

**IGU LUCC Conference
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Prague, CZECHIA**

**SOCIETAL DRIVING FORCES AND THE LU CHANGES
INTERPRETATION: CASE OF CZECHIA
IN 19th – 20th CENTURIES**

Leoš Jeleček, Jiří Janáč

Charles University in Prague, Faculty of Science
Department of Social Geography and Regional Development
Albertov 6, 128 43 Praha 2

jelecek@natur.cuni.cz – jira.janac@gmail.com

- Developmental trends and their patterns are only the very first step in understanding the change.
- Examination of various social, political, cultural, economic and technological factors at play is necessary for full comprehension of LUCC dynamics in the past.

Natural Driving Sources (NDF) vs. Societal
Driving Forces (SDF) interactions

=

Land Use, Land Cover, Landscape, Living
Environment

LUCC and driving forces notions

Bürgi, Hersperger a Schneeberger: "Landscape is the prime sphere, where the combined effects of society and nature become visible. As societies and nature are dynamic, **change is an inherent characteristic of landscapes**" (bold L.J.).

*Holistically grasped driving forces are „...the **forces that cause observed landscape changes**. I.e. they are influential processes in the evolutionary trajectory of the landscape" (ibid, p. 858).*

*Further Bürgi et al. argue, that „...new directions address four major challenges faced by landscape change studies, i.e. **studying processes** (bold L.J.) and not merely spatial patterns, **extrapolating results in space and time**, linking data of different qualities, and considering **culture as a driver of landscape changes**".*

BÜRGI et al., 2004, Driving Forces of Landscape Change – Current and New Directions. Landscape Ecology, 19, pp. 857.

Natural Driving Sources (NDS)

From the historical time perspective remain relatively stabile, **while the societal driving forces are changing relatively very fast, from the IR with the permanent tendency to accelerate.**

5 major types of LUCC DF and some their factors

➤ CLASICAL TRIAD „N – C– T“

1) Socioeconomic (SEDF): interconnected with PDF, influenced by, e.g. market economy, globalization processes, decisions of WTO etc.

2) Political (PDF)

3) Technological (TDF) – evoke immense changes, industrial and agricultural rev., rev. In the transport, urbanization, settlement structure changes, IT, genetic ingeneering

4) Natural (NDF) – areal (planary) factors = longtermed f. - climate, position, soil characteristics, global warming, short-term = natural disturbances, storms, floods...

5) Cultural (CDF) – „ways of life“, customs, architectures...

BRANDT, J., PRIMDAHL, J., REENBERG, A. (1999): Rural land-use and dynamic forces – analysis of ,driving forces‘ in space and time. In: Krönert, R. et al. (eds): Land-use changes and their environmental impact in rural areas in Europe. UNESCO, Paris, France, s. 81–102.

SDF

- Some of them had and have **general** (e.g. land rent), **international** (wars, industrial and agricultural revolutions), and **global** levels and impacts (e.g. trade with agricultural product), the other ones **regional** (land reforms, property laws) **or micro-regional** impacts. Furthermore, on this hierarchical level such structural factors are introduced through site-specific operations and actions of local actors.

Soil – land

- It's a component **part of a nature** and also **mean of production**
- When farmed natural fertility become economic one
- It isn't **free substance**: precious/valuable + **non-reproduce able** + **quantitatively delimited area on Earth** (non-transferability and non-multiplicability)
- **Such characteristics:**
create for capital moving and functioning in agriculture very different milieu comparing to industry and other sectors of economy
- **Biological character of agriculture determines basically**
diverse way of production and capital functioning and use unlike industrial production.

When land is farmed the differential ground rent is born and starts its functioning

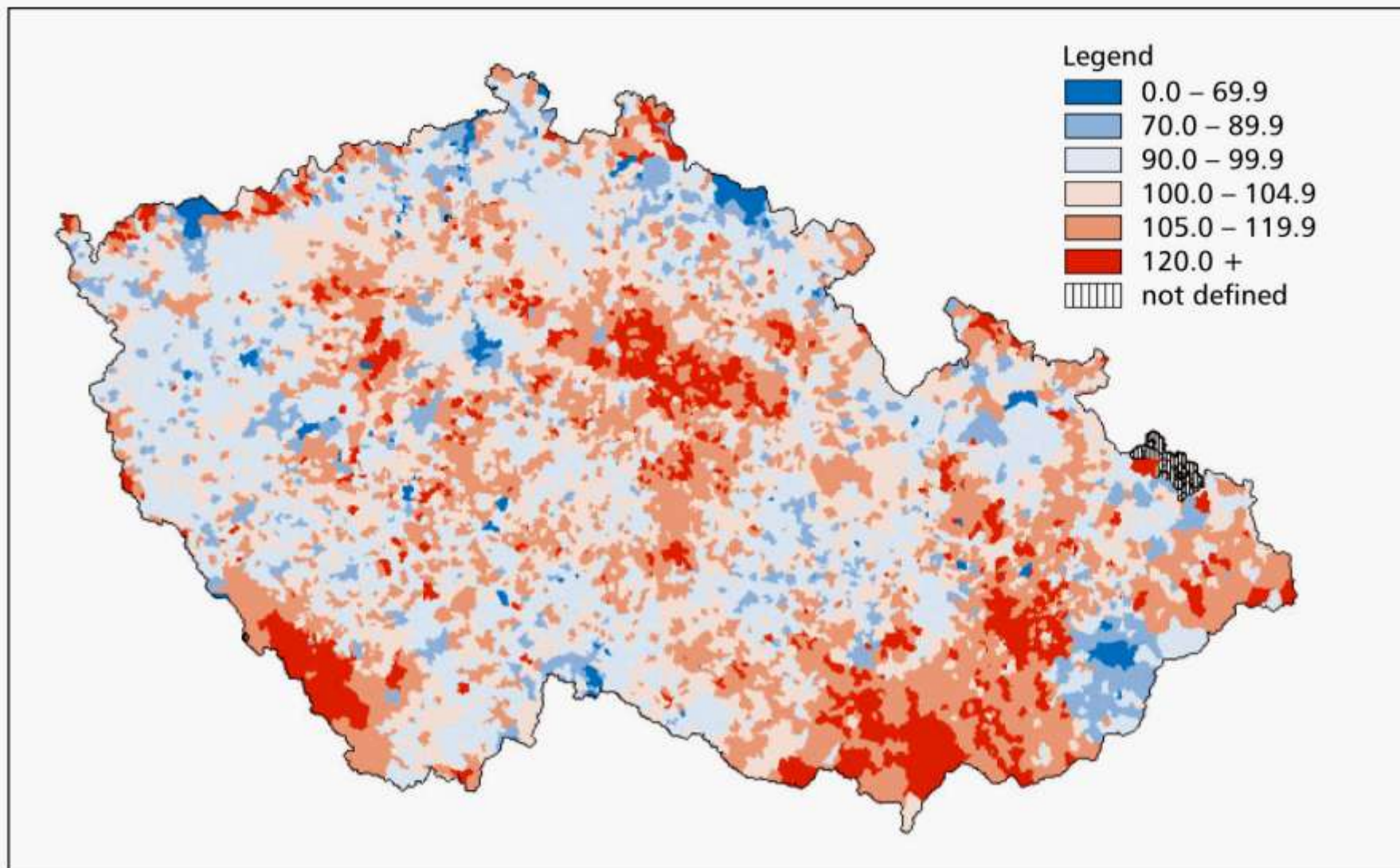
THE DIFFERENTIAL LAND RENT (DR)

- Basic economic category which **influences land use changes because of its geographical and economic aspects**
- Valid for both feudal, capitalist and communist systems.
- DR represents an **extra profit** of farming of plots with **better soil fertility or/and position to the market**
- **The price for a plot** (market one, or as a rent) of agricultural land **derives from its real economic output and the average rate of deposit interest.** Usually no land transfers happen if deposits interest rates are higher than economic output from its farming (recent situation in EU in spite of subsidizing)
- **THUS PRODUCING DIFFERENTIAL (LAND) RENT HAS BASIC IMPACT ON REGIONAL DIFFERENTIATION AND ENVIRONMENTAL QUALITY OF RURAL LANDSCAPES.**

Two forms of differential rent

The **extensive differential rent, or differential rent I (DR I)**, represents an **extra profit** which arises because all plots of land have equal amounts of capital investment **but are different in terms of natural fertility and in their position to the market** of agricultural products. **DR I relates to the extensive growth of agriculture** based on the extension of cultivated, especially arable land.

Though losing its basic impact and importance, historically, advancing **industrialization** and **urbanization** created new locational conditions, including growing demand for food.



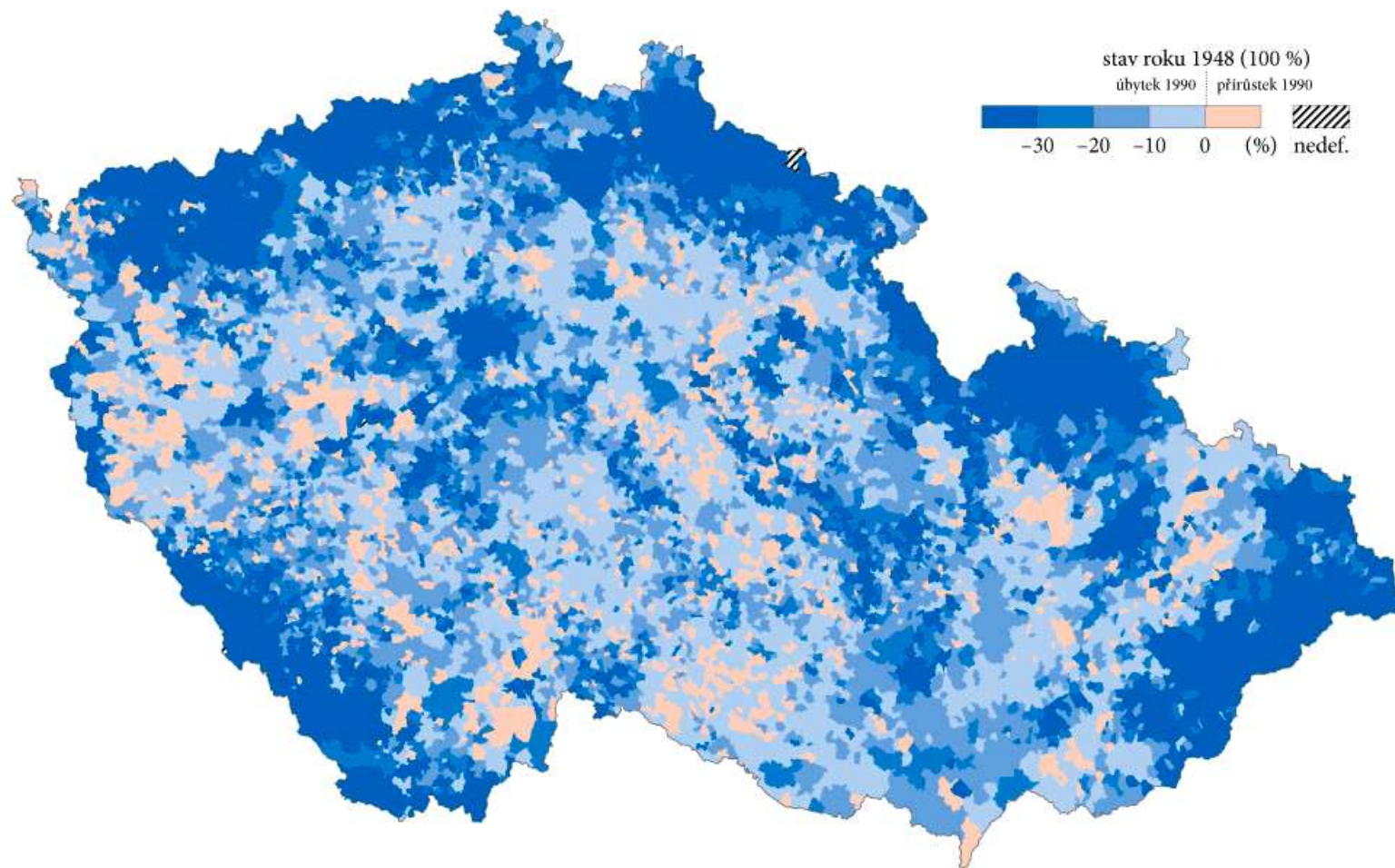
Percentage change of arable land 1845–1948 (1845 = 100)

DR II

- = **intensive form of rent**, represents an **extra profit created by unequal capital investments** into plots of land with same degree of natural fertility.
- It relates to the **intensification of LU**, i.e., more effective use of capital (as artificial fertilizers, machinery, genetic engineering) creating **more (economic) fertility of land**, but also **land abandonment** in areas with **low prospects for intensification** such as at high or remote locations or LFA

ID_849 Změna výměry orné půdy (1948–1990)

doc. RNDr. Ivan Bičík, CSc.; RNDr. Lucie Kupková, Ph.D.



Hodnota za Česko: -17,82 %

Průměr za ZÚJ: -18,08 %

Zobrazované jednotky: ZÚJ (základní územní jednotky)

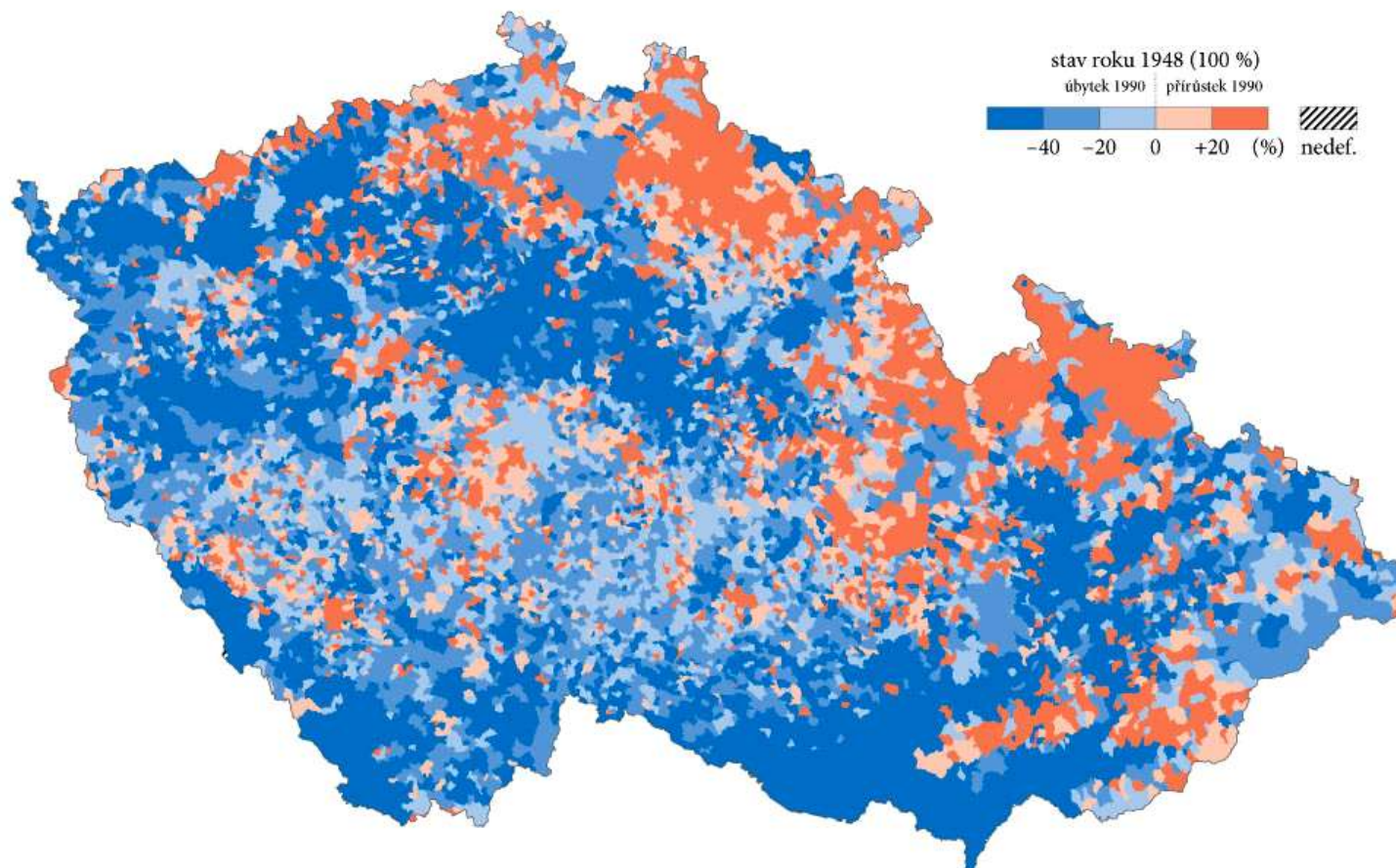
Zdroj dat: Databáze LUCC Czechia PfF UK v Praze

1 : 2 000 000



ID_852 Změna výměry trvalých travních porostů (1948–1990)

doc. RNDr. Ivan Bičík, CSc.; RNDr. Lucie Kupková, Ph.D.



Hodnota za Česko: -18,87 %

Průměr za ZÚJ: -2,12 %

Zobrazované jednotky: ZÚJ (základní územní jednotky)

Zdroj dat: Databáze LUCC Czechia PŘF UK v Praze

1 : 2 000 000

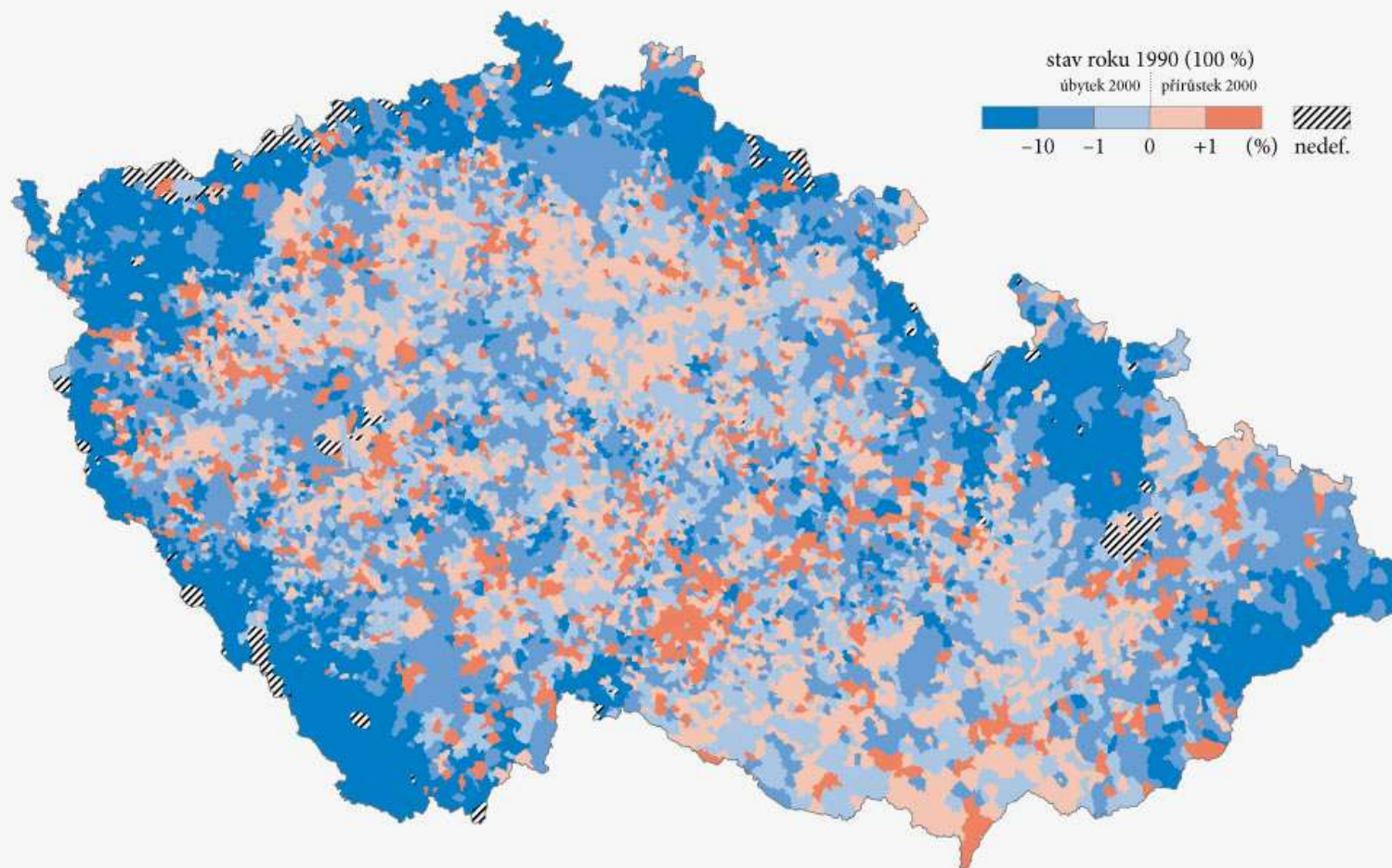


Pozn.: trvalé travní porosty = louky + pastviny

- Each historical period has been dominated by specific set of social driving forces. For instance, the **restoration of capitalist economy** in 1990s meant collateral and **gradual decrease of political factors impact on LU changes and increase of their economic** (move from differential rent I to differential rent II) **and social factors.**

ID_850 Změna výměry orné půdy (1990–2000)

doc. RNDr. Ivan Bičík, CSc.; RNDr. Lucie Kupková, Ph.D.



Hodnota za Česko: -4,64 %

Průměr za ZÚJ: -7,27 %

Zobrazované jednotky: ZÚJ (základní územní jednotky)

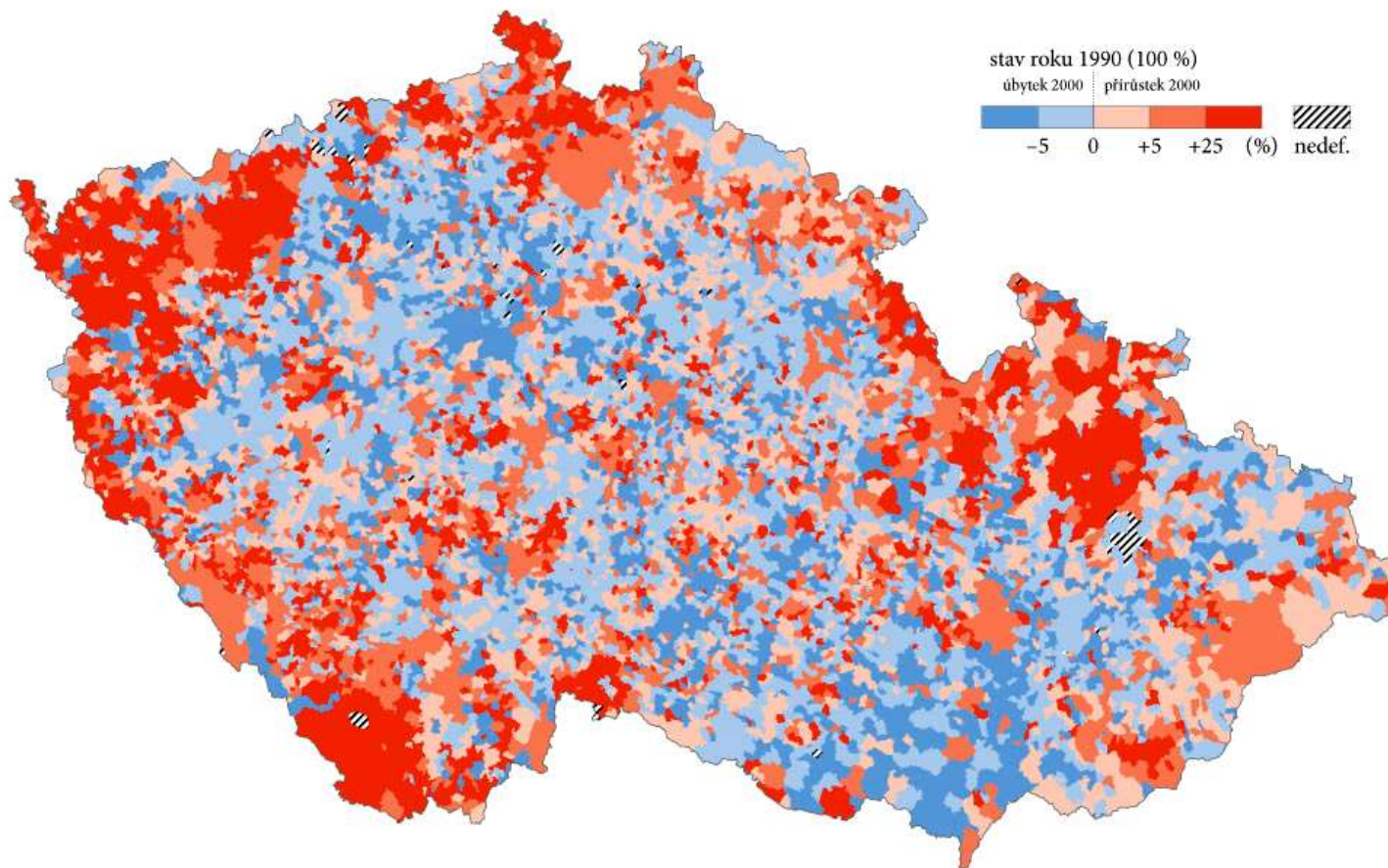
Zdroj dat: Databáze LUCC Czechia PřF UK v Praze

1 : 2 000 000



ID_853 Změna výměry trvalých travních porostů (1990–2000)

doc. RNDr. Ivan Bičík, CSc.; RNDr. Lucie Kupková, Ph.D.



Hodnota za Česko: +16,01 %

Průměr za ZÚJ: +20,09 %

Zobrazované jednotky: ZÚJ (základní územní jednotky)

Zdroj dat: Databáze LUCC Czechia PřF UK v Praze

1 : 2 000 000

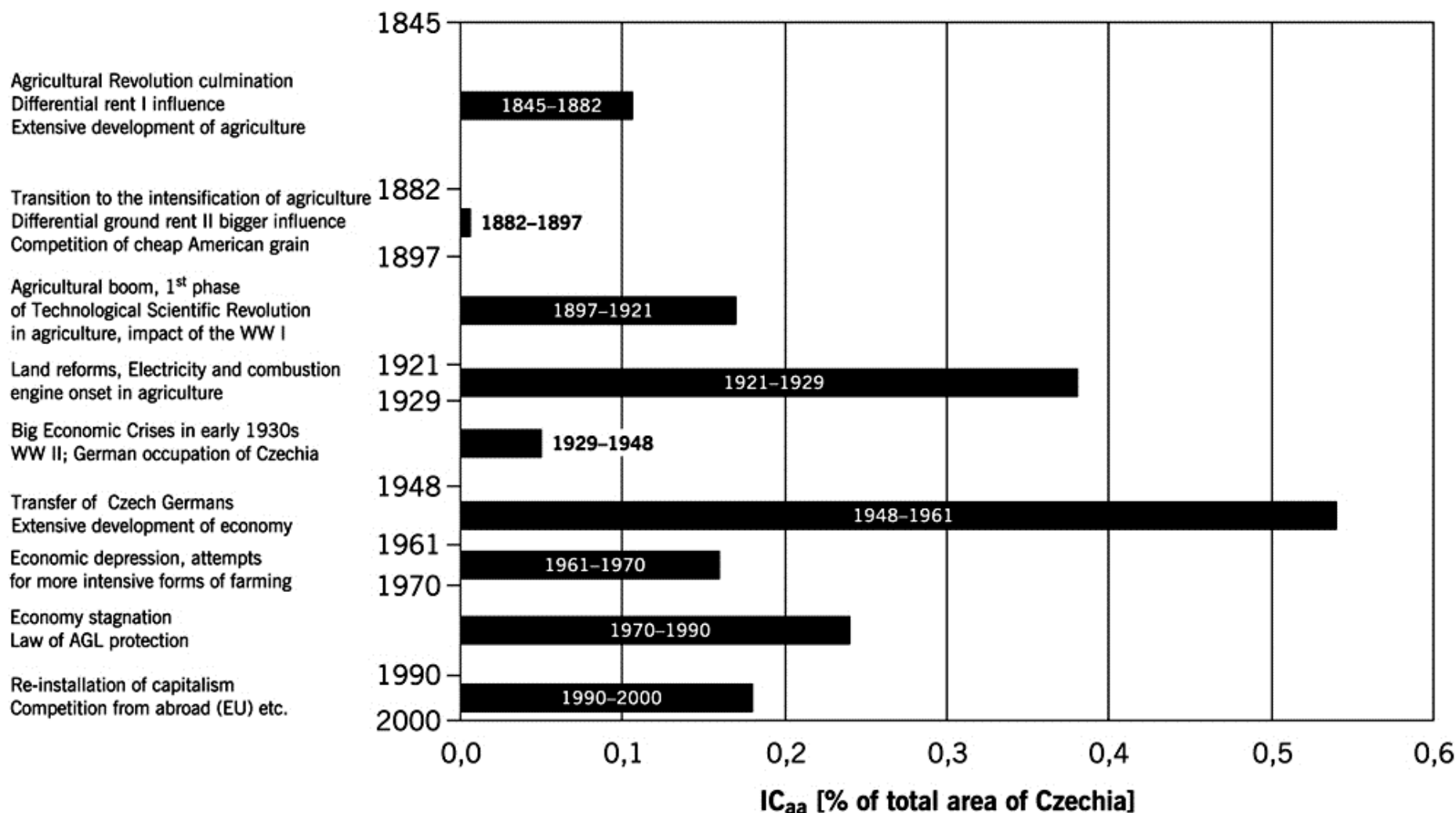


Pozn.: trvalé travní porosty = louky + pastviny

Graph demonstrates the ever changing
“weight” of diverse driving forces in the
different phases of Czechia’s history in
19th and 20th centuries

Land Use Changes in Czechia 1845–2000 and some of their Societal Driving Forces

IC_{aa} = average annual index of change in %



Small model areas with very different geographical, geopolitical positions, economic, historic-geographical etc. conditions of development which have had influenced land use changes in between 1845 and 2005.

MODEL AREAS IN CZECHIA

Zápy: 200m asl, great influence of the capital, highway.

Hor.Rokytnice: 550-970m asl, giant mountains, recreation, national park, subsidies for grassing

Labe valley: 150-600m asl, Hilly, forested, protected landscape area

Jáchymov: 700-1200m asl, ridge of mountain, forests and meadows, nature reserve

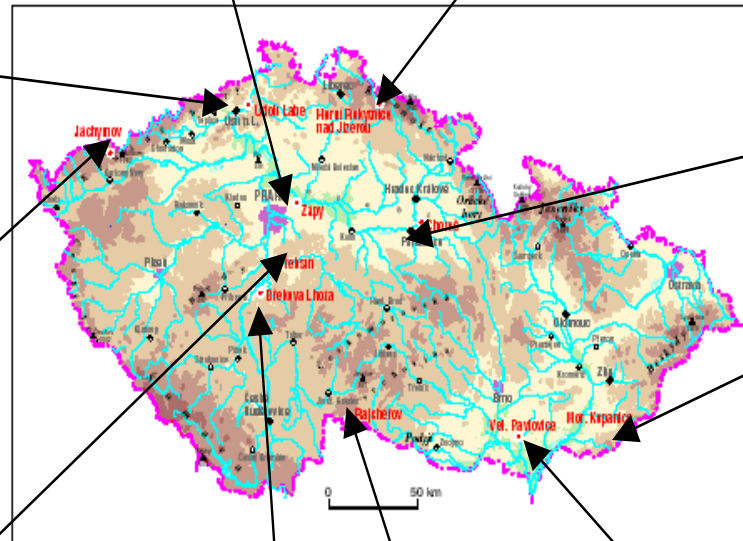
Choteč: 230m asl, lowland, agriculture, marginal meaning in the region

Mor. Kopanice: 450-900m asl mountainous, forested, Biospheres reserve of Unesco

Třebší: 300m asl, change from agriculture to recreation function, abandoned agricultural land

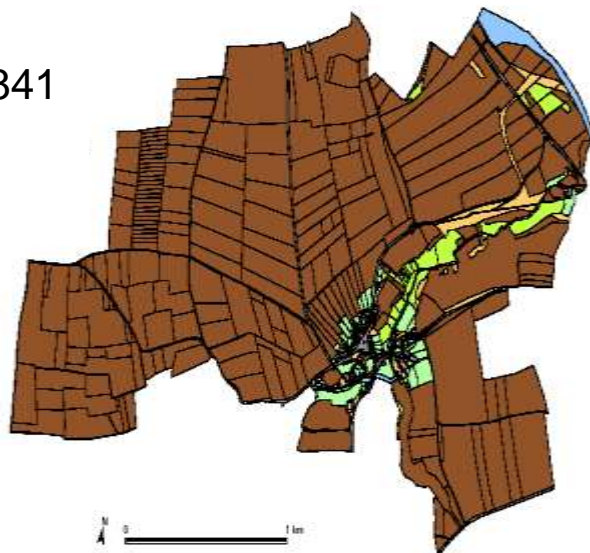
Břekova Lhota: 300-400m asl., dekadent agriculture (semi-productive area)

Rajchěřov: 550-700m asl, peripheral near-border region, out settled area, formerly „iron curtain“



ZÁPY

1841



1992



Kutlíře

Struktura ploch 1845 a 2005

1845



2005



1:15 000



Legenda

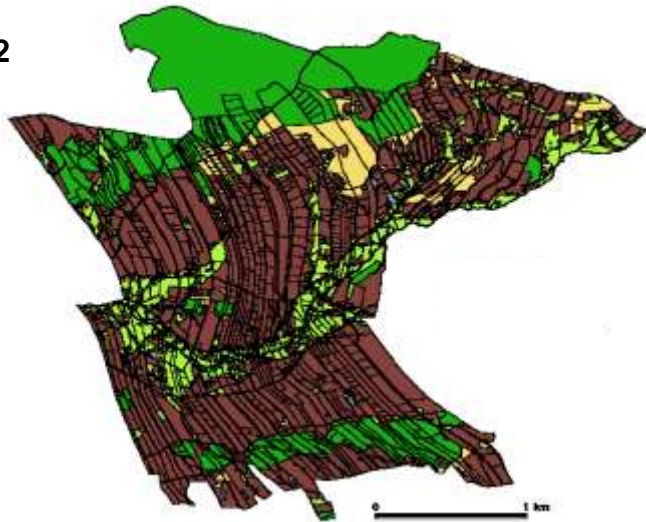
- orná půda velkých honů
- trvalé kultury
- zástavba souvislá
- lesy
- rozptýlená maloplošná zeleň
- trvalé travní porosty
- ostatní

- silnice
- významné meze a linie křovin a stromů
- vodní toky
- zástavba - samostatné objekty



ROKYTNICE N. JIZEROU 1842 → 1998

1842



1998



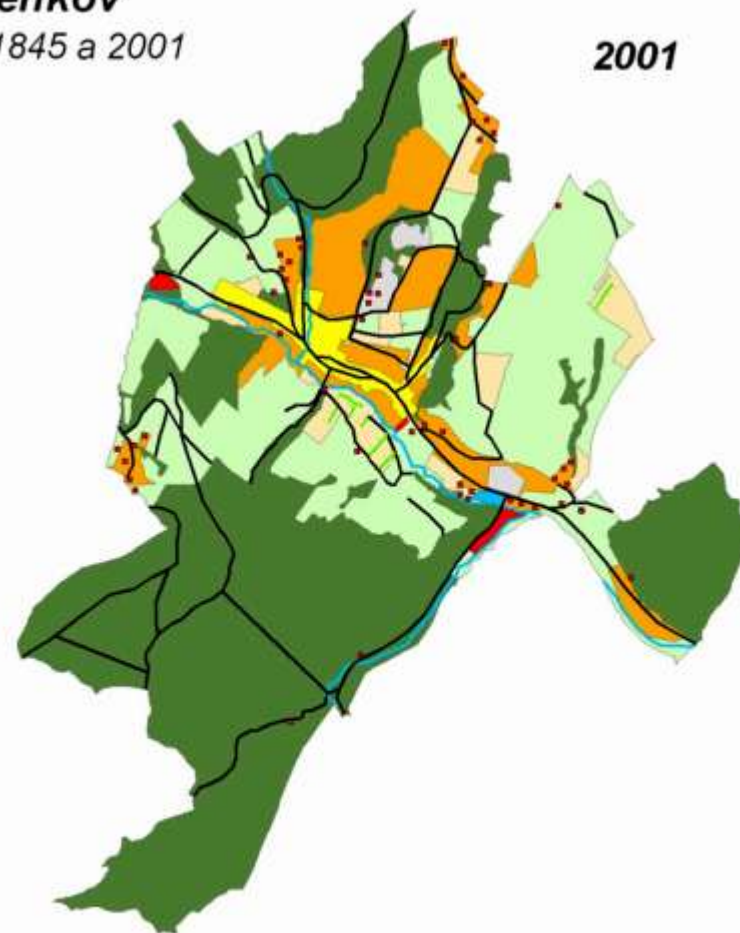
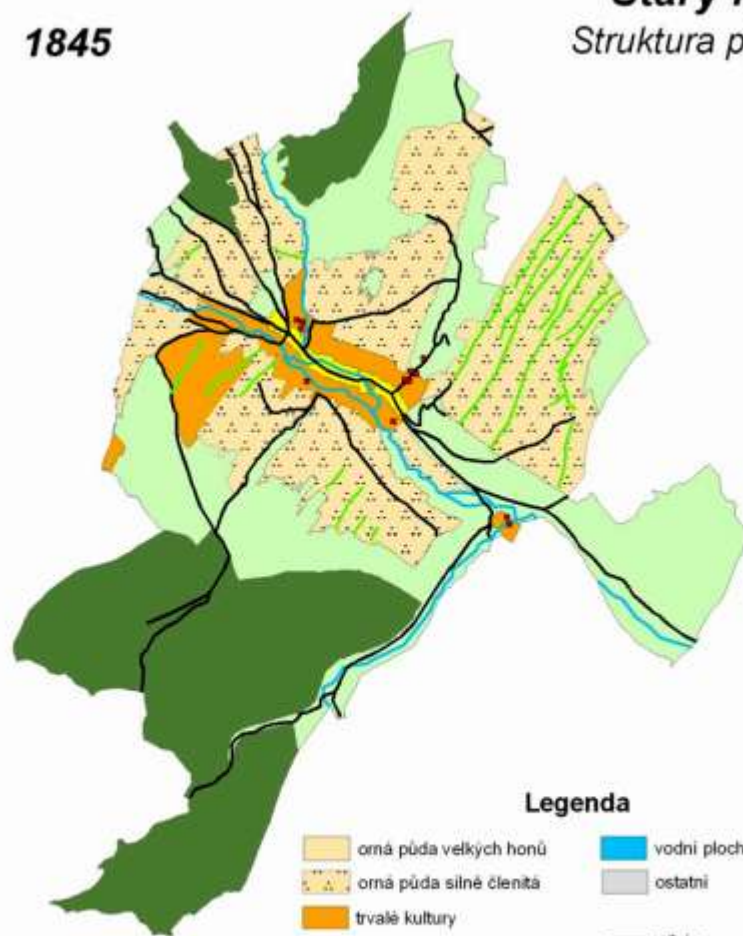
-  roads
-  solid areas
-  built-up areas
-  gardens
-  water areas
-  pastures
-  arable land
-  abandoned arable land
-  meadows
-  abandoned grasslands
-  forest areas
-  shrubs
-  recreation areas (cottages)
-  unclassified



Starý Hrozenkov Struktura ploch 1845 a 2001

1845

2001



Legenda

- | | |
|-----------------------------|---------------------------------------|
| orná půda velkých honů | vodní plochy |
| orná půda silně členitá | ostatní |
| trvalé kultury | silnice |
| zástavba souvislá | významné meze a linie křovin a stromů |
| zástavba s malými zahradami | vodní toky |
| lesy | zástavba - samostatné objekty |
| trvalé travní porosty | |

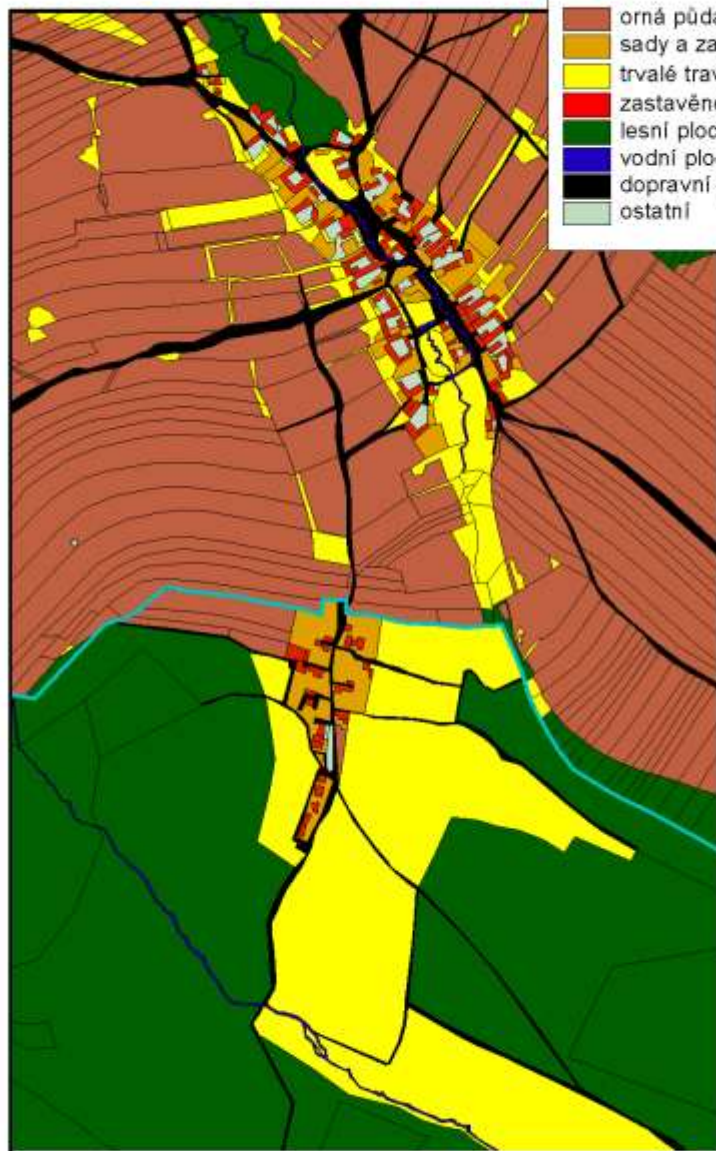
1:35 000





Košťáلكov

- státní hranice
- orná půda
- sady a zahrady
- trvalé travní por
- zastavěné ploch
- lesní plochy
- vodní plochy
- dopravní plochy
- ostatní

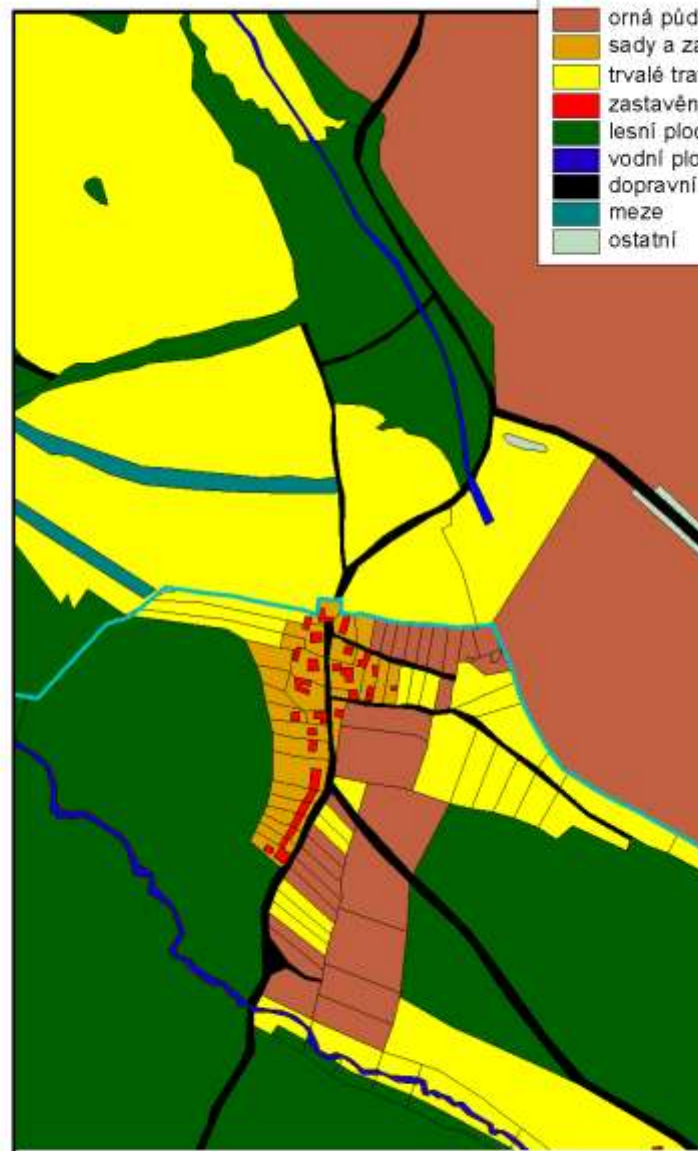


Klein Taxen



Košťáلكov

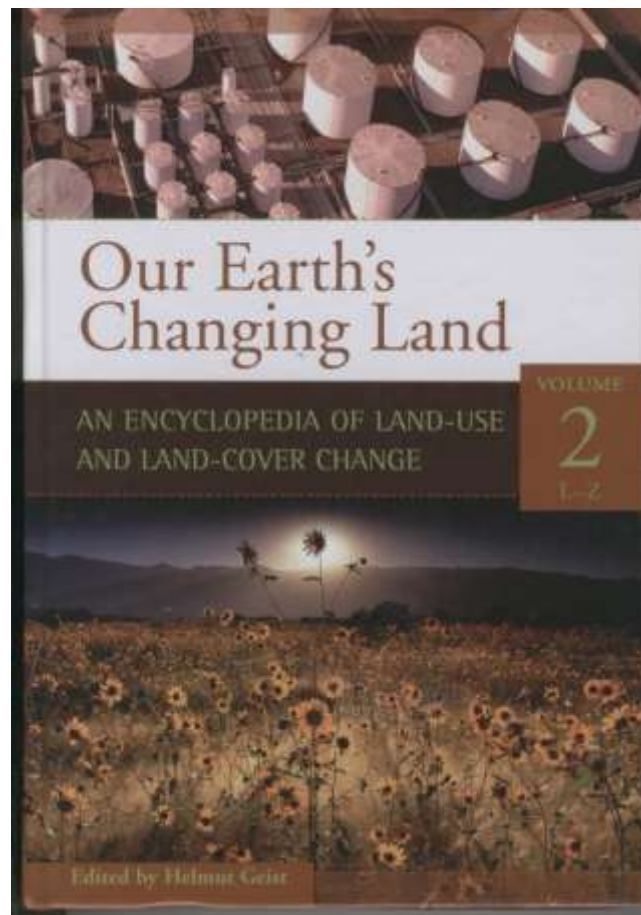
- státní hranice
- orná půda
- sady a zahrady
- trvalé travní porosty
- zastavěné plochy
- lesní plochy
- vodní plochy
- dopravní plochy
- meze
- ostatní



Klein Taxen

Které hranice lze vyčíst z fotografie?





The Earth's Changing Land: An Encyclopedia of Land-Use and Land-Cover Change, Vol. 1: A – K, Vol. 2: L–Z. Greenwood Press, Westport, CT, 2006, 715 + xviii s.

<http://www.greenwood.com/books/printFlyer.aspx?sku=GR2704&location=international> (Non-North Americans: \$125; others; \$225)

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PARTICIPATION AND
ATTENTION**