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Land Use/Cover Changes in Selected Regions in the World

Volume I

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IV. Land Use/Cover Changes in Czechia over the Past 150 Years – An Overview

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1. Land Use in Czechia: Data Sources, Classification, Methods

Czechia (political name Czech Republic) is a landlocked country in Central Europe. Though it is equidistant from the Baltic and Mediterranean seas and occupies a truly central position in Europe, it is not, like some continents, a space that is a deserted periphery. On the contrary Czechia is a relatively densely populated state (130 people/sqkm) and only a few decades ago its economy was among the best in the world. The country is quite rich in natural resources and has a long industrial tradition.

The most typical landscape of Czechia is a rolling, undulating country. Mountains form a fringe along the border but none are very high: the highest point, Mount Snezka, reaches only 1,602 meters a. s. l. The lowest point of Czechia, territory, at elevation 115 m.s.l. lies along the Labe River at the German border. There are also fertile plains, but these are small, following the major rivers Labe, Vltava, and Morava. Thus the most distinctive natural feature of the country is a great variety of landscapes in a relatively small area.

Because people have settled what is today Czechia over a thousand years ago, hardly any truly natural landscape remains. The early landscape was almost 90 % forest. Consequently, the most widespread land use and land cover types bear a strong human impact: agricultural land, secondary forests, and built-up areas.

Land use studies in Czechia are strongly supported by a long tradition of land use data collection. The whole territory was surveyed very early – between 1825 and 1843. The survey resulted in a series of maps at the scale 1 : 2,880; each cadastral unit (average size 6 sqkm, totaling some 13,000 units) was mapped and included also a detailed land use and land cover structure. The areal extent of each land use and land cover category in all cadastral units has also been recorded in a numerical form. These valuable records are kept in archives and have been irregularly (more recently, regularly) updated.

Only basic information on the methods of land use research can be described in this text. Most analyses utilize data from 1845 (the results of the first land survey), 1948 (after World War II, before the installation of Communist regime), and 1990 (the end of Communism) – see references. Soon, the data for 2000 (reflecting the land use structure after ten years of societal transformation) will be included.

For the sake of comparison, eight land use categories are distinguished: arable land, permanent cultures (gardens, orchards, hop-fields, vineyards), meadows, pastures, forest areas, built-up areas, water areas, and so-called remaining areas. The simplified structure includes agricultural land (arable land, permanent cultures, meadows, and pastures combined), forest areas, and “other areas” (built-up land, water bodies, and remaining areas combined).

The areal structure of some 13,000 cadastral units has been reduced to ca. 9,300 basic territorial units due to inter-cadastral boundary changes. One and the same basic territorial unit must have had the same size in 1845, 1948, and 1990; the maximum difference is 1 %. Most basic territorial units include one cadastral area only; some were created by amalgamation of two or more cadastral areas. Consequently, data by basic territorial units from all years are comparable and allow historical analyses.

Shares of all basic land use categories in the total area have been computed for 1845, 1948, and 1990 (see example on the opposite page). The same applies for areal changes of all basic categories in the periods 1845–1948 and 1948–1990 as well as for the index of change (see examples on the following pages). Other analyses include major types of change (see examples on the following pages), and search for driving forces or major causes of land use change. The latter is based on correlation of land use data with other socio-economic and physical-geographical data. A number of detailed studies have also been completed. Special attention is given to the border areas and the way how land use structure changes responded to the German population transfer after World War II from former Czechoslovakia (this transfer was similar to those in Poland, Hungary and other Central European countries as a result of the allies Potsdam conference agreement in 1945).

The immense set of land use data began to be analyzed and used for scientific purposes starting in the 1980s. A special land use research team was created at the Department of Social Geography and Regional Development, Faculty of Science, Prague, in 1994. In the past few years the original numerical land use data have been converted from hand-written sheets to computer files, historically comparable areal units were created, an electronic GIS land use atlas came to existence, and a number of regional analyses have been carried out (see references).

2. Agricultural Land

Agricultural land is composed of four different land-use categories: arable land, permanent cultures, meadows, and pastures. In most areas – especially in low and flat landscapes – agricultural land still covers more than 50 % of the total area (see map on previous page).

The area covered by agricultural land in Czechia has undergone substantial changes. Generally, agricultural land had expanded until 80s of the 19th century when it reached its peak; in that time agricultural land prevailed totally in low-lying areas (Central Bohemia, Southern Moravia) and covered large tracts of land also in hilly regions and in the mountains, even at altitudes over 1 000 m a. s. l.

The development of an industrial society, however, has produced increasing physical and economic pressure on agricultural land which became more frequently converted to other use. Until World War, II agricultural land had been decreasing mostly due to economic reasons: conversion to another use on a large scale first took place in urban areas and their immediate environs and in less fertile regions (see dark blue areas on the map).

An intensive decrease of agricultural land after World War II can be observed in all regions of Czechia. Most significant agricultural land losses happened in the border areas. The Czech frontier, plagued by the transfer of Germans (3 million people were moved from Czechoslovakia in 1945–47), became depopulated and generally neglected. In many places there was no one to care for the farmland and it was often invaded by forests (see dark blue areas on the map). These abrupt social and political changes, however, were reflected in the land-use structure after a certain delay, mainly after the 1948 installation of the “Iron curtain” along the south-western border of West Germany and Austria effectively made large tracts of land close to the border inaccessible.

The period 1948–1990 marked the existence of a totalitarian Communist system and a centrally planned economy. Agricultural land

was de facto nationalized soon after 1948 and began to be managed by the so-called state farms or Soviet-type cooperatives; these organizations were responsible for more than 99 % of all agricultural land. Though self-sufficiency in food was among the important targets of the Communist government, agricultural land has been gradually decreasing ever since 1948. Much of the agricultural land has been swallowed by large-scale industrial and housing projects that required a lot of land – usually partly arable land. This was the case for pit mines, power plants, water reservoirs and also new investments into socialist agriculture (mechanization centers, large stables, stores).

In the framework of agricultural land there has been a shift from arable land to meadows and pastures. Again, this process was more intensive in the border lands and in mountainous regions.

Though agricultural land reduction in the period 1948–1990 was substantial, the complex system of state subsidies and also the Agricultural Land Protection Act (1976) slowed the process. Especially less fertile regions enjoyed a high level of subsidies which helped many agricultural cooperatives of different forms and state companies survive economically. Undoubtedly, agricultural land changes would have been even faster under market economy conditions.

After 1990 the market economy was gradually re-established. Much of the agricultural land has been returned to the original owners, new types of transformed cooperatives (based on land ownership) emerged and farmers now must respond to national and international market conditions and EU agricultural rules are more protective and subsidized than Czech agriculture. Subsidies in the EU for agriculture and rural regions in general for gross agricultural production amount to 50 % of total costs whereas in Czechia it is only about 20 %. This situation has recently caused serious problems for Czech agriculture which may be removed after the Czech Republic joins the EU. Subsidies geared towards increased agricultural production have been cut and on the contrary, money is now spent to promote non-production functions of farms (afforestation, conversion of arable land to grassland, etc.). The reduction of agricultural land in general has continued; in reality many fields are not used anymore and lay fallow. Thus, in many places meadows and pastures are formed naturally. This increase of grassland occurred initially after more than one hundred years. With the influx of foreign investments pressure on the land is very intensive especially in attractive locations (environs of cities, along highways, at border crossings). The Ministry of Agriculture estimates that agricultural land may be reduced by up to 20–30 % compared to the acreage in 1990.

3. Forest Areas

In the pre-historic period forests covered almost the whole territory of the Czech Republic. The process of de-forestation was slow, and after the arrival of the first tribes, it took thousands of years until large tracts of forests were replaced by cultivated land. On a European scale, forests still covered some 80 % of the land around 1000 A. D.

The necessity to feed a growing population and more advanced technical skills led to large-scale forest clearance from the Middle Ages. Many natural forests were cut during colonization in the 13th–14th centuries when border areas of Czechia were systematically settled not only by Slavonic populations from internal regions, but mostly by Germans who were invited by Czech Kings (Kings of Bohemia) and nobility from relatively overpopulated regions of mediaeval Germany in order to get larger feudal ground rents. In low-lying areas forests were cut to make room for farmland, more space was needed for urban sprawl. Mountain forests were a vital source of energy. By the mid-19th century forests were reduced to less than 30 % of the total land. At that time, large forests were found only in the border mountains and most were not primeval forests any more.

In the period 1845–1948 deforestation continued only in the most fertile areas (Central Bohemia, Southern Moravia) where the last few

remaining forests were cut. Some deforestation occurred also in regions where heavy industry developed (Northern Bohemia, Northern Moravia). In the mountains and highlands the process was quite different: forest expansion occurred. In most regions, however, the changes were not by any means dramatic. From about the middle of the 19th century over the entire area of Czechia there was a general tendency for forest areas to increase permanently, reversing the earlier process. This was primarily because lumber became valuable construction and raw material (e.g. for paper production) as well as fuel.

The shift towards afforestation became more pronounced after the 1930s. The map shows that, in the period 1948–1990, there has been an increase in forests in more than 85 % of the basic territorial units. The spatial structure of afforestation is quite complicated and no generalization can be found: forest expansion occurred both in the mountains and plains, in the urban hinterland as well as in marginal regions. There has been a significant forest area increase in the former boundary regions on the frontier. Instead of planned afforestation, however, it was a natural expansion in which forests gradually invaded abandoned fields, meadows, pastures, and built-up areas. After World War II more than 1,000 villages ceased to exist – many were overgrown by forests.

What statistical land-use data can not show, however, is the quality of forests. Due to increased air and soil pollution many forests (especially in Northern Bohemia) have been badly damaged by acid rain especially since the 1960s and their environmental function has been reduced or even damaged. In the second half of 1980s it has been estimated that all forests would die within the next 10 to 15 years. Given that political and economic conditions after 1989 have changed totally (lower demand on energy production, significant decrease of pollution, etc.) this prediction was not fulfilled. Forest plots (the term used in the statistical records) or forest areas (the term we use) does not necessarily mean that such land is covered by forests. It refers to areas reserved for forests and the areas are only covered about 85–95 % by actual forests.

Slow afforestation continued also into the 1990s. More important, with the gradual close-down of polluting industries, forest quality stopped deteriorating. The present-day forests have mostly been created in the 18th–20th centuries; this fact is reflected by their micro-regional location (high grounds, poor soils, sloping land), territorial structure and composition. Secondary forests form more than 90 % of all forests and spruce monocultures still prevail. But this ecologically and economically negative situation has started to improve. Forests are seen as a stabilizing component in the landscape and apart from their pure economic function (as a source of wood) they provide a healthy environment sought after by a growing number of domestic and foreign visitors and tourists.

4. Major Types of Land Use Changes

Maps and tables show the prevailing types of land use changes for the periods 1845–1948 and 1948–1990 respectively. This analyses use the basic territorial units which are divided into a few groups. Increase (decrease) of each land use category over the specified period identifies each basic territorial unit with combination of digits – 0 (decrease) or 1 (increase or no change) – and the percentage of all possible combinations (001, 101, etc.) is calculated. The scale or size of change is not taken into account here; decrease by 0.5 hectares has the same meaning as decrease by 500 hectares.

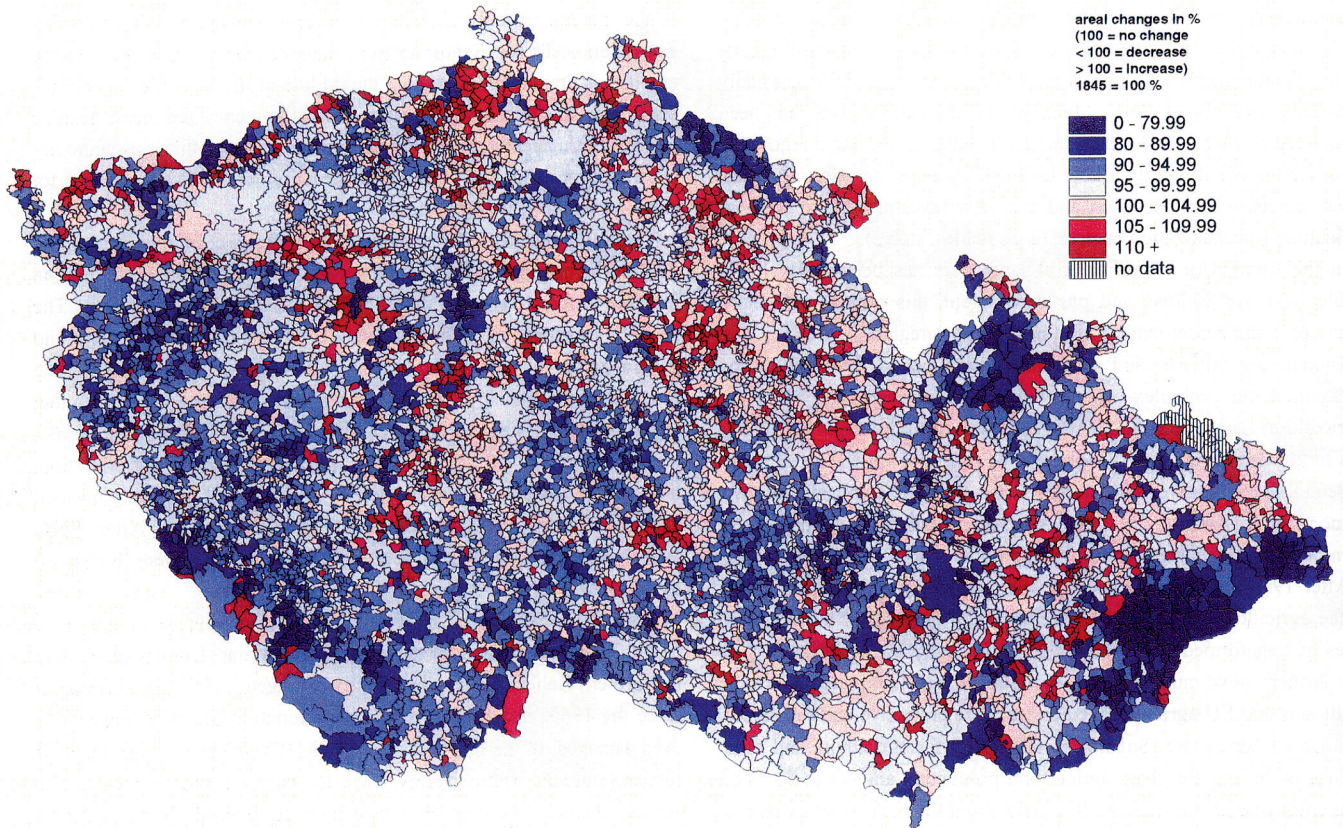
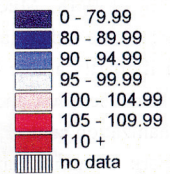
There are many ways to apply this method; only two are shown here. First, the “macrostructure” is analyzed: the increase (decrease) of agricultural land, forests, and other land is examined. Second, only changes within agricultural land (i. e. arable land, permanent cultures, meadows, and pastures) are traced.

The changes of macrostructure are shown on maps and in one table. In theory, only six combinations should occur; the creation of basic

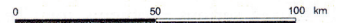
Areal changes of agricultural land 1845 - 1948

Legend

areal changes in %
(100 = no change
< 100 = decrease
> 100 = increase)
1845 = 100 %



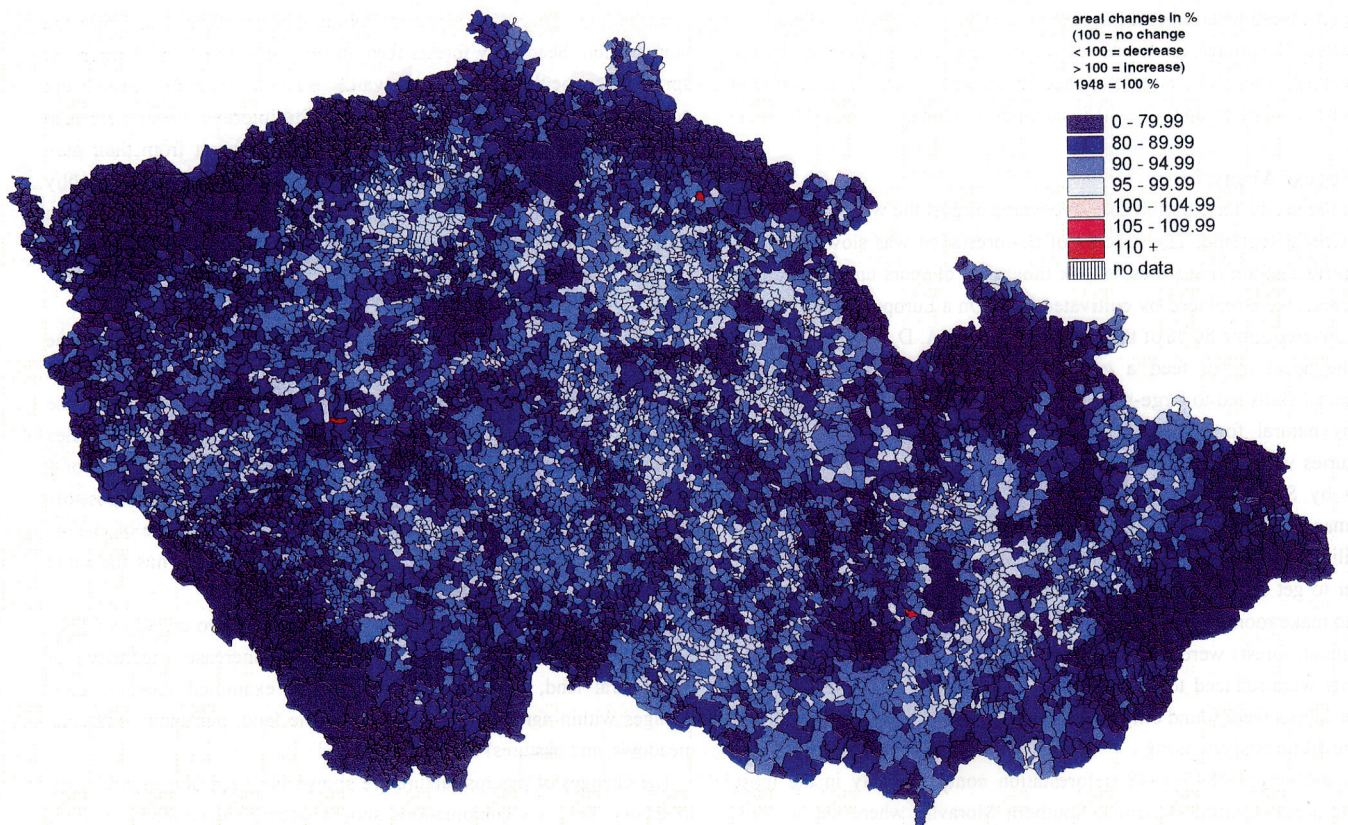
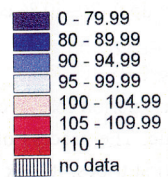
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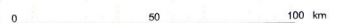
Areal changes of agricultural land 1948 - 1990

Legend

areal changes in %
(100 = no change
< 100 = decrease
> 100 = increase)
1948 = 100 %



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territorial units, however, includes a 1 % error rule (see previous text). There are also a few units where everything increases or everything decreases.

The changes of macrostructure between 1845 and 1948 differ greatly from the changes between 1948 and 1990. The spatial structure of changes in the first period (see the upper map) is much more complicated and more types of changes are found. On the contrary, the post-war picture (see the lower map) appears much more simple: most basic territorial units show just one type of change. The only major similarity is that, in both periods, a decrease of agricultural land, and an increase of forests and other areas prevailed (combination 011 or -++). In the post-war period this type of change prevailed overwhelmingly and has been recorded in 86 % of the basic territorial units. It is theoretically very interesting that the map of period 1948–1990 reflects also in the case of land use changes little or any diversity like in society political, cultural etc. structure, typical for the totalitarian system.

In the period 1845–1948 almost 30 % of the basic territorial units experienced an increase (stagnation) of agricultural land. Such changes practically did not occur in the post-war period. In this period 99 % of all basic territorial units were characterized by a decrease in agriculture and 80 % by an increase in forest areas, i.e. their area increased to the detriment of agricultural land.

The same method was used in order to trace changes in the framework of agricultural land. In this case there are 16 possible combinations. Again, the main tendencies are quite different when both periods (1845–1948 and 1948–1990) are compared. Arable land decrease, for instance, was recorded in less than 40 % of the basic territorial units in the first period; in the second period it was almost 90 %. Permanent cultures (gardens, orchards, hop-fields, and vineyards) have been increasing in most cases in both periods. The most frequent type of change in the first period was an increase of arable land and permanent cultures, and a decrease of meadows and pastures; in the second period there was an increase of permanent cultures, and a decrease of arable land, meadows and pastures.

Table 1: Typology based on the character of the development of three main land use categories area (in %)

Table 2: Typology based on the character of the development of the agricultural land sub-categories area (in %)

Note: AGL = agricultural land, FA = forest areas, OA = other areas, N = number of basic territorial units, AL = arable land, PC = permanent cultures, Me = meadows, Pa = pastures

5. Index of Change

An index of change shows the varying intensity of changing land use patterns in different regions. Though it works for data for individual land use categories (arable land, permanent cultures, meadows, pastures, forest areas, water areas, built-up areas, and “remaining” areas), the picture created by this index is a general one.

The index is calculated as follows: areal differences (in absolute values) among all land use categories within a specified period of time (e. g. 1845–1948 or 1948–1990) are summed up and this sum is divided by the total area doubled. In theory, results can vary in a range between 0 and 100. Zero would mean that there has not been any areal change in any land use category; one hundred would mean that, for instance, all land has been converted into open mine (i. e. an area originally covered by agricultural land, built-up land, etc. has been changed into category of “remaining” areas).

The index of change reflects the percentage of land where land use change occurred in the respective time period. It reflects the intensity of change in the area of study. The quality of change, however, is not taken into account; the index does not distinguish between change from arable land to grassland on one hand and urban sprawl when built-up areas

swallows agricultural land or forests on the other hand. It reflects only the extent of areas that undergo a change.

The general index of change can be supplemented by indicating how individual land use categories contribute to the index. These specific land use shares include the marks + or – so that the index can show – apart from the intensity of general changes – also the prevailing tendencies of land use changes in the area of study. For instance, this supplemental index indicates whether there has been relatively more change within built-up areas or within grasslands, etc.

The maps on the opposite page show the general index of change in the Czech Republic by basic territorial units in the periods 1845–1948 and 1948–1990. Though the first period is significantly longer (covering more than 100 years) than the second period, the general intensity of land use changes has been much higher in the latter shorter period.

The index of change in the period 1845–1948 (upper map) seldom reaches a value of 20 or more. In other words, there were only a few basic territorial units where more than one fifth of the land has been converted into another use over more than 100 years. The areas of relatively intensive changes are mostly found in lowlands. It probably reflects the intensification of agricultural production that included soil reclamation schemes and increase of arable land area. This is apparent, especially in the lowlands of the Labe and Morava river, where many swamp reclamation and rivers canalization schemes were created. High index of change is also recorded in urban areas and in the environs of cities especially cities such as Praha, Plzen, Usti nad Labem, etc.

The index of change in the period 1948–1990 (lower map) is relatively high and also the regional differences are more pronounced. In a number of basic territorial units the index exceeds 30 %. The most intensive land use changes have been recorded in coal basins where open pit mining became a rule (Northwestern Bohemia, Northern Moravia). Coal exploitation attracted a number of related industries and migrants that flocked into these areas – industrialization and urbanization combined created intensive pressure on land. Major urban areas (Prague, Brno, Plzen) experienced high intensity of change as they did in the previous period. It is noteworthy, that a high index of change is found in many mountainous border regions. In this latter case the explanation includes depopulation and consequent land use changes as a result of the Czech Germans transfer after World War II and also the installation of the iron curtain along the western border of Czechoslovakia. Moreover, extensive military training areas were established after World War II (or shortly before the War) and can also be clearly identified with an intensity of land use change in these areas.

In contrast, only minor land use changes in the period 1948–1990 have been recorded in sparsely populated peripheral regions with a weak economic base. Such marginal regions are usually distant from major urban centers and often coincide with administrative boundaries between neighboring provinces and districts.

6. Conclusions - Czechia: the Predominant Social Driving Forces of Land Use Change

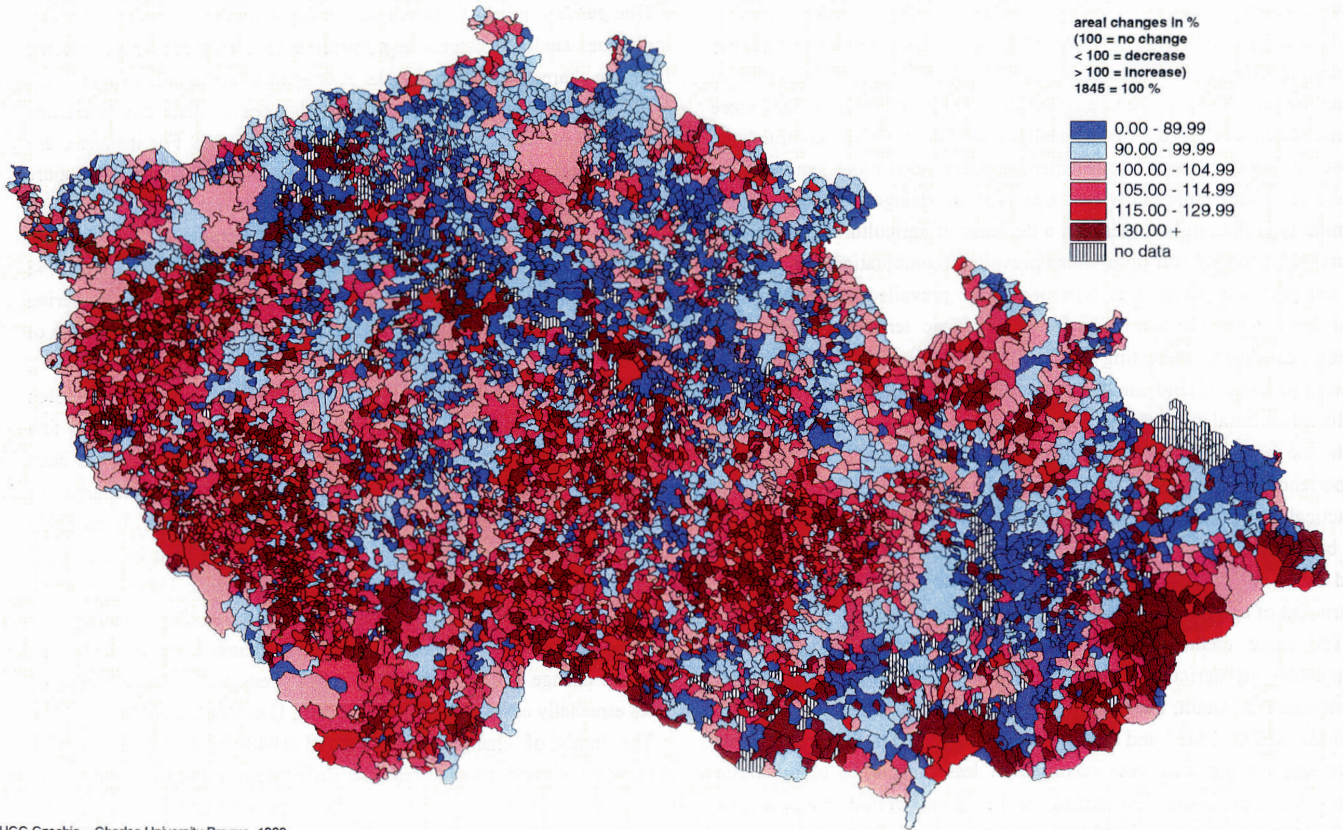
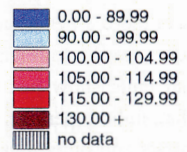
In the foregoing sections we characterized basic changes in all land use categories in Czechia and total changes in the land use structure including intensity. It is necessary to emphasize our awareness that the periods we observed admittedly correspond to the main periods of political and economic change on the territory of Czechia from the middle of the 19th century until today. However, they cannot fully correspond to all factors affecting land fund development. We use this societal development periodization as a background to identify the individual driving forces affecting land use change.

In addition, the period 1845–1948 embraces four main political-economic factors having a serious impact on the territory of Czechia: 1) the onset of market agriculture and termination of extensive agricultural land enlargement in the 80s and 90s of the 19th century; 2) the birth of

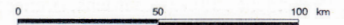
Forest area changes 1845 - 1948

Legend

areal changes in %
(100 = no change
< 100 = decrease
> 100 = increase)
1845 = 100 %



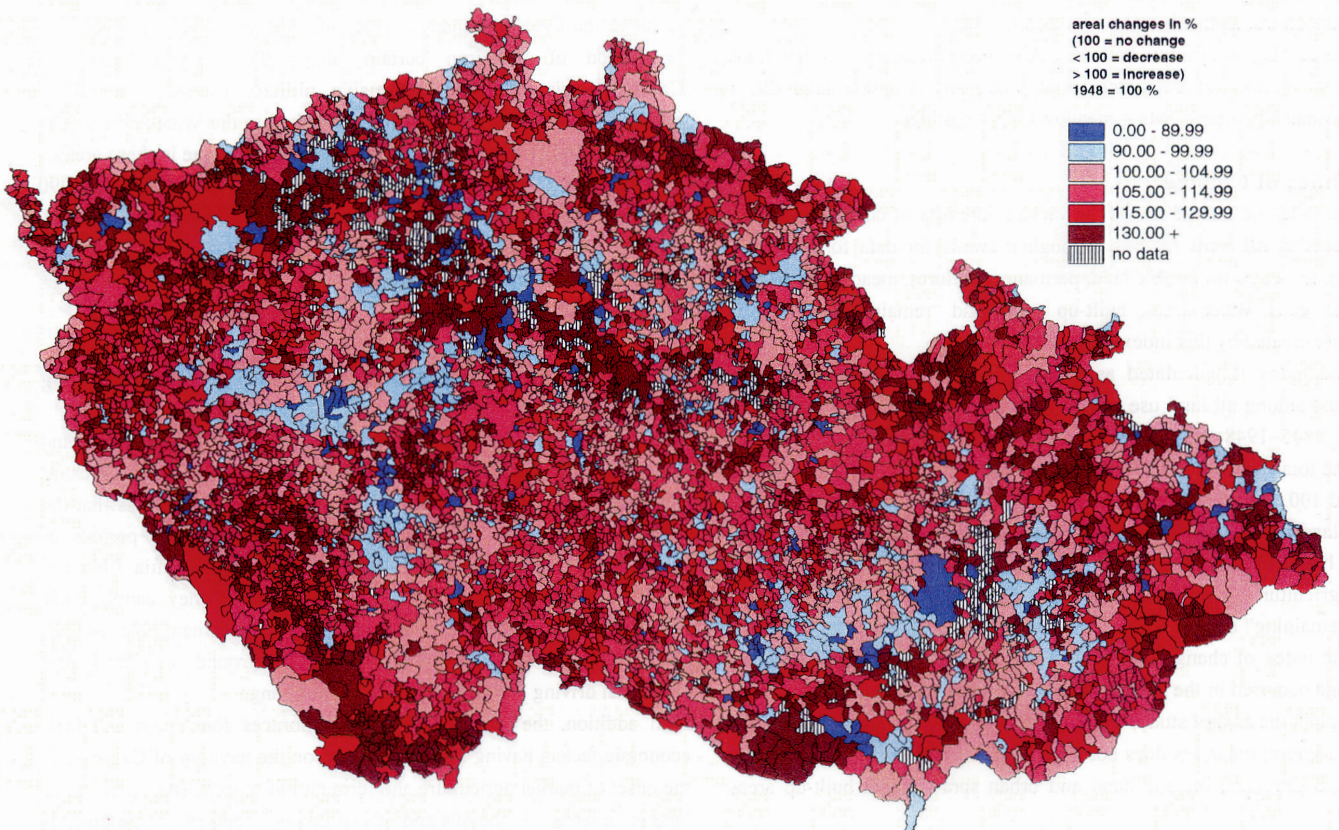
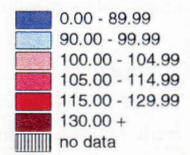
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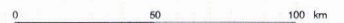
Forest area changes 1948 - 1990

Legend

areal changes in %
(100 = no change
< 100 = decrease
> 100 = increase)
1948 = 100 %



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an independent Czechoslovak state in 1918; 3) a new geopolitical and geoeconomic position of Czechia or Czechoslovakia and the global economic crises of the 1930s; 4) the occupation of Czechoslovakia and the Slovak separation in WW II; 5) the three years of non-communist rule after the war.

It is apparent that these circumstances undoubtedly influenced the agricultural policy possibilities and changes in the Czechoslovak economy. These factors affected the entire land use structure as well as individual land use categories changes in between shorter periods (compare the graph representing the index of change development or another, showing average changes of land use categories per year in Czechia during the nine periods (see below) from 1845 to 1999.

The following overview of the main societal driving forces or causes of land use structure in Czechia characterizes the prevailing tendencies as weighted average “change” that from a regional point of view, varies greatly as a result of large regional differences caused by the extraordinary natural diversity of Czechia’s landscapes.

1845–1882: was a period marking the culmination of the Agricultural Revolution – extensive development of agriculture based on arable land area slowly increased – farming under fallow declined – in forest areas, former permanent decreases changed to permanent increases, there were important changes in the agricultural land structure, mainly affected by differential rent I (reflecting differences in fertility among different plots of land, and among their position to the market of agricultural products) such as the rise of permanent cultures and major decreases of pastures and meadows. Arable land increased mostly in lowland regions with more fertile soils and was accompanied by draining of wetlands and flooded areas. Arable land increased also in frontier regions either with a high density of population (industrialized regions where many workers also gained earned income from farming) or in small population regions (logging areas). In all time periods observed, the third least significant overall change occurred during this period.

1882–1897: This was a period of rapid transition to the more intensive agriculture especially in fertile regions, and then there began a greater influence of differential ground rent II (which reflects larger capital investments into the same or rather smaller areas of more fertile soil). European agriculture was exposed to competition from cheap American grain which was transported by large and rapid steamships. A long drawn-out agrarian crisis started. The impact of these historical developments caused the smallest land use changes for all time periods observed.

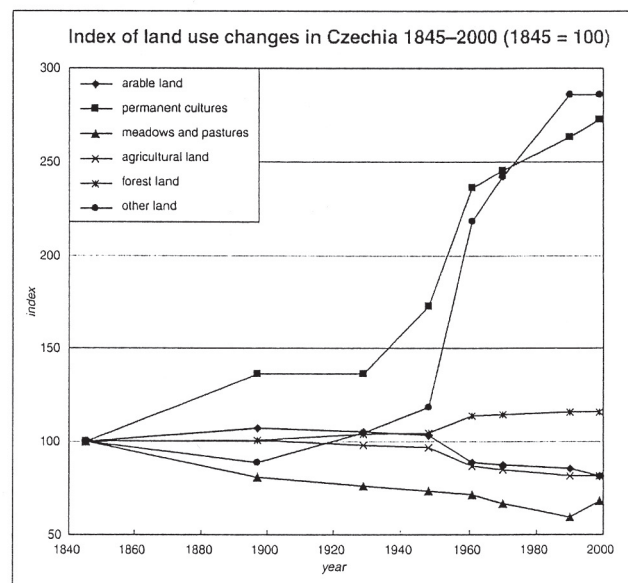
1897–1921: After 1905 there was a period of agricultural boom based on intensification typified by the elements of the second phase of the agricultural revolution (introduction of crop rotation systems), mechanization (including the onset of electricity and the combustion engine), beginning of the application of artificial fertilizers, land reclamation, (amelioration), and the impact of World War I on large arable land areas, pastures and permanent cultures, and agricultural land decrease (as fields were converted into meadows) caused by a lack of labor force (many farmers were in uniform) and capital, resulting in a larger increase of forest areas similar to the period 1948–1961. But in general, there were average land use changes noted among periods we observed.

1921–1929: was a period of economic boom following the end of the WW I, and mainly of land (real estate) reforms resulting in the “mobilization” of arable land (and its area increase: the largest in the two periods typified by arable land increase only) especially by small farmers who acquired new plots of land formerly farmed by great estates. Significant increases of arable and agricultural land occurred; for the first time we note the increase of permanent culture areas (orchards, gardens, vineyards) caused mainly by the intensive construction of family houses and later, in part by the beginning of secondary houses construction (about 400,000 second homes were

counted in the 1991 census, of which average area was 500 km²). These “country homes” became very popular in the totalitarian period especially.

The growth of these so called permanent cultures areas became permanent and continues till today. After the W.W.II, due to the very limited possibilities of travel abroad and private financial investments into enterprising, the family house construction associated with these permanent cultures became the substitute for other activities and we are noting a significant increase of small gardens and orchards adjacent to these houses. There was in this period 1921–1929 also the continual decrease in the area of meadows and pastures. This is the only period with forest area decrease – in general the second largest land use change.

1929–1948: The Big World Economic Crises in the early 1930s and World War II as well as the impact of the German occupation of Czechia. Small decreases of arable land and agricultural land promoted land use changes similar to those between 1882 and 1897. There was a small increase of permanent cultures, meadows, forests and “other” areas – not very extensive land use changes.



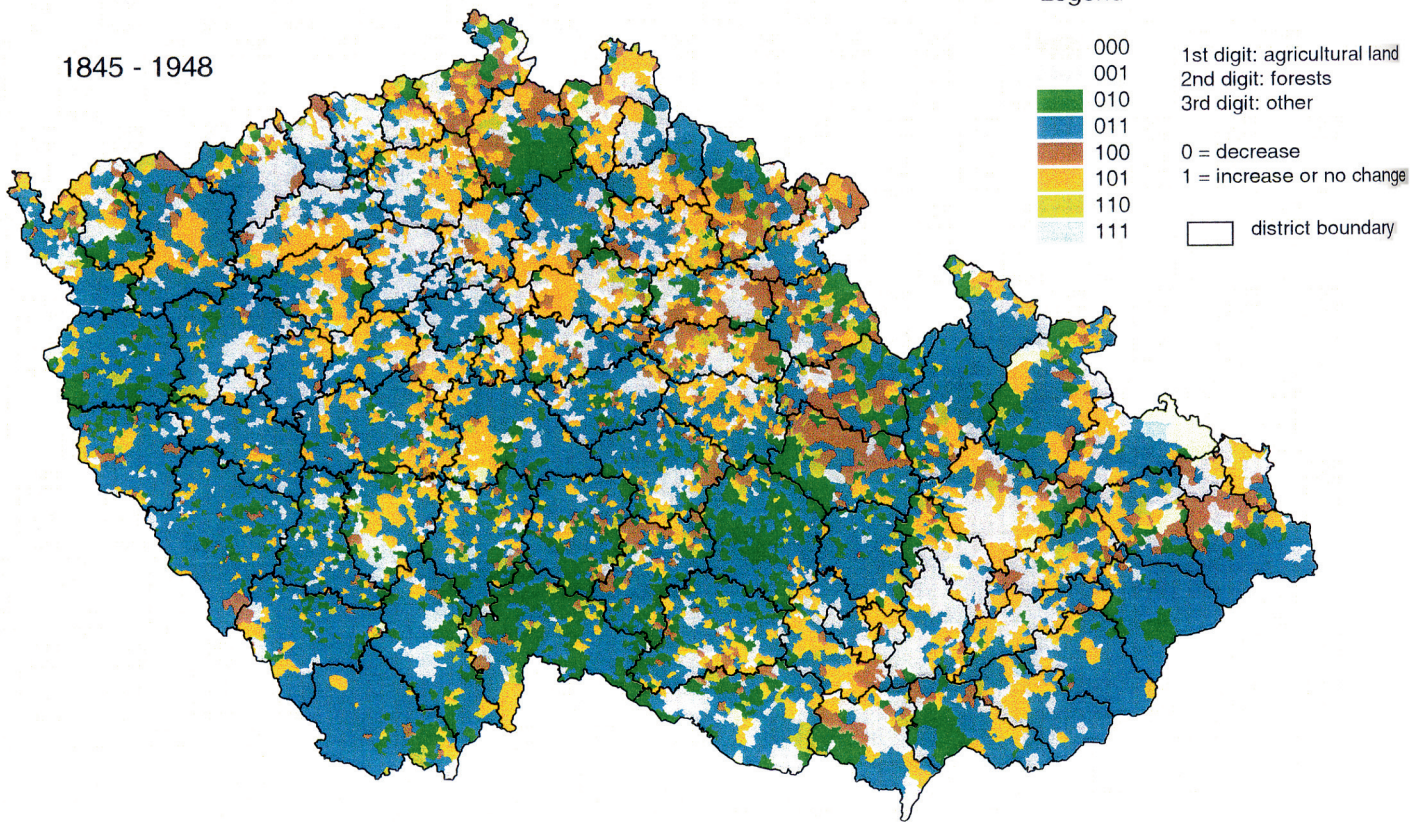
1948–1961: Was a period of phase shifts influenced by the impact of the war economy, the transfer of Czech Germans from Czechia (Czechoslovakia) from the border regions which were not fully resettled from internal sources. This resulted in a massive depopulation and therefore in land use changes such as afforestation of the arable lands, an increase of meadows and pastures areas. Extensive development of a centrally planned economy derived from the Soviet “iron concept” including immense construction activities, mining, worsening of soil quality was begun. Most important and the most significant changes of land use structure include: the largest decrease of arable land and agricultural land from 1845 until 2000 (there was an increase in permanent cultures only) and their transformation into forests (on less fertile soils) and especially into other land use categories (the largest increase of the remaining areas category of land use) mainly to the detriment of fertile soils in flat lowlands – the most important and the most significant changes of land use structure of all time periods was observed.

1961–1970: Was a period of economic depression in the first half of 1960s: there was a greater focus of farmer? co-operatives and of state estates to force the intensive farming inspired by economic reforms of the “Prague Spring”. Land use changes were significantly minor in comparison with the period 1948–1961.

1970–1990: Was a period of economic stagnation and mobilization of all available natural sources, sustained on the basis of the extensive

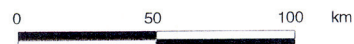
Types of land use changes

1845 - 1948



Legend

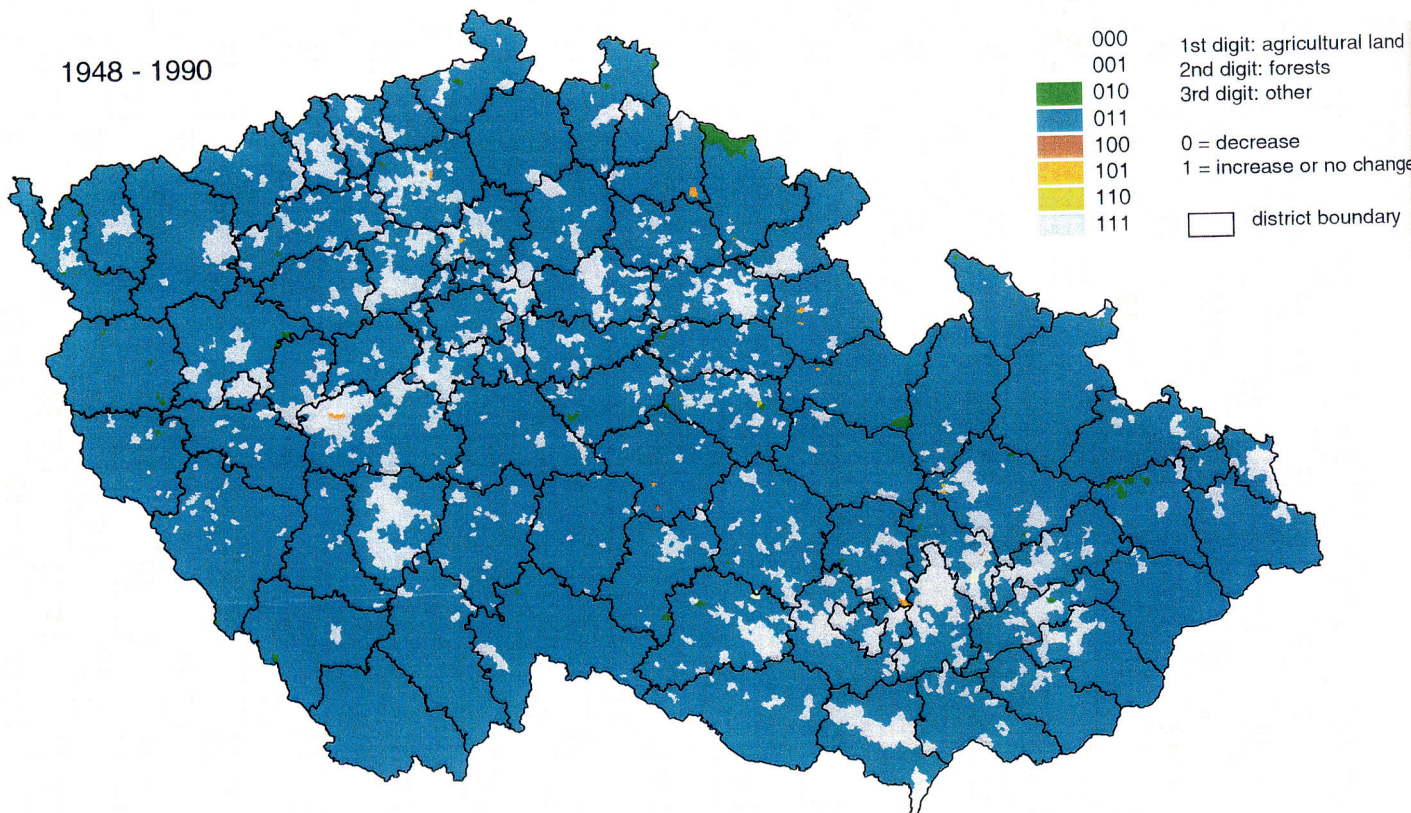
- 000 1st digit: agricultural land
 - 001 2nd digit: forests
 - 010 3rd digit: other
 - 011
 - 100
 - 101
 - 110
 - 111
- 0 = decrease
1 = increase or no change
- district boundary



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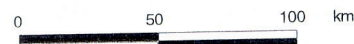
Types of land use changes

1948 - 1990



Legend

- 000 1st digit: agricultural land
 - 001 2nd digit: forests
 - 010 3rd digit: other
 - 011
 - 100
 - 101
 - 110
 - 111
- 0 = decrease
1 = increase or no change
- district boundary



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efforts (like in the 1950s) of natural and labor forces. The occurred the first unsuccessful attempts to intensify the national economy, to continue activities to stop economically unfavorable tendencies in land use development, especially of agricultural land losses. The law for agricultural land protection was approved in 1976. On the whole it was a period characterized third most significant land use changes: But agricultural land preservation became most important factor in physical planning.

1990–2000: Re-installation of a market economy; economic competition from the international competitors, especially from the EU. The restoration of the differential ground rent impacted on agriculture and free land market and resulted in the second biggest decrease of arable land areas, large increase of permanent cultures (second to the period of 1921-1929). A fundamental change in the permanent grasslands was a development in the opposite direction – such area increase as did some forest areas, and there was a restoration of land use trends which were effective until 1948. These changes had definite positive effects on the improvement of the general environmental situation. The share of environmentally positive categories of land use (i.e. permanent grass coverage or forests) increased and the share of arable land area (erosion, etc.) decreased.

The Agricultural Land Protection Act approved in 1976 limited the sub-urbanization processes around the cities of Czechia where soils of higher fertility predominated. According to this law a new land use category was applied, i.e. temporarily abandoned (unused) agricultural land. These areas, for instance land available after mining termination, had to be turned into former state which made possible their agricultural use, or the area of agricultural land needed had to be reclaimed in another areas or regions by developer.

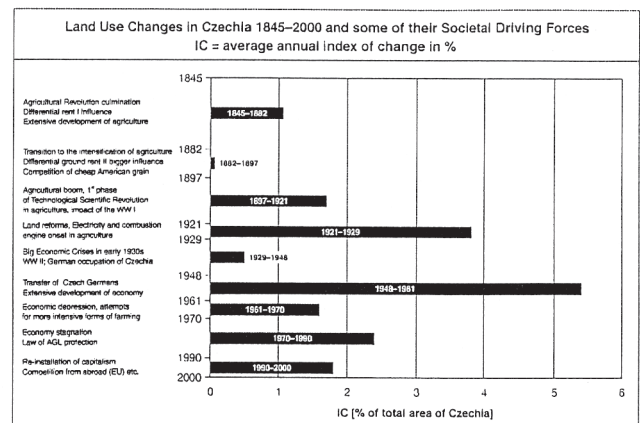
The restitution of land property back to former owners or their descendants and land privatization after 1989 changed the land property situation: only about 20 % of the land is now owned by the state. These fundamental social and economic changes resulted in the second largest decrease of arable land areas for all time periods observed. Until the fall of Communism in Czechia, producers farming in better (above-average) regional conditions had to pay a special tax from their agricultural land (the better the land, the higher the tax). The producers from regions with worse (below-average) conditions for agriculture did not need to pay a tax, and, on the contrary, their production was subsidized by the government to assure profits for them. The state received money for this purpose mainly from taxes paid by farmers in fertile regions. It resulted in a situation in which “everything was grown everywhere”.

Currently only non-productive functions of agriculture are subsidized by government, especially functions focused on nature and landscape conservation (e.g. ponds and stream maintenance or reclamation, and the conservation of meadows and pastures located on sloping areas etc.). This means that under the former regime, the subsidizing system supported the reduction of regional differences. Today it promotes the opposite process.

A second reason is significant overproduction in agriculture and very inappropriate prices of agricultural products, reducing the interest of owners who received their land back in the process of restitution to farm their fields. These people often lease their fields to farmers or cooperatives, or sometimes do not farm their land and let it lay fallow. Other programs of the ministry of agriculture or ministry of environment influence the area of forests and permanent grassland increase to the detriment of arable land mainly. Other factors affecting the agricultural land decrease in the surroundings of big cities and the big increase of built-up and so-called remaining areas is the immense development activities (supermarkets, warehouses and handling plots, as well as family home construction).

It is necessary to note that we are not able to document tendencies described above and typical for the LUCC after 1989 by detailed

regional distribution analysis, but only by data valid for the whole territory of Czechia. Within the period 2001–2003 our research team will elaborate the same database on LUCC 1990–2000 as we did for the periods 1845–1948–1990. This research will be fortified by detailed research on the LUCC in the ten test regions representing territories of Czechia typical by their different historical development and varying natural conditions. These works were started in 2000. The LUCC field mapping on a scale of 1:5000 and comparison them with land use character derived from old maps from about 1845 and 1950 for test regions will enable us to verify general and regional tendencies discovered by dynamic land use analysis presented in this part of the atlas.



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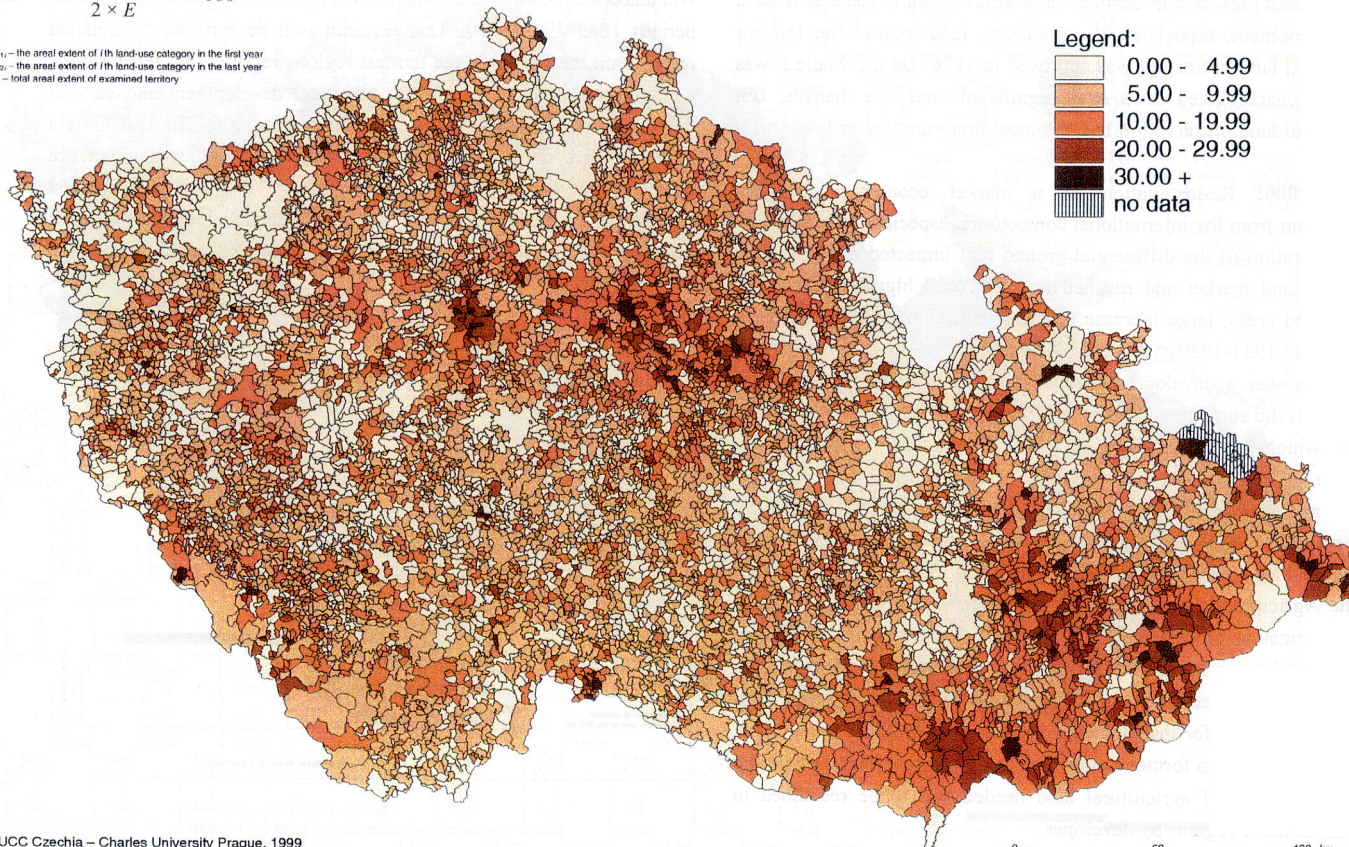
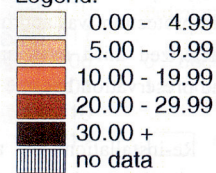
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Index of change 1845–1948 in Czechia (basic territorial units)

$$IC = \frac{\sum_{i=1}^n |A_{1i} - A_{2i}|}{2 \times E} \times 100$$

A_{1i} – the areal extent of i th land-use category in the first year
 A_{2i} – the areal extent of i th land-use category in the last year
 E – total areal extent of examined territory

Legend:



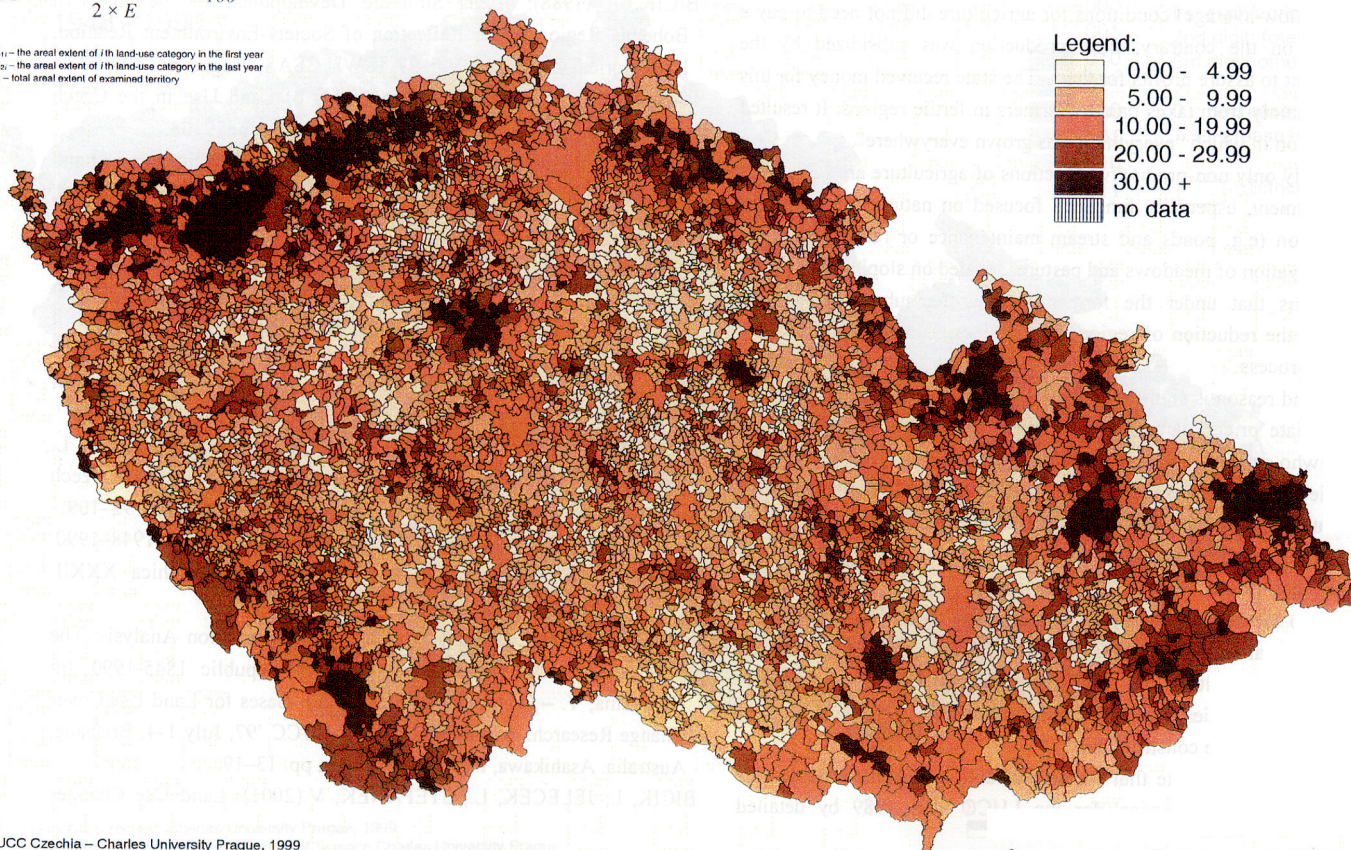
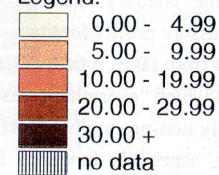
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Index of change 1948–1990 in Czechia (basic territorial units)

$$IC = \frac{\sum_{i=1}^n |A_{1i} - A_{2i}|}{2 \times E} \times 100$$

A_{1i} – the areal extent of i th land-use category in the first year
 A_{2i} – the areal extent of i th land-use category in the last year
 E – total areal extent of examined territory

Legend:



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