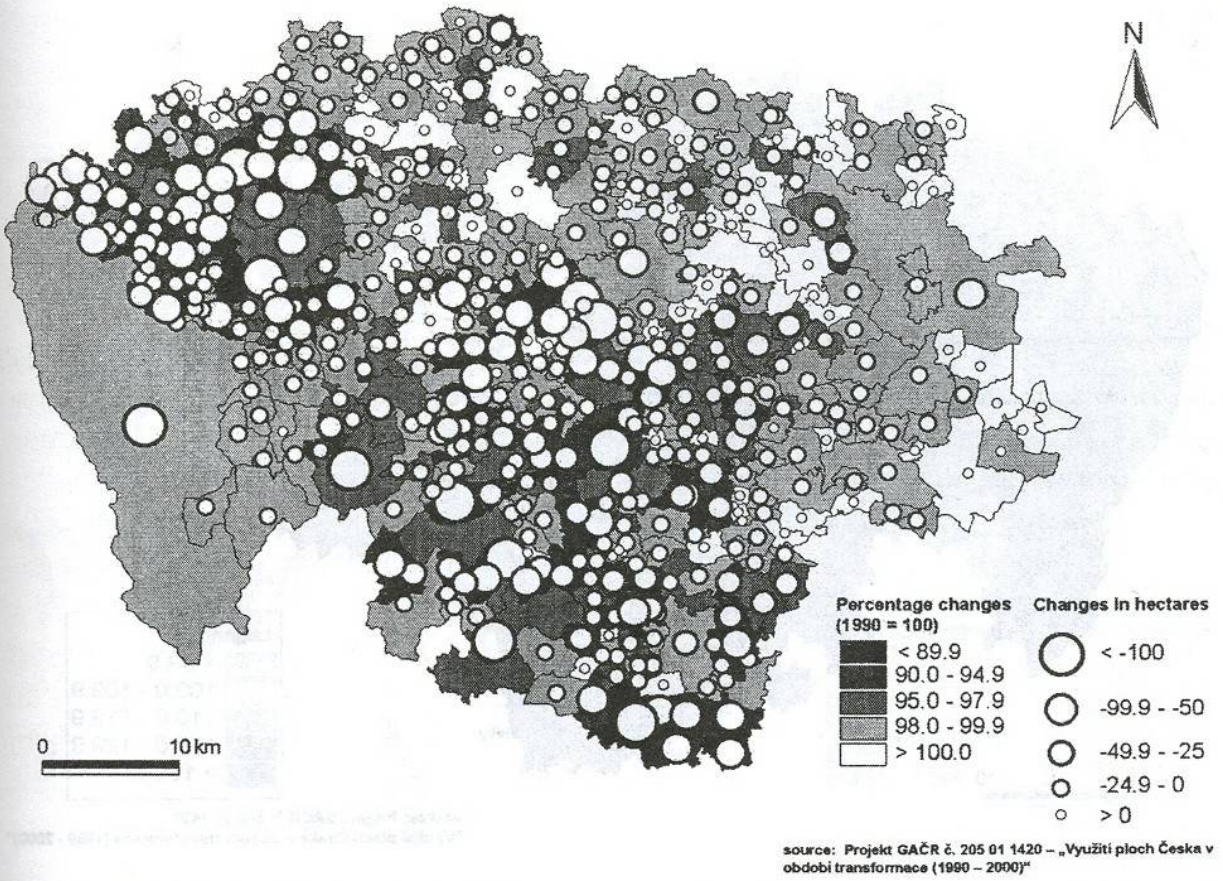


Fig. 4 Development of arable land 1990–2000

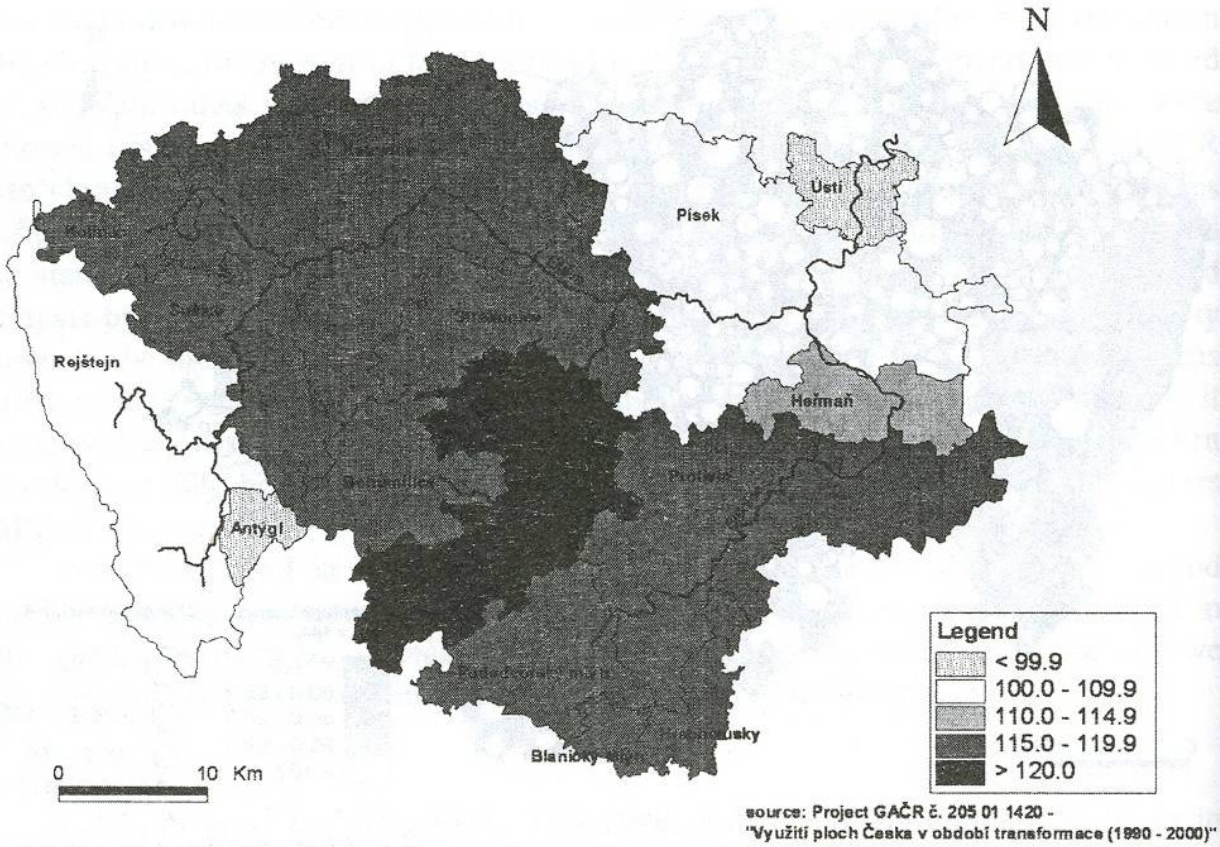


Fig. 5 Development of forest areas 1845–1948

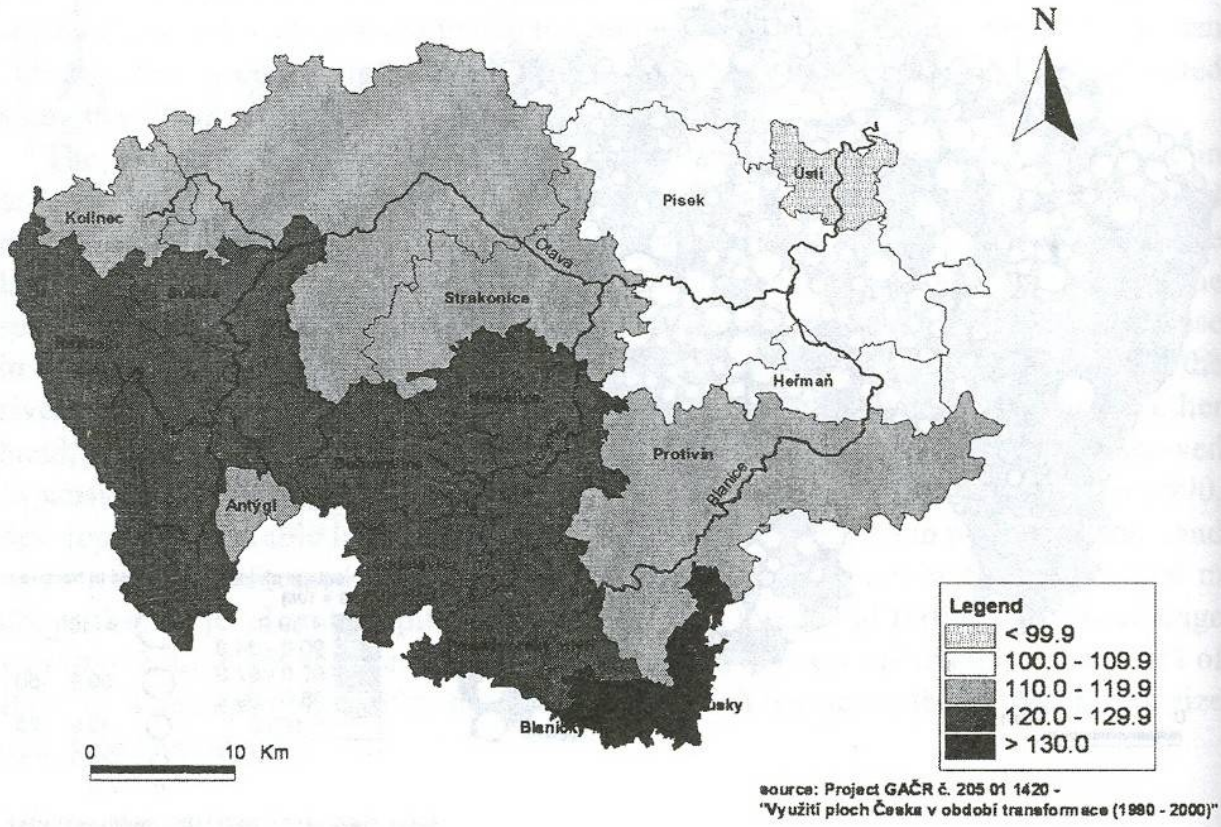


Fig. 6 Development of forest areas 1948–1990

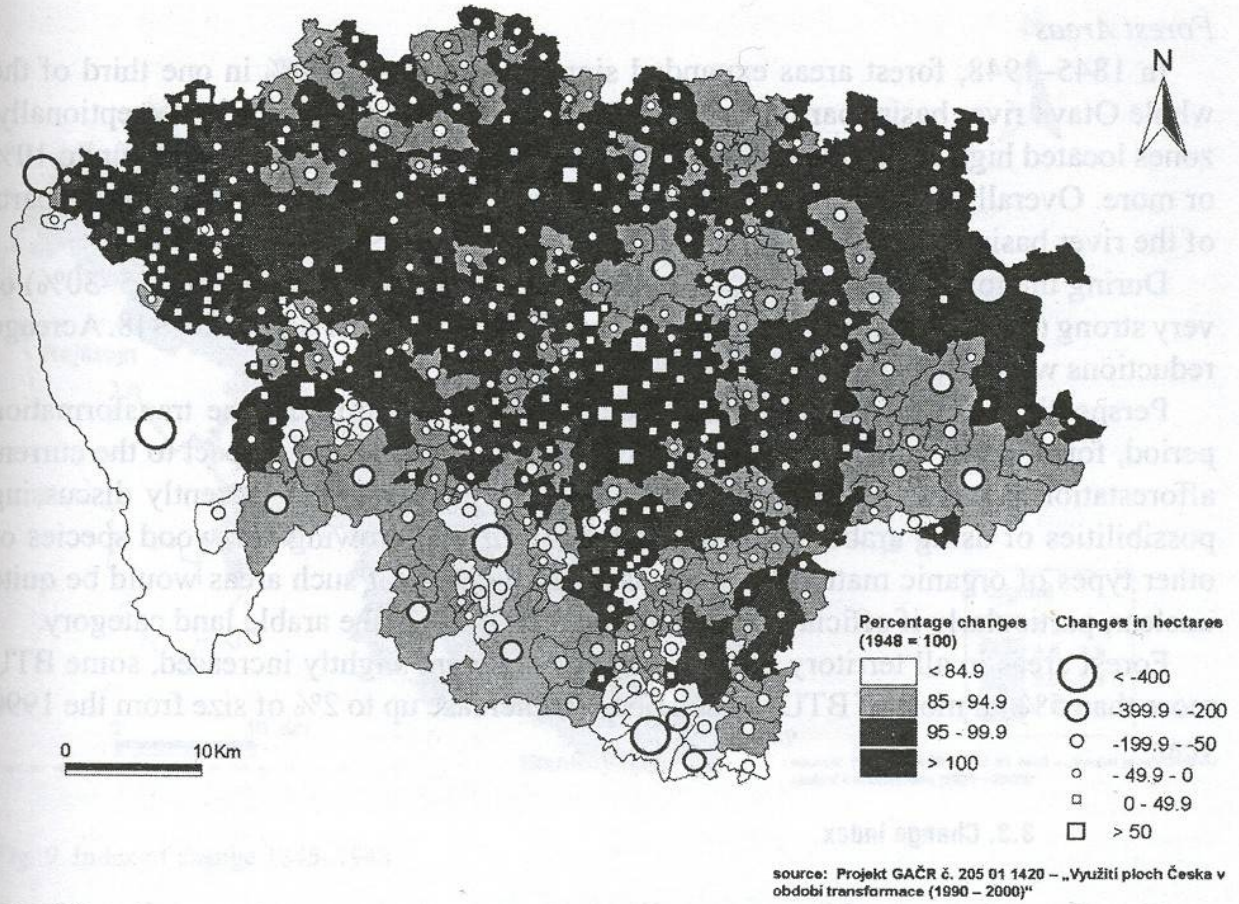


Fig. 7 Development of grassland 1948–1990

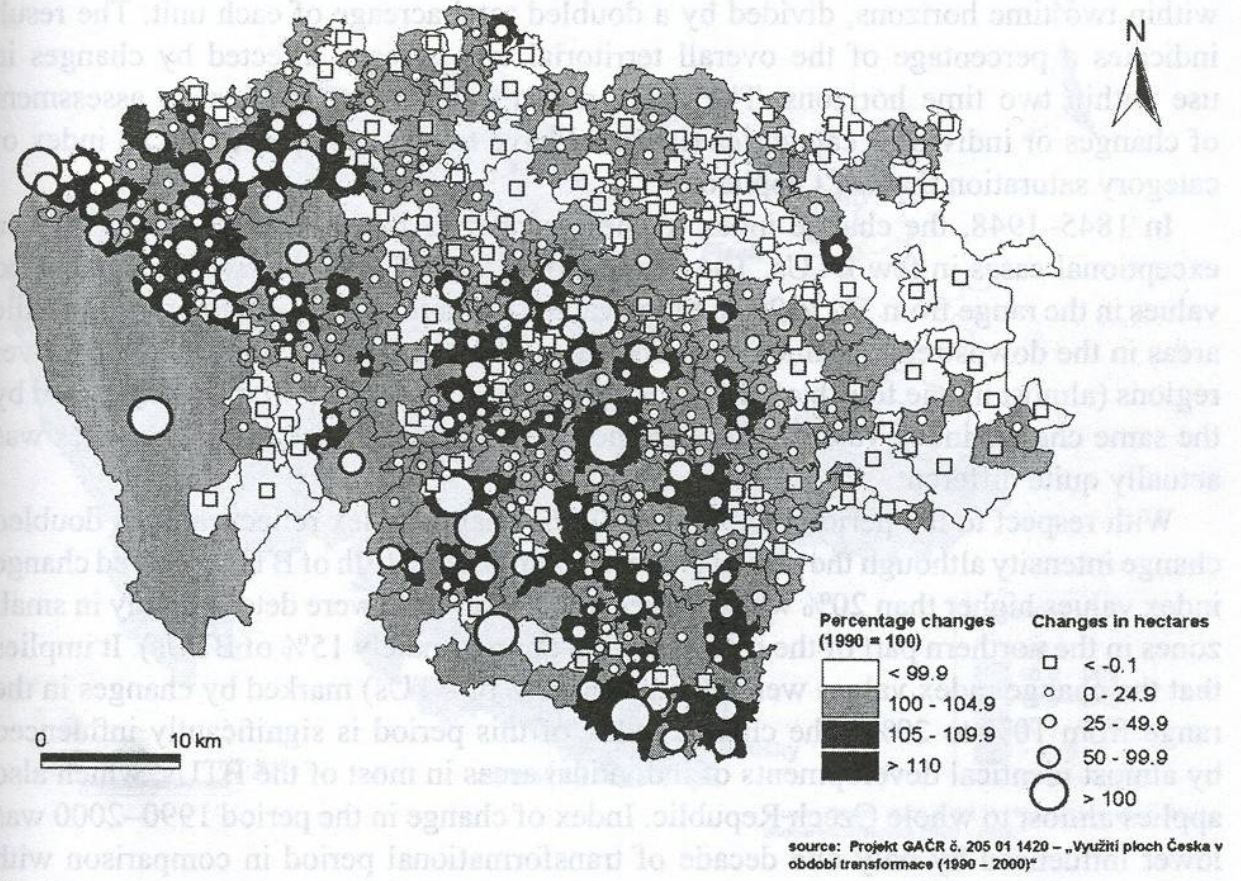


Fig. 8 Development of grassland 1990–2000

Forest Areas

In 1845–1948, forest areas expanded significantly by 15–30% in one third of the whole Otava river basin, particularly on slopes in the Šumava foothills. Exceptionally, zones located high above the sea level close to the frontier showed a decline up to 10% or more. Overall, forest areas showed a slight or moderate intensive rise in most parts of the river basin (up to 15% of the original acreage).

During the totalitarian regime, increase in forests areas was moderate (15–30%) or very strong (more than 30%) in the whole river basin in comparison with 1948. Acreage reductions were exceptional.

Perspectives of forest areas are broad. In the future as during the transformation period, forest areas are expected to rise for at least 15 years with respect to the current afforestation intensity and supporting projects. Experts are also currently discussing possibilities of using arable land for production of fast growing fire wood species or other types of organic matter. In such case classification of such areas would be quite unclear, particularly if official records maintained them in the arable land category.

Forest areas in all territory of Otava river catchment slightly increased, some BTU more than 5%, in most of BTU we can observe increase up to 2% of size from the 1990 year.

3.3. Change Index

The change index enables a generalised assessment of area structure dynamics. It represents the sum of absolute acreage remainders of all eights monitored categories within two time horizons, divided by a doubled total acreage of each unit. The result indicates a percentage of the overall territorial unit acreage affected by changes in use within two time horizons. The index doesn't allow for significance assessment of changes or individual categories (it would have to be accompanied by an index of category saturation that isn't applied).

In 1845–1948, the change index in the Otava river basin surpassed 30% only in exceptional cases in few BTUs. The vast majority of BTUs in the river basin showed values in the range from 5% to 20%. Index values lower than 5% were frequent in fertile areas in the downstream Blanice river and the midstream and downstream Otava river regions (almost in one fourth of all BTUs). Many territorial units were characterised by the same change index values, although their development in terms of categories was actually quite different.

With respect to the period of 1948–1990, the change index reflects almost doubled change intensity although the period is shorter. Almost one fifth of BTUs showed change index values higher than 20% while values lower than 10% were detected only in small zones in the northern part of the river basin (in approximately 15% of BTUs). It implies that the change index values were mostly (in 60% of BTUs) marked by changes in the range from 10% to 20%. The change index of this period is significantly influenced by almost identical developments of individual areas in most of the BTUs, which also applies almost to whole Czech Republic. Index of change in the period 1990–2000 was lower influenced by only one decade of transformational period in comparison with 40 years of totality. But changes are significant because there were realized some

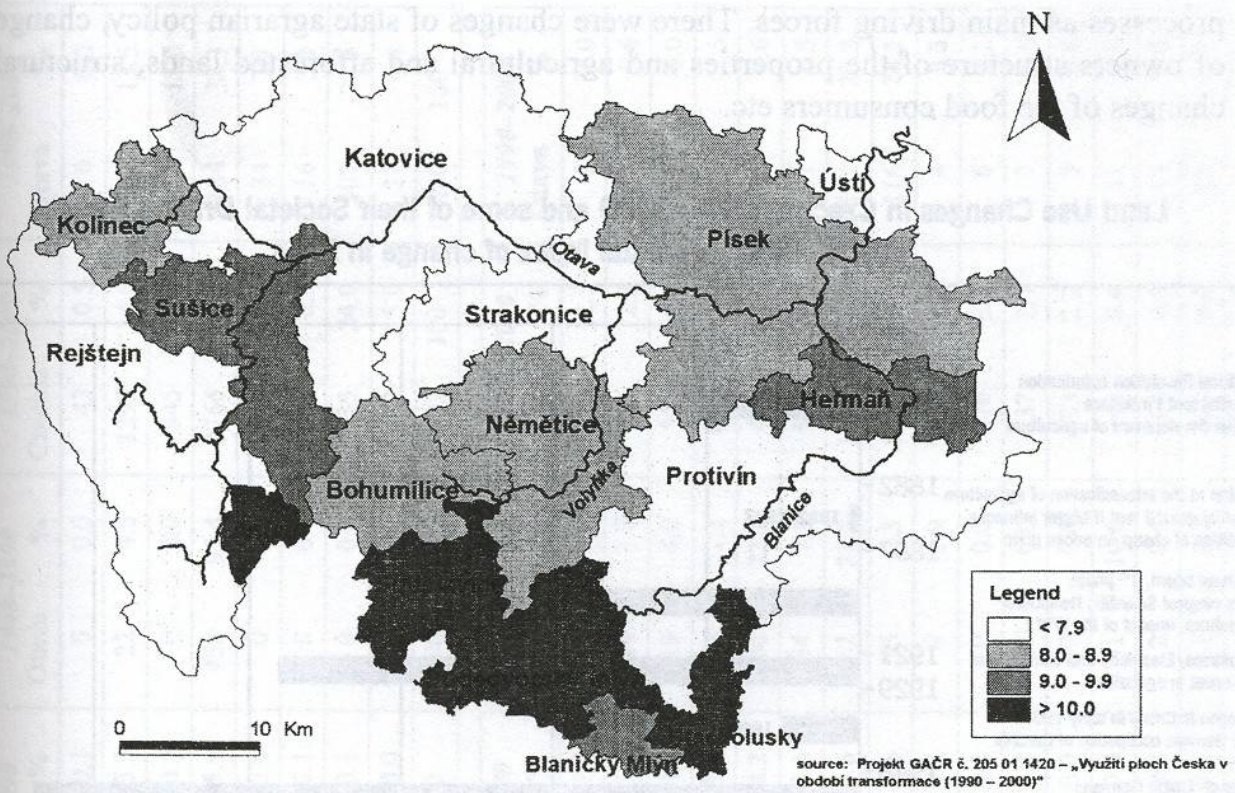


Fig. 9 Index of change 1845–1948

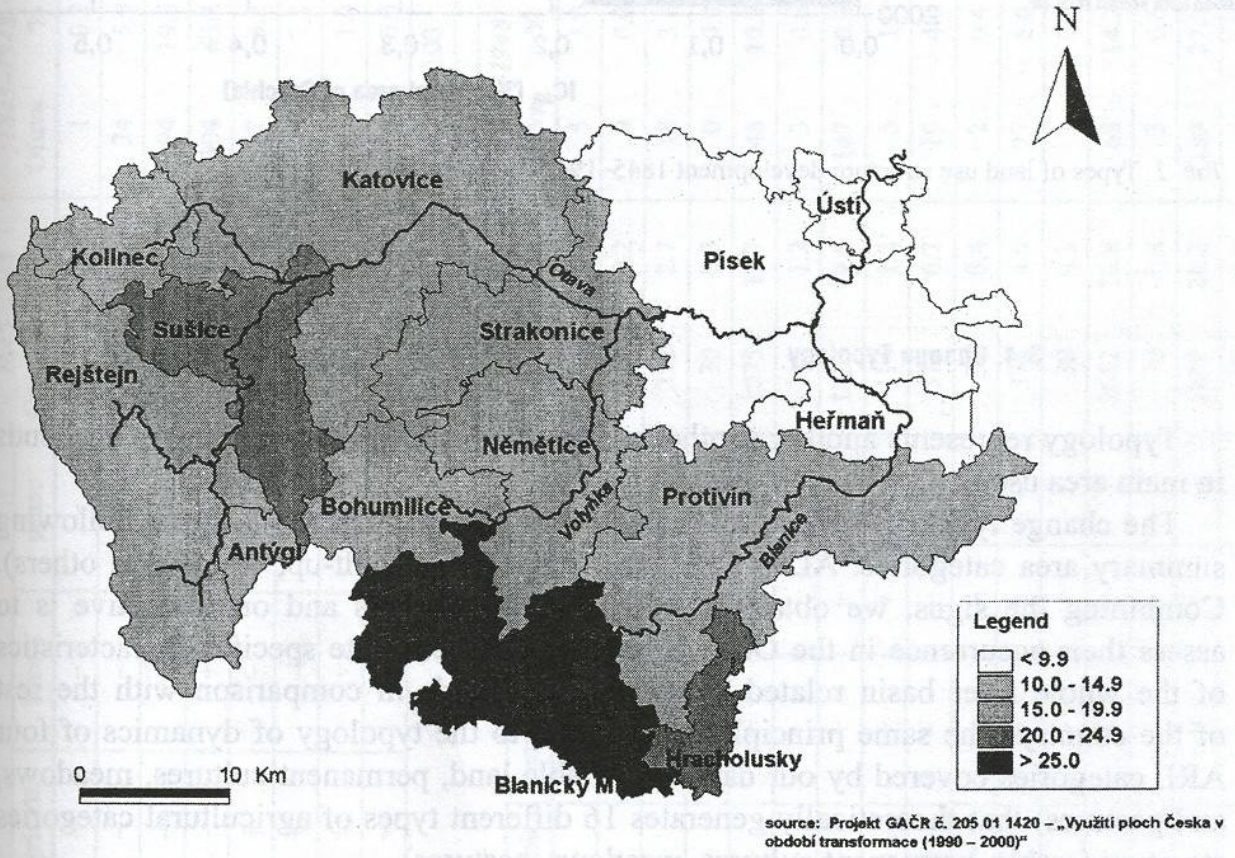
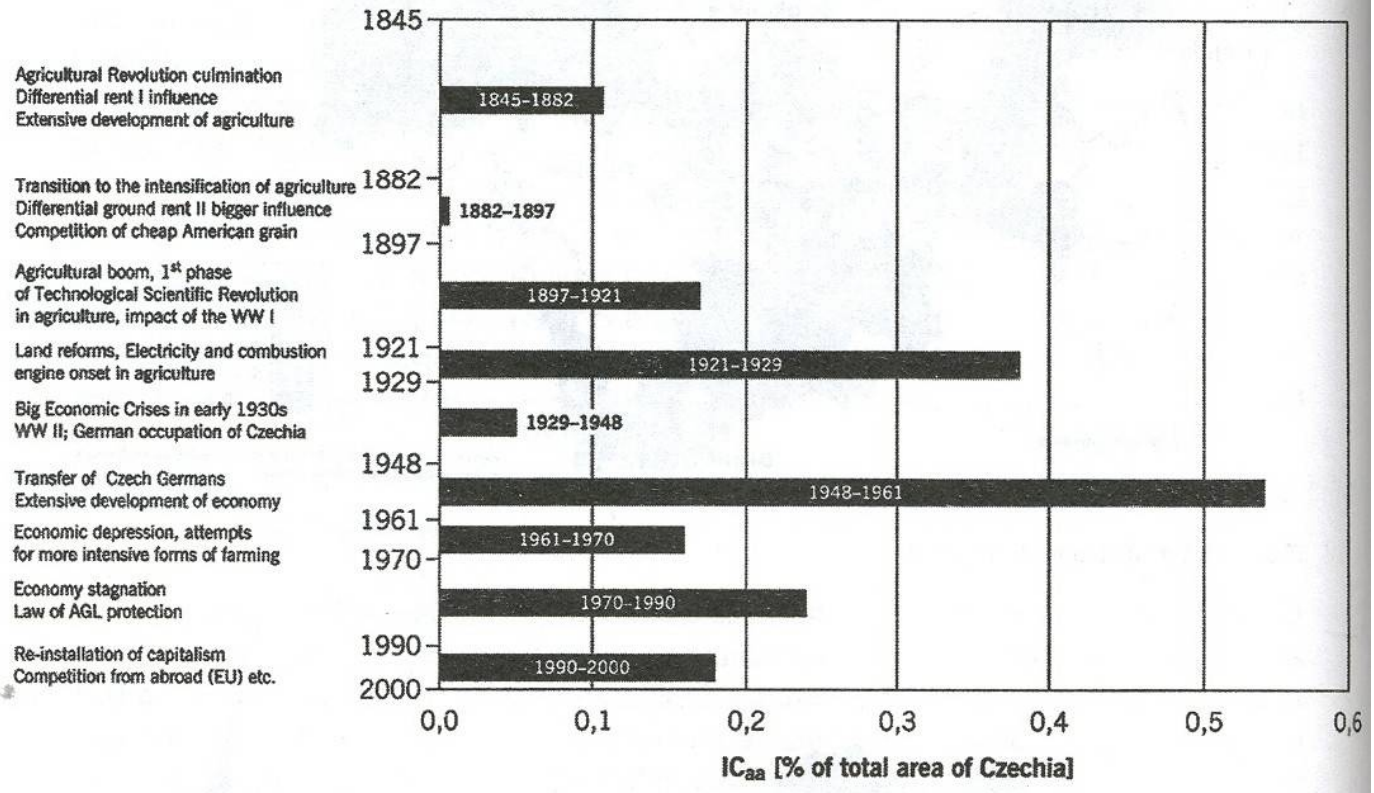


Fig. 10 Index of change 1948–1990

processes as main driving forces. There were changes of state agrarian policy, change of owners structure of the properties and agricultural and afforested lands, structural changes of the food consumers etc.

Land Use Changes in Czechia 1845–2000 and some of their Societal Driving Forces
IC_{aa} = average annual index of change in %



Tab. 1 Types of land use structure development 1845–1948–1990–2000

3.4. Change Typology

Typology represents another synthetic indicator of generalised development trends in main area use.

The change typology reflects an increase ("+") or decrease ("–") in the following summary area categories: ALR, forest and other areas (built-up, water, and others). Combining the signs, we obtain 6 macrostructure options and our objective is to assess their occurrence in the Otava river basin and evaluate specific characteristics of the whole river basin related to monitored periods in comparison with the rest of the country. The same principle was applied to the typology of dynamics of four ARL categories covered by our database (arable land, permanent cultures, meadows, and pastures) that theoretically generates 16 different types of agricultural categories structure (arable, permanent cultures, meadows, pastures).

Tab. 2 Types of development of macrostructure and structure of agricultural categories 1845–1948–1990–2000

agricult.	forest	other	*1845–1948* Czechia	%	*1845–1948* Otava	%	*1948–1990* Czechia	%	*1948–1990* Otava	%	*1990–2000* Czechia	%	*1990–2000* Otava	%
–	–	–	405	4.4	1	0.2	6	0.1	0	0.0	43	0.5	0	0.0
–	–	+	1272	13.8	24	5.0	1228	13.3	22	4.6	1293	14.5	65	13.5
–	+	–	1235	13.4	94	19.6	46	0.5	0	0.0	845	9.5	53	11.0
–	+	+	3724	40.4	304	63.3	7916	85.9	458	95.4	2766	31.1	184	38.3
+	–	–	737	8.0	17	3.5	2	0.0	0	0.0	822	9.2	34	7.1
+	–	+	1585	17.2	35	7.3	12	0.1	0	0.0	557	6.3	16	3.3
+	+	–	249	2.7	5	1.0	5	0.1	0	0.0	2135	24.0	107	22.3
+	+	+	9	0.1	0	0.0	1	0.0	0	0.0	442	5.0	21	4.4
			9216	100	480	100	9216	100	480	100	8903	100	480	100

arable	perm. crop	meadow	pasture	*1845–1948* Czechia	%	*1845–1948* Otava	%	*1948–1990* Czechia	%	*1948–1990* Otava	%	*1990–2000* Czechia	%	*1990–2000* Otava	%
–	–	–	–	132	1.4	5	1.0	686	7.4	47	9.8	226	2.5	5	1.0
–	–	–	+	23	0.2	0	0.0	546	5.9	18	3.8	192	2.2	3	0.6
–	–	+	–	252	2.7	18	3.8	367	4.0	19	4.0	543	6.1	29	6.0
–	–	+	+	30	0.3	0	0.0	286	3.1	6	1.3	688	7.7	36	7.5
–	+	–	–	1075	**11.7**	**48**	**10.0**	2229	**24.2**	**106**	**22.1**	484	5.4	22	4.6
–	+	–	+	113	1.2	3	0.6	1157	**12.6**	**34**	**7.1**	544	6.1	31	6.5
–	+	+	–	1823	**19.8**	**147**	**30.6**	1897	**20.6**	**152**	**31.7**	1313	**14.7**	131	**27.3**
–	+	+	+	114	1.2	5	1.0	795	**8.6**	**35**	**7.3**	1707	**19.2**	116	**24.2**
+	–	–	–	571	6.2	19	4.0	260	2.8	9	1.9	334	3.8	4	0.8
+	–	–	+	34	0.4	2	0.4	38	0.4	0	0.0	276	3.1	6	1.3
+	–	+	–	373	4.0	27	5.6	23	0.2	0	0.0	237	2.7	7	1.5
+	–	+	+	30	0.3	1	0.2	0	0.0	0	0.0	193	2.2	3	0.6
+	+	–	–	2652	**28.8**	**68**	**14.2**	825	9.0	51	10.6	748	**8.4**	31	**6.5**
+	+	–	+	70	0.8	3	0.6	75	0.8	2	0.4	604	**6.8**	19	**4.0**
+	+	+	–	1859	**20.2**	**133**	**27.7**	32	0.3	1	0.2	428	4.8	18	3.8
+	+	+	+	65	0.7	1	0.2	0	0.0	0	0.0	386	4.3	19	4.0
				9216	100	480	100	9216	100	480	100	8903	100	480	100

Tab. 3 Index of development in all eight observed categories of land use in Otava river catchment and Czechia

OTAVA										
category	**arable**	**perm. cult.**	**meadow**	**pasture**	**agricult.**	**forest**	**water**	**built up**	**other**	**wa +bu+o**
1845–2000	74.59	410.10	109.31	31.29	**74.71**	**132.88**	115.34	254.03	415.57	**266.60**
1845–1948	100.62	241.17	107.24	56.28	**93.93**	**111.94**	84.59	170.73	124.15	**111.41**
1948–1990	81.21	166.75	85.33	53.15	**80.06**	**118.65**	133.05	142.83	325.22	**232.41**
1990–2000	91.28	101.97	119.45	104.61	**99.34**	**100.04**	102.47	104.17	102.93	**102.96**
CZECHIA										
category	**arable**	**perm. cult.**	**meadow**	**pasture**	**agricult.**	**forest**	**water**	**built up**	**other**	**wa +bu+o**
1845–2000	81.17	262.88	92.00	44.93	**81.39**	**115.87**	140.98	282.23	374.53	**284.52**
1845–1948	103.60	166.19	97.91	47.55	**97.08**	**104.68**	79.33	183.63	123.94	**117.24**
1948–1990	82.16	157.62	79.66	84.61	**84.16**	**110.33**	173.89	147.54	302.34	**240.59**
1990–2000	95.36	100.36	117.95	111.70	**99.62**	**100.32**	102.20	104.18	99.95	**100.87**

4. Conclusions

This chapter summarizes only the most significant findings.

- In 1845–1948, areas covered by arable land expanded slightly in the whole river basin. In 1948–1990, they were reduced by 22 487 ha, i.e. by 18.3%, and the scope of arable land in 1990 fell by approximately 8% in comparison with 1948.
- In total, meadows and pastures declined from 66 700 ha in 1845 (which equalled to 26.06% of the whole river basin. Meadows and pastures were reduced by 19 709 ha.
- The overall reduction of ALR between the monitored periods represented 4% (12 000 ha) and 12.3% (37 019 ha). In the course of 160 years, agricultural land resourced shrank by 49 000 ha.
- Forest areas expanded during the whole monitored period. In the first 100-year phase, they grew by 10 500 ha, i.e. 3.53% of the 1845 acreage. In 1948–1990, they grew by further 18 327 ha, i.e. by 6.15% in comparison with 1948. Forest areas expanded by one third in comparison with 1845.
- The above-specified findings imply that the last 160 years changed the prevailing category of area use. In 1845, it was the arable land category that prevailed in almost 40% of the area while in 1990 it was replaced by forest areas accounting for 39.13%.
- Despite a significant decrease in population, the share of built-up areas doubled from 0.43% to 1.05%.
- The highest rise was detected in the category of other areas. At the beginning of the monitored period, they accounted only for 5800 ha while in 1990 they covered 32 740 ha, which means 2.5 multiplication from 1.94% to 10.99% in 1990.
- In 1845–1948, most of 491 BTUs in the Otava river basin were marked by two change types – a) decline of ALR and rise of forest and other areas (64.15%), and b) decline of ALR and other areas and rise in forest areas (19.55%).

Besides, there were also other four theoretical types, but they were represented only by 1.22%–7.54%. In 1948–1990, one change type (–++) involved almost 96% of all BTUs, while another one (––+) applied to all (4%) of the remaining BTUs (––+). The whole period can be assessed in similar terms, i.e. changes of the second period significantly outstripped changes of the first period.

- Assessment of typological changes involving four ALR categories is provided in table 5 of the annex. In total, arable land grew in this period in 258 BTUs and diminished in 233 BTUs. Permanent cultures (mainly gardens) expanded in 464 BTUs. Meadows grew in 340 and pastures only in 17 BTUs.
- In 1948–1990, the same typology shows a significantly different distribution of 16 possible types of ALR structural changes. Arable land grew only in 65 BTUs, permanent cultures (gardens) in 407 BTUs, meadows in 218 BTUs, and pastures in 96 BTUs.
- The overall character of landscape changes is specified by the change index. It is calculated from total values. In relation to the first period of more than hundred years, the index value equalled 5.5% (i.e. 5.5% of the whole region were affected by category changes within the period). The second period lasted only 42 years, but the change index value reached 13%, which implies that the second period was affected by significantly bigger changes – in proportion to one year, their intensity was 4 times higher!

The main objective of the paper was to characterise main trends in development dynamics of individual categories and the overall area structure. Undoubtedly, the impact of changes in area use on runoff conditions and retention capacity in the Otava river basin can be assessed only after analysing further details. It is vital to study terrain roughness in individual categories and the overall fragmentation that plays a significant role in the water retention process. Nevertheless, in terms of ecology and water management, the changes summarised in the paper resulted in an unquestionable improvement of valuable areas (forest areas, meadows and pastures), in a significant reduction of arable land, and overall decrease in the ALR, particularly in the second half of the 20th century. We must say, that especially in the transformational period (after 1990) rose differences between real size of categories in landscape and in the statistics of geodetic survey. This difference in the case of arable land is approximately 8% for all Czechia (therefore is higher share of unregistered grasslands), higher percentage are concerned in the mountain and hilly regions.

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VÝVOJ STRUKTURY PLOCH V POVODÍ OTAVY V LETECH 1845–1948–1990

Résumé

Článek charakterizuje hlavní trendy v dynamice vývoje jednotlivých kategorií a celkové struktury ploch v povodí Otavy.

Sledován je rozsah vybraných kategorií landuse, které mohly významněji ovlivnit změnou své rozlohy odtokové a celkové přírodní poměry v povodí Otavy. Soustředili jsme se na ZPF, ornou půdu, lesní plochy, dále pak na index změny vyjadřující celkovou intenzitu změn ve sledované územní jednotce (pomocí podílu ploch z celkové rozlohy na nichž došlo ke změně kategorie) a typologii vývoje struktury ploch. Jednak je hodnocena makrostruktura podle šesti typů na základě přírůstku či úbytku ve třech kategoriích sumárních – ZPF, lesních a jiných ploch, jednak uvádíme vývoj (úbytky či přírůstky) čtyř kategorií ZPF – tedy 16 možných typů vývoje struktury.

Použité údaje vycházejí z databáze v prostředí GIS, obsahující data o využití ploch pro osm základních a tři sumární kategorie, kromě potřebných dat identifikačních a navazujících. Jsou sledovány orná půda, trvalé kultury, louky, pastviny (dohromady tvořící zemědělskou půdu – ZPF). Další základní (i sumární kategorií) jsou lesní plochy. Třetí kategorii sumární tvoří jiné plochy (zastavěné, vodní, ostatní). Tyto údaje jsou za cca 13 000 katastrálních území pro roky 1845, 1948, 1990 a částečně i 2000 převedeny na základní územní jednotky (ZUJ) na principu srovnatelnosti dat.

Výsledky hodnocení ukazují, že v celém stošedesátiletém období došlo k výměně nejvýznamnější kategorie využití ploch. V roce 1845 byla nejrozsáhlejší kategorií orná půda s necelými 40 % na rozloze území, v roce 1990 to byly lesní plochy podílem 39,13 %. Podíl lesních plochy se v celém sledovaném období postupně zvětšoval – oproti roku 1845 prakticky o jednu třetinu. Celkový pokles ZPF v období sledovaných 160 let představuje 49 000 ha.

Podíl zastavěných ploch, třebaže v území došlo k významnému poklesu počtu obyvatel, dvojnásobně vzrostl z 0,43 % na 1,05 %. Podstatně největší vzrůst ovšem zaznamenaly ostatní plochy. Zatímco v počátku analyzovaného období zaujímaly necelých 5 800 ha v roce 1990 to bylo 32 740 ha. Šlo tedy o více než 2,5násobný nárůst z 1,94 % na 10,99 % v roce 1990.

Celkový charakter přeměny krajiny dokumentuje index změny. Ten pro celé území počítaný z úhrnných hodnot (tedy zahrnující i protichůdný pohyb jednotlivých ZUJ) vykazuje pro prvé období, více než stoleté, úroveň 5,5 % (což představuje 5,5 % celkové plochy regionu na nichž došlo mezi krajními léty ke změně kategorie). Index změny ve druhém období, které trvalo jen 42 let, tedy dvaapůlkrát kratší periodu, úrovně 13 %. To zcela jednoznačně dokumentuje podstatně větší změny v druhém období, v přepočtu na jeden rok zhruba 4x intenzivnější!

Je zřejmé, že k posouzení vlivu evidentních změn ve využití ploch v povodí Otavy na odtokové poměry a schopnost krajiny „podržet" srážkové přívaly je nutné analyzovat další podrobnosti. Především členitost jednotlivých kategorií ploch a celkovou fragmentaci krajiny, která hraje pro zadržení vody významnou roli. Nicméně zde dokumentované změny bezpochyby vedly ke zlepšení celkové struktury ploch posílením rozsahu ekologicky a vodohospodářsky cennějších kategorií (lesní plochy, drnový fond) a naopak významným zmenšením jak celkového rozsahu orné půdy, tak celkovým poklesem rozsahu ZPF a to především v druhé polovině 20. století.