Chapter 8
Conclusions

Abstract This chapter presents synthesis of the land use research covering the last 175 years and discusses the main findings. During this period, modernization trends and new forms of spatial organization have much altered the existing functions, including land use patterns. Major land use changes in different periods of time are presented. The first phase covered by the research (1845–1896) brought the peak of extensive farming; land use structure was rather similar regardless of different natural, social, and economic conditions. During the second period (1896–1948), though it included crucial political and economic events (World War I and II, independence), no major changes of land use patterns were recorded. On the contrary, the Communist period (1948–1990) brought fundamental changes. The transfer of ethnic Germans, transition to a centrally planned economy, and technological modernization were among the crucial driving forces of land use changes. Regarding the most recent period (from 1990 onwards), a number of different concepts have been enforced (restitution of property seized by the Communists, privatization, etc.) and these have profound effects on land use patterns. Regional differences in land use classes as well as major landscape processes in Czechia 1845–2010 are shown in maps and tables. In the very end, an outlook for future landscape changes in Czechia is given. These are likely to be affected especially by external factors that include EU Agricultural Policy, global food prices, and climatic changes. Though fertile regions will probably be intensively farmed also in the future, land use trends in uplands and highlands remain uncertain.

Keywords Land use patterns · Driving forces · Regional differences · External influence · Future prospects

8.1 Main Findings and Synthesis

The interaction between landscape and society has changed profoundly over the examined period (175 years). Society, originally organized at local and microregional levels, has been transformed into a more complex and more hierarchical

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system. Such a transformation included a number of modernizing processes defined by Purš (1973, 1980) as a "Complex Revolution of the Modern Era" (industrialization, urbanization, demographic and social restructuring, democratization, etc.). Within the new geographical organization, different levels of core and peripheral areas can be distinguished. Modernization and new spatial organization have much altered the existing spatial functions: some disappeared and new concepts, required by the society, came to existence.

Land use patterns have been affected by modernization trends too. Depending on the new spatial functions, different land use classes have undergone changes in terms of size and regional structure. The role of external driving forces (supranational, European, partly also global ones) has been rising steadily and kept influencing the new regional patterns. The highly urbanized core areas influence the spatial functions of the environs including land use patterns. The food industry in Czechia since 1850, relying on sugar beet, potatoes, and cereal crops (sugar factories, distilleries, starch factories, breweries), can be taken as an example. Hundreds of small, local processing factories had to close down and during the period 1948–1990 the production became concentrated into large businesses. When market economy had become re-established in 1990s, many of these giant companies had not survived and the importance of the remaining ones grew even more (see: Beranová and Kubačák 2010; Balej et al. 2011; Bičík and Jančák 2005).

Box 8.1 Sugar and dairy industries development impact on LUCC in Czechia 1845–2010

There were some 400 small sugar factories in Czechia in mid-nineteenth century. Distances among farms and processing units were small (see Box 6.3). The number of sugar factories declined to 149 (period 1920–1925) and later to 91 (period 1945–1950). Of these, only 50 sugar factories survived until 1990; as a result, the transport distances were constantly growing. That is not all: in 2003, there were just 13 sugar factories in Czechia, at present the number equals 7. Some of the surviving ones will probably close in the future.

Fifty years ago, the total sugar beet yield amounted 5 million tonnes per year; about one million tonnes of sugar used to be produced annually. The waste material from sugar beet factories was used as forage (production of milk and meat). Agricultural policies under socialism, i.e. concentration into large companies, plus the influence of EU regulations, and advancing globalization caused that the sugar production in Czechia decreased by about one-half (540,000 tonnes per year) and sugar must be imported now. In the fertile areas, the arable land where sugar beet was originally grown is now often occupied by other crops. The less fertile regions, however, have experienced a marked decrease of arable land under Communism as well as during the period of economic transformation. Due to better natural conditions and lower costs of production, much of the sugar industry has moved

> to Southern Europe. Dairy farming has been negatively affected by lower production of sugar beet, too, and consequently the structure and intensity of farming in the sugar beet regions have changed profoundly. The above-mentioned example (sugar beet production, processing, consumption, dairy industry) shows that the economic transition and landscape changes in Czechia have been very intensive over the past 175 years. Farming production kept rising until 1960s, stagnated in the period 1960–1985, declined later, and has been slightly rising since 2005.
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> Some other crops have gone through similar process as sugar beet (hops, flex) and are rather unimportant at present. On the contrary, wine, maize, rapeseed, etc. have become more important over the time; some agricultural practices were renewed (grazing). The changing importance of different farming types has a big influence on land use and on the intensity and efficiency of farming.
>
> Balej et al. (2011)

Hampl and Müller (2011, pp. 211–212) studied the uneven speed of transition in different structures triggered by the post-1989 transformation. They argue that political and economic structures have changed quite fast (within days, weeks, or months). Social, cultural, and demographic changes are much slower and usually take years. Even slower are social-geographical changes and their reflection at regional level. Such a "delay", as defined by Hampl and Müller (2011), is confirmed by the above-mentioned example of sugar production/consumption and also by our land use analyses from different periods. Purš (1980) works with the same concept of "delay" on the example of Industrial Revolution.

Analyses of land use driving forces (Hampl and Müller 2011 take land use as one of social-geographical structures) show that within all examined periods land use changes have been somewhat slower than changes of other social-geographical structures. The increase of regional differences of land use types, resulting in new typological regions with similar land use patterns, was the slowest process of all. To sum it up, the uneven speed of changes mentioned by Hampl and Müller applies also to land use changes that have been always slower since the beginning of Industrial Revolution.

The earliest period analysed (1845–1896) includes the peak of extensive farming. The permanent increase of agricultural and arable land ended with the agrarian crisis; consequently, land use structure became stabilized during the last two decades of the nineteenth century. Intensive forms of farming have prevailed since then and regional differences of land use patterns began to increase—until the end of the nineteenth century land use structures in Stable Territorial Units (STU) were rather similar regardless of different natural, social, and economic conditions. Thus, the marked difference between low-lying, fertile areas (where arable land kept increasing) and less fertile regions (increase of forests) appeared first time.

The period 1896–1948 was a turbulent one and included important political and economic events in Czechia and Central Europe. Statehood and political regime changed five times during this period on the territory of the present-day Czechia. Though the first half of the twentieth century included also the agrarian reform and profound changes of land tenure, changes of land use patterns were surprisingly small. Rather big changes of land tenure were reduced or even negated by political reasons (see Sect. 6.7). The agrarian reform, launched in 1919, was largely a political action. From the economic standpoint, it brought negative results as the land tenure became much more fragmented. In a sense, this agrarian reform served as a "model" for the confiscation of German property after 1945, and also for confiscation of private land by the Communists after 1948 (Bičík and Jeleček 2005; Bičík et al. 2001).

On the contrary, the Communist period (1948–1990) brought fundamental changes in all social and economic structures. Regional differences of land use patterns increased. The transfer of ethnic Germans (1945–1947) was one of the crucial driving forces of land use changes. These changes, however, were taking place with a certain delay, also due to the fact that resettlement programmes in the frontier were largely unsuccessful and iron curtain was installed in the meantime. Transition to a centrally planned economy, which included collectivization and introduction of "socialist" manners in rural areas, constitutes the second important driving force. Agriculture became modernized, productivity rose. In general, technological modernization was advancing in the whole country as was urbanization and industrialization; many people found better living conditions in urban areas. Seen from the land use perspective, built-up and remaining areas were expanding, but agricultural land was shrinking.

The most recent period (transitional) reflects a whole array of different political and economic driving forces. In 1990s, the restitution of property seized by the Communists and privatization had dramatic effects on the land use structure, especially on arable land and permanent grassland. Restitution was very important politically. However, from the economic standpoint the logical outcome was fragmentation of land into smaller fields and plots—process adverse to that in Western Europe. Most people who legally regained the land, however, did not start any agricultural business; consequently, ownership became fragmented, but much of the land was still being managed in large units. The last decade of the twentieth century also brought a lot of corruption and uncontrolled suburbanization in the core areas. The agricultural intensity declined significantly, regional inequalities rose. Economic factors (differential rent) played an important role. The willingness of new landowners to farm varied region by region (Bičík and Götz 1998; Doucha 2001; Bičík and Jeleček 2005, 2009).

Two basic methods that help us to assess general land use changes in Czechia over the period of last ca. 180 years are employed. The first one works with types of land use "macrostructure". Land use structure is simplified into three aggregate classes: agricultural land, forest areas, and other areas. Increase/decrease of size within a certain period of time is shown by marks "+" and "–". In theory, six combinations (six types) exist (see Sect. 5.4).

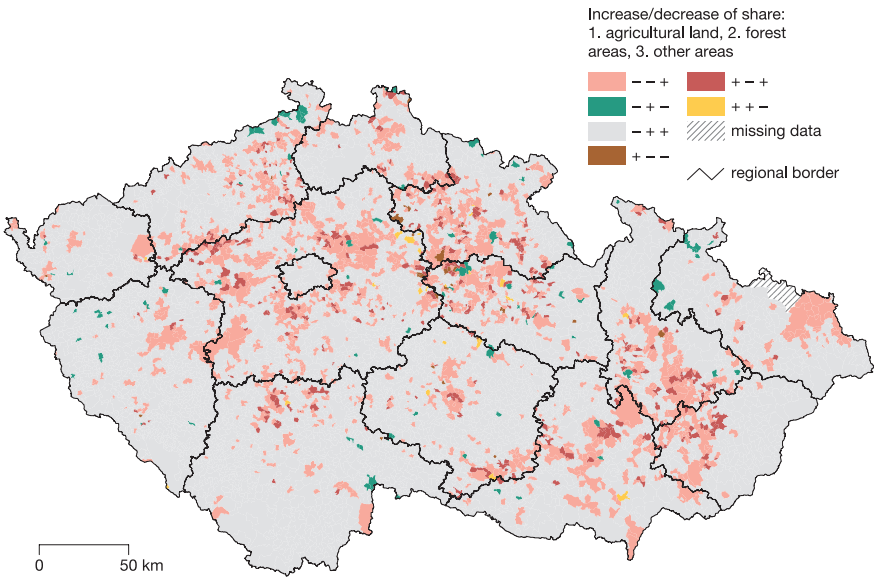

Fig. 8.1 Regional differences of aggregate land use classes (1845–2010). *Source* LUCC Czechia Database

Figure 8.1 documents the regional distribution of the two most frequent macro-types of land use changes. Almost 80 % of all STUs show the same type of change: decrease of agricultural land, increase of forests and other areas. The second type—much less frequent—combines decrease of agricultural land and forests with increase of other areas (16.5 % of STUs). Though the most frequent type covers much of the Czech territory, in the case of the second one a certain regional concentration exists: such STUs are located mostly in the low-lying areas (the Elbe Plain, along the Morava River, Ostrava Region). In these areas, the intensity of agriculture either remained at the same level or decreased only slightly; economic activities became concentrated in major core areas and their environs. Thus, farming now "competes" with new, non-agricultural spatial functions like suburbanization, logistics, transport, etc.

When comparing the land use structures in 1845 and 2010, decline of agricultural land is the most distinctive feature (STUs with such a decline cover 96.7 % of Czechia). Increase of forests, recorded on 80.4 % of national territory, is very typical too. Other areas (water, built-up, and remaining areas combined) have been expanding practically everywhere (98.4 % of Czechia).

Figure 8.1 does not reflect various land use changes that may have been taking place during shorter periods of time between 1845 and 2010. These partial changes were often very diverse in terms of structure and intensity. Table 8.1 shows in details different changes of land use structure within four shorter periods.

Table 8.1 Typology of land use changes by STUs in Czechia 1845–2010 (proportion of the national territory, %)

Type	Period				
	1845–1896	1896–1948	1948–1990	1990–2010	1845–2010
– – +	3.7	17.4	9.6	21.1	16.5
– + –	22.3	2.7	0.4	15.9	0.9
– + +	16.5	72.3	89.9	43.2	79.3
+ – –	32.7	0.6	0.0	5.0	0.2
+ – +	13.5	6.2	0.1	3.0	2.6
+ + –	10.9	0.4	0.0	11.7	0.2
No change	0.0	0.0	0.0	0.1	–
Missing data	0.4[a]	0.4[a]	–	–	0.3[a]

Note The first mark (+, –) indicates increase/decrease of agricultural land, the second one forest areas, the third one "other" areas (water, built-up, and remaining areas combined). [a]The regions of Hlučínsko and Valticko, plus České Velenice and its environs became part of the present-day territory of Czechia only after World War I. *Source* LUCC Czechia Database

Table 8.1 contains a lot of interesting information:

1. The first period (1845–1896) is the only one when increase of agricultural land was typical (57.1 % of all STUs). In the last decade of the nineteenth century, the historically smallest extent of built-up and remaining areas combined was recorded.
2. The period 1845–1896 shows the most regular distribution of land use types. The transition from late feudal system towards market-oriented economy, towards urban/industrial society was taking place in this period. The "1845 data" were actually collected between 1826 and 1843.
3. Major landscape changes were recorded under the Communist rule (1948–1989). Decrease of agricultural land, increase of forests and other areas (almost 90 % of STUs) resulted from large-scale industrialization, urbanization, and general modernization (including agricultural modernization). Environmental protection was inadequate.
4. All periods (excluding the earliest one) show dominance of one type of land use change: decrease of agricultural land, increase of forests and other areas. The same is true when the period 1845–2010 is examined as one unit.
5. Marked differences among types of land use changes in different periods reflect changing needs and expectations of the society.
6. Important increase of forests has been recorded in two periods: 1948–1990 (90.3 % of STUs) and the most recent period 70.8 %.

The above-mentioned types of land use changes reflect agricultural intensification (decline of agricultural and arable land in long term) and changing spatial functions. Forest kept expanding; see "forest transition" as discussed by Mather (2002, 2006); Mather and Needle (1998). The continuous expansion of other areas can be explained by ongoing modernization and new functions required by the emerging industrial and post-industrial society (industrial areas, logistics, transport, various technical structures, sport facilities, military areas, water reservoirs, etc.).

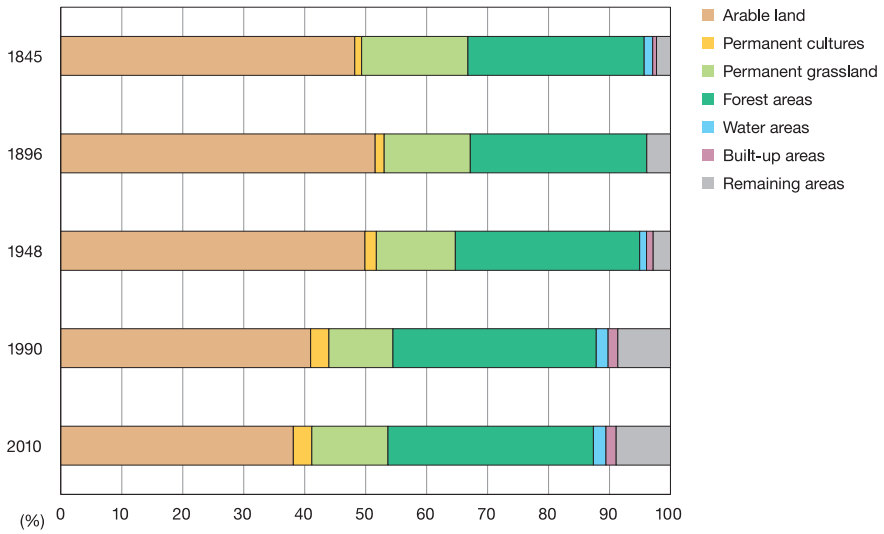

Fig. 8.2 Changing land use structure in Czechia 1845–2010. *Source* LUCC Czechia Database. *Note* In 1896, water, built-up, and remaining areas are shown together

The current trends of land use changes in Czechia show few signs of sustainability and future trends are unclear. Some scientific studies (Krausmann 2001; Krausmann et al. 2003, etc.) suggest that the ongoing expansion of other areas and decrease of agricultural land may soon pose big problems, especially with respect to the energy balance and food production. The concept of food security may become much more important in close future and many nation states may strive to be self-sufficient as much as possible—goal that is hard to achieve under conditions of EU single market.

Figure 8.2 clearly shows that arable land has been constantly declining over the past 100 years. The proportion of arable land (at present ca. 38 % of the national territory) is not too different from the proportion of forests (almost 34 % in 2014). The extent of permanent grassland fluctuated a lot. As of 2014, other areas (water, built-up, and remaining areas combined) cover more than 10 % of Czechia.

Land use database similar to the Czech one is used by Slovenian researchers (Gabrovec and Kladnik 1997; Gabrovec et al. 2001). They often employ synthetic/generalizing approach for assessment of major landscape processes; the same approach has been used on the Czech territory too. This method monitors four major processes of landscape changes: urbanization, agricultural intensification, afforestation, and increase of permanent grassland. Three grades are distinguished: strong, medium, and minor changes (for details see Chap. 5).

The Slovenian method has been used in this publication to analyse the main processes in the Czech landscape in the course of different periods between 1845 and 2010. Table 8.2 shows different processes and varying intensity of land use changes and confirms the above-mentioned results based on the changes of land use macrostructure. One should keep in mind, however, that the intensity of changes may actually be very different and depends on the accuracy of data and

Table 8.2 Major landscape processes in Czechia 1845–2010

Type	Intensity	1845–1896		1896–1948		1948–1990		1990–2010	
		Total number of STUs	Area (%)	Total number of STUs	Area (%)	Total number of STUs	Area (%)	Total number of STUs	Area (%)
Agricultural intensification	Strong	4,843	56.6	429	3.5	89	0.4	325	2.3
	Medium	1,203	13.2	527	5.8	272	1.9	129	1.0
	Minor	63	0.7	102	1.0	135	1.1	16	0.1
Increase of permanent grassland	Strong	195	1.6	280	1.9	177	0.8	2,195	24.2
	Medium	165	1.7	400	3.5	749	5.5	571	8.6
	Minor	16	0.2	129	1.6	339	3.3	59	1.0
Afforestation	Strong	1,057	11.2	1,958	19.2	399	4.2	337	3.2
	Medium	664	7.7	1,388	17.6	1,177	12.8	228	3.2
	Minor	38	0.4	185	2.2	283	2.8	30	0.5
Urbanization (other changes)	Strong	36	0.5	1,140	15.9	2,391	35.0	896	12.8
	Medium	67	0.9	1,082	13.9	2,297	27.2	359	6.2
	Minor	14	0.1	173	2.2	491	4.8	50	0.7
Stability (less than 1 % of STU area changed)		451	5.2	1,019	11.8	33	0.2	3,637	36.3
Total		8,812[a]		8,812[a]		8,832		8,832	

[a]*Note* Areas where data are missing (1845, 1896) cover about 0.4 % of Czechia. *Source* LUCC Czechia Database

statistical method used. However, the method clearly documents the basic trends of land use changes in each STU.

1. Each of the examined periods is characterized by different major landscape changes;
2. The intensity of processes varies greatly over time;
3. Agricultural intensification is typical (70.5 % of the national territory) for the earliest period (1845–1896);
4. In the period 1896–1948, afforestation as a "dominant process" was recorded on some 39 % of the national territory. During the following period (1948–1990) the pace of afforestation slowed down and the process was "dominant" in about 1,600 STUs that cover less than 20 % of the national territory;
5. The period 1990–2010 shows a relative stability ("stable land use structure" means that land use changes were recorded on less than 1 % of the examined territory). Stable STUs cover about 36 % of Czechia. One-third of the national territory experienced increase of permanent grassland;
6. Urbanization was the most important process in the period 1948–1990. Typically, built-up and remaining areas were increasing; such STUs (5,700 in total) cover ca. 67 % of national territory;
7. Under Communism (1948–1989) there were no regions that could be described as "stable". Only 33 STUs (covering 0.2 % of Czechia) showed less than 1 % change of land use structure.

Figure 8.3 shows major landscape processes/land use changes between 1845 and 2010 measured by the so-called Slovenian method (for details see Sect. 5.4.4). The map is important also due to the fact that the changes that occurred during partial

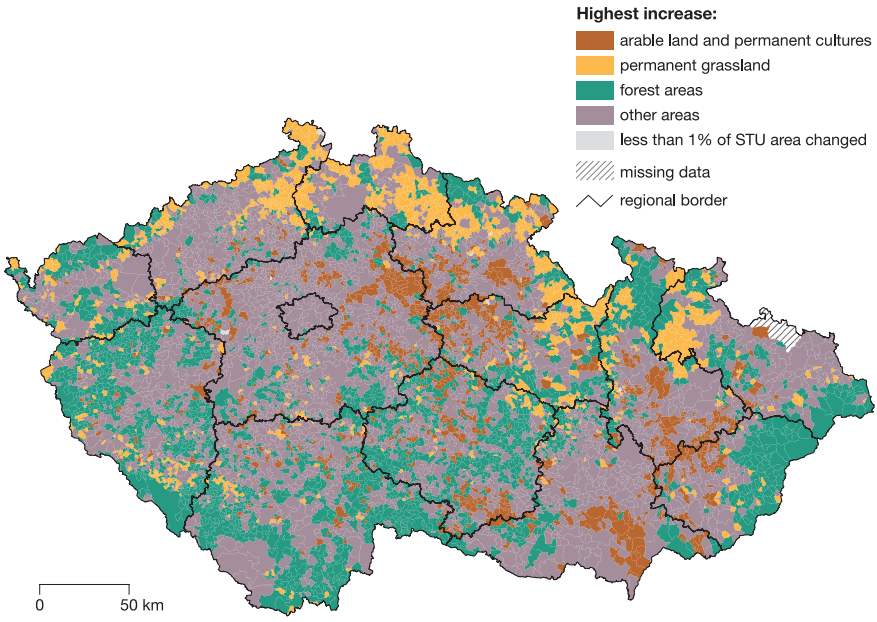

Fig. 8.3 Changes of land use structure between 1845 and 2010. *Source* LUCC Czechia Database

periods differed a lot from each other and in many STUs were even contradictory. Thus, the long-term changes over the period of last 170 years are shown here. Assessment, however, should be done with care: the main landscape processes may sometimes be based on minor changes of the four examined land use classes though within some STUs such a small change can in fact be the biggest one of all (see Sect. 5.4.4).

Regional differences reveal some of the key trends. These confirm previous results that have been obtained using other methods (all are based on the LUCC Czechia Database). The key findings suggest that vast majority of Czechia is covered by STUs where afforestation has been taking place and where remaining areas have expanded (about 40 % each). Both types of these key landscape processes tend to create contiguous regions.

Transition from arable land to permanent grassland as a dominant landscape process has occurred on some 20 % of Czech territory. It is typical in the northern half of the country, especially in elevated regions and on sloping grounds. To some extent it is found also in the foothills of Šumava and Český les.

Increase of arable land and permanent cultures as a dominant process has been observed on some 15 % of Czech territory, typically in the most fertile regions: in Pomoraví and Podyjí (Moravia), and also in Polabí (Bohemia)—see Fig. 3.1. This type is occasionally found also in other parts of Czechia, but it does not form compact areas.

The maps clearly confirm that there is a long-term tendency to form large contiguous regions with same or similar trends of land use changes. The society as a whole influences more and more the spatial functions of STUs and that of larger regions and consequently influences also gradual changes of land use patterns. In general, the figure reflects the fact that over the past 170 years the society has changed profoundly: there has been an important shift from mostly local processes (land use structure was first of all affected by decisions made on local level) towards a more complex matrix (large regions with similar land use types and similar functions are formed). These new functions that are "required" by the society gradually change the existing land use patterns; local inhabitants and local administration have only limited powers to influence such changes.

The outcomes of landscape research confirm the trends that have been described earlier in research projects focused on historical changes of settlement system and population. Differences among functions of urban areas keep rising as does the intensity of spatial relations with the environs (Hampl 2000; Musil 1977; Hampl and Müller 2011, etc.). Modernization trends during the last 200 years profoundly affected spatial organization of the society: local and microregional systems, largely "closed off" in the past, have been transformed into a more structured, multi-level spatial organization. As regards land use data, the above-mentioned changes, including changes of spatial functions, are reflected with a certain delay.

Figure 8.4 shows the most important trends of landscape changes over the past 50 years in Czechia. Regional differences of land use changes (extent, structure) are well presented. Great regional differences reflect the changing conditions of

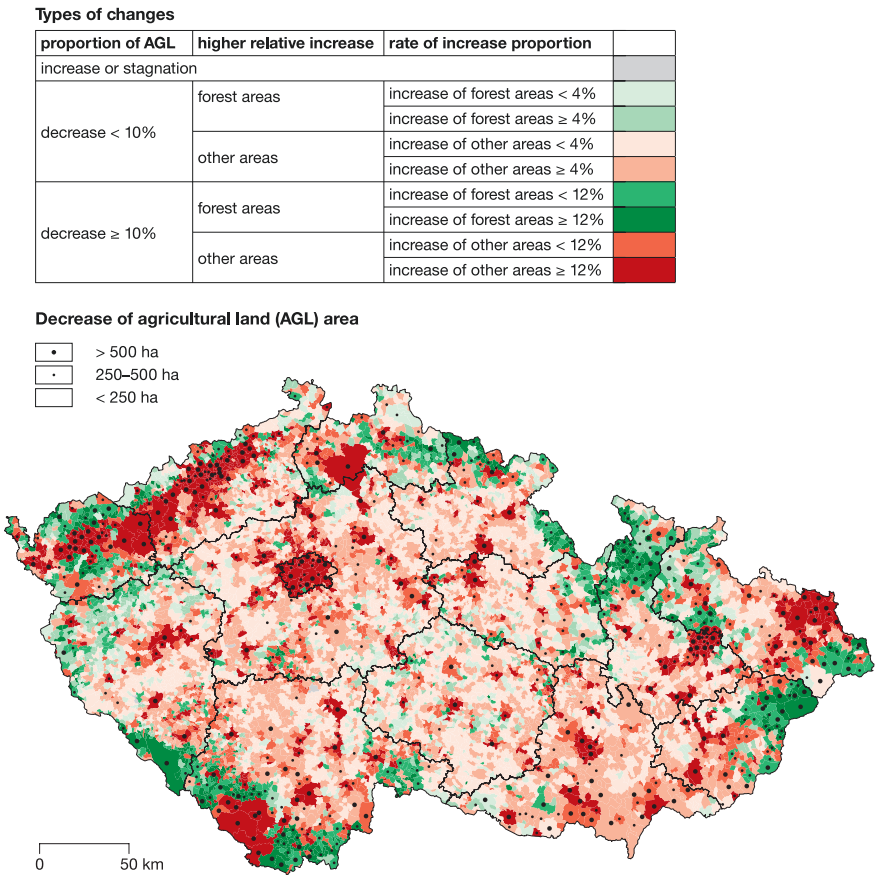

Fig. 8.4 Typology of landscape changes 1948–2000. *Source* LUCC Czechia Database

economic modernization and the effects of new functions in different regions required by the society. Great loss of agricultural land is shown as a typical process of larger regions with special mining and industrial functions (Ostrava region, brown coal region of north-western Bohemia, Prague).

Any land use change reflects new spatial functions of the landscape. It also reflects natural conditions, geographical location, and social-geographical phenomena (population, services, land prices, etc.). The analyses presented in this publication allow to define regions with similar spatial functions and similar land use structure. Stable territorial units (STU) with similar land use structure are grouped together to form typological regions. These differ significantly among each other. Though the creation of such typological regions is not yet complete and certainly some transition zones do exist, the following typological regions (defined by different long-term land use changes) can be defined in Czechia (Bičík and Kupková 2012; Bičík et al. 2010):

- Urban areas in big cities and towns;
- Hinterland of big and middle-sized cities and towns where farming has partly made way for residential development, depots, commercial centres, roads, etc., with microregional effects on the environment;
- Low-lying areas far from the major urban zones, with favourable natural conditions for farming. Arable land dominates; grassland and forests are rare;
- Undulating, hilly regions (altitudes 450–600 m a.s.l.) with average /below average natural conditions. Farming, residential function, partly also leisure time activities are typical;
- Highlands and low mountains that suffer from depopulation and decline of farming;
- Military training areas (existing and abandoned) where any kind of development was/is severely limited. Revitalization, new spatial functions may emerge in the future; the recorded land use changes often reflect reclassification only;
- National parks and other large-scale protected areas. Land use structure is rather stable with high proportion of forests and grassland and limited economic activities;
- Peripheral regions where long-term depopulation and extensive farming are typical. Leisure time activities are important in some areas;
- Mountainous areas with special spatial functions. Depopulation and long-term expansion of forests that now cover much of these regions are typical;
- Mining and industrial areas with devastated landscapes. Land reclamation schemes in effect over the past 30 years;
- "New wilderness" emerges locally forming new elements in landscapes that were originally used in an intensive way. Usually small patches of former farmland now abandoned, former quarries, overgrown paths, abandoned sheds, etc.

8.2 Generalization and Outlook for Future Landscape Changes in Czechia

The changing relations between nature and society over the past 170–190 years as reflected in land use data can be generalized into three main trends. First, there are long-term processes connected with shifts towards more extensive/intensive farming. Originally, agricultural landscapes covered up to two-thirds of Czechia; currently, it is just over one-half of the national territory. Extensive farming prevailed in Czechia until the end of the nineteenth century. Over the past centuries, farmland was gradually expanding, while forests—locally also bodies of water—kept declining (Lipský 1998, 2001; Jeleček et al. 2012). The traditional society was not capable to use natural resources in a more intensive way; it also was cheaper—though just until a certain point—to increase agricultural production by expanding fields. Intensification processes in agriculture have been gradually becoming important since mid-nineteenth century and brought a marked increase

of production. Intensification trends dominated in all developed countries in Europe during the twentieth century.

Intensification/extensification of farming has been reflected in changing proportions of arable land, permanent cultures, and grassland. Transition from arable land to permanent grassland and vice versa was especially common, traditionally used as a tool to improve fertility of the soil. The fluctuating extent of arable (agricultural) land in the past was often influenced by the size of population dependent on the land.

Historically, forests were directly affected by the fluctuating extent of agricultural land. The total extent of forests always reflected increase/decrease of agricultural land. The relative stability of population over the past decades also contributed to the expansion of forests. With the exception of low-lying areas, forests usually constitute the second (sometimes even the first) most important land use class in terms of size in most STUs. With the advance of modernization, forests were seen as a space with a whole array of new functions—not just as a source of wood. Consequently, less fertile patches of agricultural land have been gradually converted into forests—process that has been taking place at local level already since early nineteenth century. This is the so-called forest transition as defined by Mather and Needle (1998) or Mather (2002).

The above-mentioned trends (intensification/restructuring of farming plus expansion of forests) have become typical in Czechia since 1890s. In the end of the nineteenth century, almost one-half of the population were farmers or forest workers; farming and forestry created some one-third of GDP. Spatial changes of agricultural land and forests are closely interconnected with crucial social and economic changes started by the Industrial Revolution and Complex Revolution of the Modern Era (Purš 1973, 1980; Jeleček 1985, 1991).

The third important process is the marked increase of built-up and remaining areas. These are "artificial" land use classes, pure result of human activities. Expansion of these artificial areas has much to do with the true nature of industrial and post-industrial society: it is not the population boom that really counts but rather the growing ambition of humans to "consume" the space in different ways. Built-up and remaining areas have been growing first of all in the developed countries of Europe; in Czechia this has been happening since 1950s. Much of this growth is concentrated in low-lying areas, especially in regions with high quality farmland, sometimes also in former forested areas. This transition from natural and semi-natural land use classes to pure anthropogenic areas brings a sort of "competition" between intensive agriculture and new social and economic activities (residential, production). In Czechia, built-up areas have expanded by more than 50 % since 1948, remaining areas by more than 200 %. As a result, these two land use classes now cover ca. 11 % of the national territory. While built-up areas are clearly defined, remaining areas are very heterogeneous, also from the environmental standpoint.

Due to the high mobility of modern society, changing spatial functions of the landscapes are influenced by local people as well as by (often distant) urban dwellers. Thus, "artificial" surfaces like sports grounds, recreational areas, golf

courses, parking lots, roads, etc. keep expanding simply because part of the population perceive them as "essential". Future trends, however, are unclear. Further increase of built-up and remaining areas would trigger irreversible processes that are antagonistic to sustainable development.

Multifunctional landscapes and sustainable development are among the key targets of Czech agricultural and environmental policies. To be successful, however, a sound knowledge of long-term land use trends is required. "Multifunctional landscape" in Czechia may consist of very different land use patterns and consequently a number of different policies should be considered. Different spatial functions, and also land use structure have become regionally specialized over the past 200 years; the policy of sustainable development should reflect this fact (Bičík and Kupková 2012).

With the end of economic transformation and given the fact that Czech economy is likely to remain relatively stable, land use changes are expected to slow down in the future. Regional differences of land use will probably keep rising, especially the difference between fertile farmlands in the low-lying regions near core economic areas (intensification; i.e. growing proportion of arable land and permanent cultures) and peripheral regions with less fertile soils (extensification; i.e. increase of permanent grassland, afforestation). The total extent of abandoned agricultural land should gradually decline—due to the economic recovery part of the arable land that became abandoned in 1990s is being used again; small patches of abandoned agricultural land where ecological succession is in progress may gradually develop into forests. The ongoing suburbanization is likely to swallow agricultural land in the environs of urban centres also in the future; the character and pace of this process much depend on public awareness and activities of grassroots movements.

Future land use changes will depend on a number of domestic and international factors. Economic performance, especially competitiveness of Czech agriculture, will be among the key internal factors. Future reforms of EU Common Agricultural Policy will play crucial role at the international level—austerity cuts and a further reduction of tariffs will probably become inevitable. Production and consumption of food on the global scale plus global food prices may be very important too; as an example, consumption of animal products keeps rising fast in Eastern Asia, especially in China. Global climate changes (droughts, weather fluctuations), lack of basic resources (fossil fuels, water, Phosphorus), and changes of global farming production are likely to play an important role too.

Based on the above-mentioned premises, two contrasting future scenarios can be taken into consideration. First, rising global food prices (in theory also increase of protectionism in Czechia and Europe) may create a sort of pressure on future transition of permanent grassland into arable land, especially in uplands and highlands. Given the fact that in the global context the quality of Czech soils is just average, such a transition is not expected to be a mass phenomenon.

On the contrary, under conditions of (theoretical) liberalization of European agricultural policy and in case of future economic crisis, Europe may appear on the world periphery. Such a scenario would include further downturn of Czech

agriculture and even more intensive transition from arable land to permanent grassland; i.e. intensive farming would survive only in the fertile low-lying areas.

In other words, the single biggest uncertainty is the future of land use trends in uplands and highlands (intensification versus extensification). These areas, however, cover almost two-thirds of the national territory and therefore are crucial for the shape of Czech landscape as a whole. A broad range of economic and political driving forces (national, European, global) will play an important role here. Thus, as seen above, predictions and future scenarios are extremely difficult to create (Kupková and Bičík 2007).

Czechia, located in Central Europe, is significantly more densely populated than central parts of the other continents. High population density and long history of human activities have brought intensive conflicts among different spatial functions. Moreover, the integration processes in Europe create some special requirements linked to infrastructure, higher quality of residential projects, and outdoor activities. The availability of land and space, however, remains limited in Europe. Increasing demands bring a number of environmental problems. Land use changes in Czechia (to a certain extent also in the other post-Communist countries) have been much influenced by turbulent political events during the twentieth century and by the reintroduction of market economy in the course of the last 25 years. Thus, analyses of long-term land use changes (based on the LUCC Czechia Database 1845–2010) can serve as a useful tool for prediction of the future trends in Czechia and abroad.

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