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NEWSLETTER

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IGU LUCC STEERING COMMITTEE 2012-2016

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IGU LUCC WEBSITE

All important information about IGU LUCC commission's activities you can find at IGU LUCC website – <http://www.luccprague.cz/>. There you can find up-to-date information about IGU LUCC commission activities, planned conferences and meetings, etc. E-mail address of IGU LUCC secretariat remains the same – igu.landuse@gmail.com.

Jiří Stockmann, IGU LUCC office

NEWS

Conclusion of the *Time-spatial analysis of land use: dynamics of changes, fragmentation and stability assessments by application of the CORINE land cover data layers*. Project pursued at the Institute of Geography of the Slovak Academy of Sciences (IG SAS) in Bratislava, Slovak Republic

The 2010-2012 Project supported by the VEGA Grant Agency (a scientific grant agency for science of the Ministry of Education, Research & Science, and Sports of the Slovak Republic and the Slovak Academy of Sciences). Project coordinator was Prof. Ján Oťaheľ.

The aim of the Project was the assessment of landscape change dynamics as determined by social interests driven by the political and economic stimuli. The stimuli have considerably changed landscape of Slovakia in the past half-century. Central management determined both urbanization and socialization of agriculture and consequently the character of landscape structure in the 1950s. The return to market economy in the 1990s and accession of Slovakia to the European Union (EU) at the beginning of the millennium triggered changes in settlement structure and the rate of agricultural landscape exploitation. Apart from anthropic changes, attention was paid to landscape changes caused by natural events – forest fragmentation due to calamity windstorm and wild fires. Aerial and satellite images, CORINE Land Cover (CLC) of 1990, 2000 and 2006 (CLC1990, CLC2000 and CLC2006) data were applied to the assessment of landscape changes. Comparison with the natural landscape potential, demographic and economic indicators, and the legal limits to regional development contributed to the landscape change dynamics, fragmentation and stability assessments.

Results of the Project showed that land cover flow urbanization (LCFU) in Slovakia in 1990-2006 increased by 3% a year which represents only a fifth of the European trend (16.4%) and that the frequency of floods increases in basins with the increasing area of land cover changes, which reduce landscape stability. Persistence in use of forest areas correlates with the properties of natural landscape and it was assessed in the context of optimisation of rational land use. In terms of area, the most extensive changes in Slovakia in 2000-2006 include diminishment of monoculture coniferous forests (by more than 12,000 ha), which were relatively less resistant to natural disasters than the mixed forests.

Ján Feranec, Ján Oťaheľ and Monika Kopecká

FORTHCOMING MEETINGS

REGIONAL CONFERENCE OF THE INTERNATIONAL GEOGRAPHICAL UNION, KYOTO, JAPAN, 2013, AUGUST 4-9

During IGU Regional Conference the IGU LUCC commission will organize several sessions and business meeting (also oriented on the next activity of the Commission after 2013) as usually in the main days of IGU Congress. Also several field trips will be possible – in Japan as well as in Russian Far East.

More information at <http://www.igu-kyoto2013.org/>

Proposal of main LUCC topics in Kyoto Conference:

1. Classification of classes and categories in land use/land cover (LUCC);
2. Regional LUCC studies from different countries;
3. Interaction of regional/local development and LUCC;
4. Globalization and LUCC;
5. Historical changes in LUCC in regional, state and global levels.

IGU LUCC REGIONAL MEETING, PRAGUE, CZECHIA, 2013, JUNE 20-22

Week of interesting activities connected with Land Use/Cover Changes and Remote Sensing topics is in preparation during June 17-22 in Faculty of Science, Charles University in Prague, Czechia:

June 19: The seminar focused on land cover changes in Czechia and Middle Europe will be realized under supervision of Czech Geographical Society and its section Regional Geography together with Historical Geography Research Centre in Prague. Seminar will be in Czech language.

June 20-23: International IGU LUCC seminar (in English). Especially European LUCC researchers will discuss Land Use and Cover Changes from different angles – land use and remote sensing, historical land use, landscape function changes, land use/land cover of cities and urban sprawl etc. After this two-day section there will

be realized the field trip (June 22th) to the landscape of Middle and North-West Bohemia, intensively changed by human activities.

First circular will be announced in February 2013

June 17-20: The SCERIN seminar, focused on remote sensing (see below), organised for scientists from Middle and Eastern Europe (only for invited persons).

MEETING “LCLUC Science in the SCERIN Region: Current Focus and Future Directions”, PRAGUE, CZECHIA, 2013, JUNE 17-19

The first meeting of GOF-C-GOLD South Central and East European Regional Information Network (SCERIN) entitled “LCLUC Science in the SCERIN Region: Current Focus and Future Directions” is planned for 17-19 June 2013 at the Faculty of Science, Charles University, Prague, Czech Republic.

The goals of the GOF-C-GOLD SCERIN network are to promote the use and improve the quality and availability of Earth System remote-sensing data in South Central and Eastern Europe (SCE). Further information about the network is available on the SCERIN web site <http://www.fao.org/gtos/gofc-gold/net-SEERIN.html>.

The objectives of the SCERIN-1 meeting include:

- 1) Review the availability of satellite data, products, and approaches for land-cover monitoring in the SCE region; outline region- specific research, applications and development needs
- 2) Discuss major ongoing scientific programs and projects and define SCERIN participants’ potential contributions and follow-up activities,
- 3) Form Focus Groups (FGs) to work on specific issues (actions) determined by the SCERIN community

A one-day visit to the west Bohemia - Sokolov region will be organized on June 19th 2013 for SCERIN participants to observe typical examples of LCLUC, such as land-use change associated with open-cast mining, reclamation, re-vegetation, and monocultures of Norway spruce.

To ensure continuity and collaboration between the existing networks in the region, SCERIN-1 is planned in coordination with the regional IGU meeting, to be held in Prague 20-22 June, 2013. Leading remote sensing experts will provide a 2-day

advanced training session on “Classification methods in Land-Use/Land-Cover Change” (held June 20-21, 2013 at Charles University) for SCERIN and IGU students and post graduates.

Jana Albrechtova, Premysl Stych (stych@natur.cuni.cz), Lucie Kupkova and Petya Campbell

LAST MEETINGS

IGU REGIONAL CONFERENCE, COLOGNE, GERMANY, AUGUST 26-30, 2012

Results of steering committee business meeting (August 29th):

Participants: Balteanu, Bičík, Gabrovec, Feranec, Milanova, + 3 guests

1. After discussion there was decided to renew prof. Geist’s appeal for active membership in steering committee (task for current chair)
2. Four present members of IGU/LUCC steering committee will continue in next period 2012-2016, as well as absent members G.S.Chauhan, H. Geist and Ernan Rustiadi; new member will be prof. J. Feranec (Slovakian Academy of Science, Geographical Institute in Bratislava). There was also agreed that one new member will be named by Russian delegation and one from North/Latin America (will be delegated later). Vice-president prof. Himiyama will be asked for nomination of one member for his SLUAS project.
3. If prof. Geist won’t be willing to become a chair (will be solved till September 30th 2012), commission will be led by prof. Bicik)
4. According to recommendation of SC members and to agreement of speakers all papers from Köln will be published at IGU/LUCC website. Larger popularization of results of LUCC research will be guaranteed by this publishing.
5. Commission will continue in tradition of LUCC Atlases publishing. Volume VII (focused on LUCC of Czechia and Slovakia) was published in October 2012 by Charles University in Prague, Faculty of Science). Who is interested, please contact prof. Bicik (bicik@natur.cuni.cz). Other volumes will be published in 2013; Volume VIII (focused on Asia states) will be edited by prof. Himiyama (Japan), Volume IX (focused on Europe) will be published again in Czechia (editor prof. Bicik). Volume X would be published in 2014. More information about atlases and possibilities of cooperation and/or publishing will be put out at commission/s website (www.luccprague.cz)

6. Chair also asked all present members for regular sending of IGU/LUCC relevant information; all notices etc. will be published at commission website and regular annual newsletters

7. During discussion there was recommended, that except regular participation at Regional Congresses (Kjoto – Japan 2013, Krakow – Poland 2014, Moscow – Russia 2015) special IGU/LUCC seminars should be organized once a year. In 2013 special seminar will be organized by occasion of summer school (NASA + ESA) in Prague (June 2013, Charles University in Prague, Faculty of Science). Another seminar will be in Bucurest (Romania) in 2014, it will be organized by Geographical institute of the Roman Academy of Science by prof. Dan Balteanu.

8. Finally, chair thanked all meeting participants for correct and friendly talks and cooperation in last four years. He also asked for more intense cooperation in next period 2012 – 2016.

Ivan Bičík

PUBLICATIONS

IGU/LUCC commission has been publishing special Atlases focused on Land Use/Cover Changes in different world regions more than ten years. Until 2012 following books had been published:

Land use/Cover Changes in Selected Regions in the World:

- Himiyama, Y., Mater, A., Bicik, I., Milanova E. V.: Volume I: (November 2001), Hokkaido,
- Himiyama, Y., Mater, A., Bicik, I., Milanova E. V.: Volume II: (December 2002), Hokkaido,
- Himiyama, Y., Mater, A., Bicik, I., Milanova E. V.: Volume III: (December 2003), Hokkaido,
- Himiyama, Y., Mater, A., Bicik, I., Milanova E. V.: Volume IV: (April, 2005), Hokkaido,
- Himiyama, Y., Mater, A., Bicik, I., Milanova E. V.: Volume I – IV: (March 2010), Hokkaido,
- Bičík, I., Himiyama, Y., Feranec, J.: Volume V: (February 2010), Prague,
- Himiyama, Y., Bičík, I.: Volume VI: (July 2012), Hokkaido,
- Bičík, I., Himiyama, Y., Feranec, J., Stych, P.: Volume VII: (November 2012), Prague.

More than 50 papers from all over the world were published in these atlases. IGU LUCC commission in cooperation with IGU vice-president Y. Himiyama make efforts

to continue with issuing of next Volumes, which present contemporary and former trends in land use and its historical development. Therefore we kindly ask all researchers, who are interested in LUCC problematic, to contribute with their papers to next Volumes. In case of your interest please contact chair of IGU LUCC commission Ivan Bičik (bicik@natur.cuni.cz). Next Volumes are planned to be published in 2013.

Papers requirements:

- a) Paper has to be focused on Land Use/Cover Changes topics analysed by remote sensing or by statistical data; text and figures/maps should be in the equal extent.
- b) Theme of the paper should not cover only some landscape detail, but it could be analysed in larger consequences and considering larger area (administrative region, state, river basin etc.).
- c) We accept papers from all countries in the case they fulfil scientific and technical requirements (high resolution of figures/maps).
- d) Editors send papers for review and after that the papers are accepted for publishing; or they are sent to authors for adjustments according to review.
- e) The extent of text in English language is 10 – 12 pages (font Times New Roman, line spacing 1,5), graphical supplements (maps, figures, photos, diagrams etc.) are in the same extent.

In 2013 IGU LUCC commission is planning to publish two Volumes with regional focus on Asia (Volume VIII) and Europe (Volume IX).

Himiyama, Y., Bičik, I. eds. (2012): Land use changes in selected Regions in the world. Volume VI. Issued by IGU/LUCC, Institute of Geography, Hokkaido University of Education, Asahikawa, p. 65.

Content:

- Y. Himiyama: Preface
- Singh, R.,B., Mal, S.: Climate Change and Vegetation Pattern in Nanda Devi Biosphere reserve, Indian Himalaya.
- Singh, R., B., Kumar, A.: Climate Change, Water Resources and Land Use Change in Drylands of Rajasthan India.
- Zengmin, J.: Rapid Land Use Change in Suburban Areas of China.

- Zengmin, J.: Restructuring of land Use in Chinese Villages Undergoing Development.
- Rustiadi, E, et al.: The Dynamics of population, Economic Hegemony and Land Use/Cover Change of Jabodetabek Region (Jakarta Megacity).
- Haruyama, S.,Yositaka, M., Kondo, A.: Evaluation of Land Cover Change in the Amur River basin using NDVI derived from NOAA/AVHRR PAL dataset.

In case of your interest in this Volume VI please contact prof. Yukio Himiyama:
himiyama.yukio@a.hokkyoidai.ac.jp

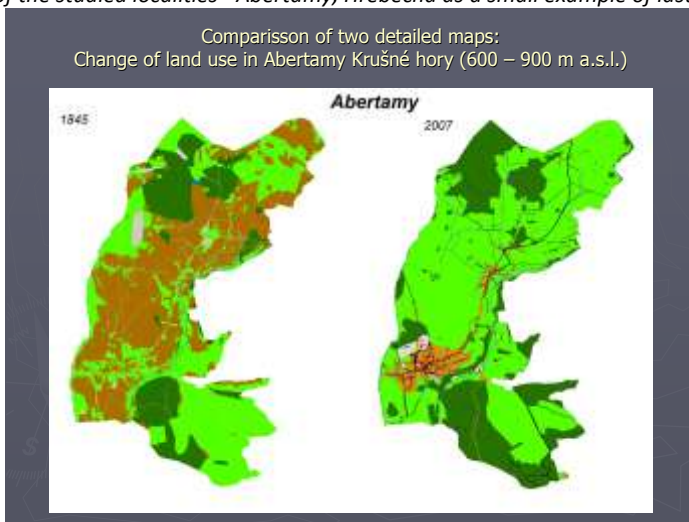
Bičík, I., Himiyama, Y., Feranec, J., Štych, P. eds. (2012): Land use changes in selected Regions in the world. Volume VII. IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa, p. 80

Content:

- Bičík, I.: Preface
- Bičík, I., Kupková, L., Štych, P. (2012): Changes of Land Use Structure in the Czech Republic: From Local Patterns to a More Complex Regional Organization. pp. 5 - 12
- Štych, P., Bičík, I., Chromý, P., Bláha, J. (2012): Košťálov and Klein Taxen. pp. 13 - 18
- Bičík, I., Jeleček, L., Štych, P., Janoušek, Z., Bláha, J. (2012): Abertamy and Hřebečná. pp. 19 - 24
- Štych, P., Bičík, I., Spazierova, K., Janoušek, Z., Bláha, J. (2012): Rudná. pp. 25 - 30
- Štych, P., Bičík, I., Malíková, J., Jan D. Blaha (2012): Živohošť, Křeničná and Blažim. pp. 31 - 36
- Bičík, I., Štych, P., Janoušek, Z., Stonáček, V., Bláha, J. (2012): Velká Vrbka, Malá Vrbka, Kuželov. pp. 37 - 42
- Bičík, I., Štych, P., Jeleček, L., Bláha, J. (2012): Kobylí. pp. 43 - 48
- Frélichová, J.: Integrated Landscape assessment of Cézava Region: How can the Concept of Ecosystem Services Contribute? pp. 49 - 62
- Feranec, J., Soukup, T.: Trend of changes in Czechia's and Slovakia's artificial surfaces (1990 – 2006) represented on a map. pp. 63 - 70
- Bičík, I., Kupková, L. (2012): The utilisation of the Relative Development Index in the assessment of land use in Czechia 1845—2000. pp. 71 – 79

In case of your interest in this Volume VII please contact prof. Ivan Bičík:
bicik@natur.cuni.cz

One of the studied localities - Abertamy, Hřebečná as a small example of last Atlas,



Source: Bičík, I., Himiyama, Y., Feranec, J., Štych, P. eds. (2012): *Land use changes in selected Regions in the world, Volume VII.*



Source: Bičík, I., Himiyama, Y., Feranec, J., Štych, P. eds. (2012): *Land use changes in selected Regions in the world, Volume VII.*

Ivan Bičík a kol. (2010): Vývoj využití ploch v Česku [Land Use Changes in Czechia]. Česká geografická společnost, Edice Geographica, Praha, 250 s. ISBN 978-80-904521-3-8

This publication could be (in shortened version) published in English language in the very end of this year.

Book summary

Research of landscape changes and of their impacts on various components of societal and environmental systems has been gaining importance since the 1980s. Large international projects were established (e.g., International Geosphere-Biosphere Programme – IGBP, International Human Dimensions Programme – IHDP) that started to form conditions for a widely based study of global changes. Questions related to land use and land cover changes (LUCC) on various hierarchical levels – from global to local – became integral parts of this research of nature-society interactions. International Geographical Union (IGU), which had a special working group focused on land use for many years, re-joined these interdisciplinary efforts in Brisbane in 1997 by a foundation of what is currently IGU/LUCC Commission. For a long time, this commission was led by Yukio Himiyama from Japan, then by Alexander Mather from the UK, and currently by the editor of this book, Ivan Bičík.

Thanks to these international involvement and contacts of Ivan Bičík, Czech scholars studying land use changes were able to present their results on various seminars and conferences abroad (not only IGU/LUCC, but also ESEH – European Society for Environmental History, IALE – International Association of Landscape Ecology, etc.). Furthermore, the authors published more than a hundred articles in both Czech and international scientific journals, focusing on methodological aspects of their research, regional differentiation and consequences of land use changes both in the Czech Republic and in the whole Central Europe, connections and dependencies between land use and selected indicators of natural and socio-economic conditions, etc.

This book presents results of at least twenty years of effort of the editor and a small team of his collaborators, which has been supported by several projects of the Grant Agency of the Czech Republic (GAČR) since 1993. These projects were primarily oriented on long-term landscape changes in the Czech Republic, and partly on the transformation of Czech agriculture after the year 1990. The team was also supported by many students of the Faculty of Science, Charles University in Prague (departments of social geography and regional development, physical geography and geo-ecology, cartography and applied geo-informatics, and institute for environmental studies).

The book would not come into existence without the valuable data source of the so-called “Stable cadastre”. It consists of land use maps from the years 1826 – 1843, covering the whole territory of the current Czech Republic in the scale 1: 2.880. A statistical evidence of land use (in ca 50 categories) was derived from these maps, and is available in the archives of the Czech Office for Surveying, Mapping and Cadastre (ČÚZK). These data were later (around

the year 1948) used to create tables describing the structure of land use for the years 1845 and 1948 (in metric units already) for approximately 13.000 cadastral units of the Czech lands. During the 1990s, our team has used these tables to create the “Database of long-term land use changes in Czechia (1845 – 2000)” (hence Database), by re-organising the information and adding two modern time horizons – 1990 and 2000. All the four studied years (1845, 1948, 1990 and 2000) constitute important milestones, or turning points, in the history of both the Czech Republic and Central Europe.

The original data could not be used directly – we had to establish stable spatial units and comparable land use classification. Because of changing area (boundaries) of some of the cadastres, some cadastral units had to be merged into so-called Basic Territorial Units (BTUs), the area of which has not changed by more than 1 % during the whole monitored period. In this way, the existing ca 13.000 Czech cadastres were merged into 8.903 BTUs (average area 8,86 sq. km), where 80 % of BTUs consist of one cadastre, 10 % of two cadastres, and 10 % of more than two cadastres. Similarly, land use classification had to be simplified in order to ensure its comparability between all studied time horizons. Land use of each BTU is classified into eight basic categories, or three aggregate categories, as can be seen from the table below.

Land use classification

Aggregate category	Basic category	Notes
Agricultural land (AGL)	Arable land (ARL)	
	Permanent cultures (PC)	gardens, orchards, vineyards, hop-gardens
	Meadows (M)	together, Permanent grasslands (PG)
	Pastures (P)	
Forested areas (FA)	Forested areas (FA)	
Other areas (OA)	Water areas (WA)	
	Built-up areas (BA)	
	Remaining areas (RA)	

Thus, the database consists of 8.903 spatial units (BTUs), for each of which we know areas of eight basic land use categories in four time horizons (1845, 1948, 1990 and 2000). This database, that is currently available online (at <http://lucc.ic.cz>), formed a basis for our land use research. It enables us to describe long-term tendencies in land use structure, and to understand driving forces that influenced these changes. Step-by-step, a cluster of methods, either adapted or newly created, was used to assess this database.

The simplest method examines changing shares of individual land use categories. This is described in detail in chapters 6 to 8 of our book. Most importantly, our database shows a significant decrease of both agricultural and arable land, particularly in the period 1948 – 1990 (by 18 and 20 %, respectively – fig.27). This trend was most profound in mountains, highlands and generally less fertile Czech regions, and also in localities with peripheral spatial position (figs 28 and 32). A similar trend occurred in the previous period (1845 – 1948, fig.10), but much weaker. To the contrary, the share of forested areas has been increasing steadily

since the end of the 19th century (from 29 % to 34 % nowadays, *ibid.* and fig.44). The growth of forests (and also of permanent grasslands in the latest time period) was most significant in higher and less fertile regions (figs 33, 51 and 52). The growth of built-up and “remaining areas” accelerated after the year 1948 (figs 34 and 36). In the period 1948 – 1990, more than 95 % of BTUs saw a decrease of area of agricultural land, and 80 % of them an increase of built-up areas.

A more synthetic approach to research of long-term land use changes was taken in chapter 10. Chapter 10.1 presents a typology of BTUs based on an assessment of increases (including stagnation) or decreases of areas of the three aggregate land use categories (i.e., agricultural land, forested and other areas). Assuming that areas of these three categories could either increase or decrease, and provided the types “+++” and “---” should not exist in reality, six basic types of changes of land use structure can be distinguished in the studied time periods (1845 – 1948, 1948 – 1990, 1990 – 2000) – see figs 79 to 81. It was found that each time period was typical of significantly different frequencies of the types of land use changes. A similar approach was adopted to assess the changes of areas of four individual categories within the agricultural land (i.e., arable land, permanent cultures, meadows and pastures). This typology enables us to distinguish 16 types of agricultural land use changes (including the “++++” and “----” types). Also here, the individual time periods differed from each other dramatically.

Several other methodologies were used for a synthetic assessment of changing land use structure in the Czech Republic. For instance, the so-called Index of change (IC, see chapter 10.3) describes by one number the overall intensity of land use change in one BTU during one time period. The number, ranging from 0 to 100 (%), shows on how many percents of the whole area of the given BTU any land use change occurred between two time horizons – see figs 20, 38, 49 and 82 to 84.

Other synthetic methods are based on geo-ecological assessments of landscape. It is for example the Coefficient of ecological stability of landscape (CES). It is a complex indicator, describing the structure of land use in one unit and one time horizon by one number. Shares of the eight basic land use categories on the whole area of a BTU are weighed by given coefficients, which schematically express ecological “stability” or “quality” of the given category (highest 1,0 for forests, lowest 0,0 for built-up areas). CES index ranges from 0 to 100. The higher the CES, the more ecologically “stable” the unit. Similarly, the Coefficient of anthropogenic influence (CAI, see chapter 10.4) puts areas of the eight basic land use categories either into the numerator (arable land, built-up areas, remaining areas) or into the denominator (meadows, pastures, water areas, forested areas) of a fraction, according to assumed rate of anthropogenic impact on them. It results into a number ranging from 0 to infinity; the higher CAI, the higher anthropogenic impact. See the maps in figs 85 to 89.

Finally, we applied the so-called “Slovenian” methodology (Gabrovec, Petek, Kladnik, etc.) of typology of major land use changes (chapter 10.5). It is based on an assessment of a simplified land use structure (arable land + permanent cultures, permanent grasslands, built-up areas + remaining areas, forested areas, water areas). Types of land use changes are then established according to which of the categories increased most dramatically in the assessed time period (afforestation, grassing-over, intensification and urbanisation). Moreover, it

distinguishes three levels of prevalence of the major change (low, intermediate and high intensity). Once again, this method proved that the individual time periods differed in both frequencies of the respective types and in their spatial occurrence. See the maps in figs 89 to 94.

In case of your interest in this book please contact Department of Social Geography and Regional Development, Faculty of Science, Charles University in Prague:
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Figure example from the book

Typology of the macrostructural categories development
 Agricultural land, Forest, Other areas (built up, water, the rest)
 (+ increase of the size, - decrease of the size) in Czechia

TYPE	period 1845 – 1948			period 1948–1990			period 1990–2000		
	Number of BTU	% BTU area	% area	number of BTU	% BTU area	% area	number of BTU	% BTU area	% area
<i>Hlučínsko</i>	18	0,20%	0,33%						
+++	3	0,03%	0,01%	1	0,01%	0,00%	141	1,58%	0,69%
+-	272	3,06%	2,53%	7	0,08%	0,01%	1 904	21,39%	19,03%
++	1 608	18,06%	16,64%	12	0,13%	0,07%	490	5,50%	5,30%
+-	721	8,10%	7,80%	2	0,02%	0,00%	1 234	13,86%	11,48%
++	4 053	45,52%	46,64%	8 062	90,55%	89,84%	2 543	28,56%	30,03%
+-	1 286	14,44%	13,20%	47	0,53%	0,42%	905	10,17%	12,00%
+-	942	10,58%	12,85%	772	8,67%	9,64%	1 686	18,94%	21,48%
Total number of BTU	8 903			8 903			8 903		

Source: Bičík, I. et al. (2010): *Vývoj využití ploch v Česku [Land Use Changes in Czechia]*. Česká geografická společnost, Geographica edition, Prague.

Example of land use changes in Abertamy (Czechia)

Change of categories size from 1842 (1st column) into different categories in 2000 (rows in ha)

Total area	arable	perm. cult.	grass-land	built up areas	forest	water area	remainin	Total
857,5 ha								
arable	0	9,78	248	2,1	27,7	2,3	13,4	339,3
perm. cultures	0	0	0	0	0	0	0	0
grassl.	0	13,8	211,5	3,4	91	3,3	13,7	125,2
built up area	0	0,9	1,5	1,5	0,3	0	0,5	3,2
forest area	0	0	23,4	0	115,8	0,2	3,3	26,9
water area	0	0	1,7	0	0,3	1,6	0,2	2,2
remainin	0	1,9	14,5	0,4	5,7	0,3	7,5	22,8
total	0	26,4	325,1	5,9	124,9	6,2	31,1	519,7

Source: Bičík, I. et al. (2010): *Vývoj využití ploch v Česku [Land Use Changes in Czechia]*. Česká geografická společnost, Geographica edition, Prague.

Table explanation:

Figures in the table were obtained by a spatial overlay (in GIS) of detailed land use maps in the scale of 1:5,000 from the years 1842 and 2000. The total area of the analysed territory is 857.5 hectares.

Individual rows in the table represent the amounts of land (in hectares) that were converted from the land use categories labelled in the leftmost column into other land use categories as labelled in the uppermost row.

Cells of yellow colour on the diagonal denote the total area of land parcels that were classified in the same land use category in both years. So, for example, 211.5 hectares were covered by grasslands in both years. We can also see that between 1842 and 2000 125.2 hectares of grasslands were lost; it means that in 1842 the total area of grasslands was 336.7 hectares (211.5 + 125.2 = 336.7). In total, any land use change occurred on 519.7 hectares (out of the 857.5) between the years 1842 and 2000.