

COMMISSION REPORT 2012-2016

C12.26 Commission on Land Use and Land Cover Change

1. MEMBERSHIP

A. Members of the Steering Committee, 2012-2016

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B. Members: 142 (41 countries/regions), as of 24th February 2016

Australia	1	Austria	6	Brazil	1	Bulgaria	2
Brazil	1	Canada	1	Chile	1	China	14
Czech Republic	16	Ecuador	1	Eritrea	1	Finland	1
Germany	5	Greece	1	India	7	Indonesia	2
Iran	2	Ireland	2	Italy	3	Jamaica	1
Japan	20	Kenya	1	Lithuania	3	Mexico	1
Mongolia	1	Netherlands	1	New Zealand	1	Nigeria	2
Poland	1	Portugal	1	Romania	4	Russia	3
Slovenia	2	Slovakia	10	South Africa	3	Sri Lanka	1
Switzerland	3	Taiwan	3	Tunisia	1	U.K.	1
USA	8						

The number of commission members is lower in comparison with last years. Nevertheless, it is not caused by lower interest in land use topics, but because of “cleanup” of mailing list. The old list was based on data older than 10 years. But a lot of members have changed their e-mail addresses and all contacts, so it is not possible to contact them anymore. After revision of mailing list and deleting of non-existent e-mail addresses the number of commission members is 142. This number is relatively stable in last years – each year some new IGU Lucc researchers have become members of commission, and each year it is necessary to delete several e-mail addresses, because they are not functional anymore.

C. Commission website:

Until autumn 2015 there was functional commission website www.luccprague.cz. Because of problems with re-registration our domain luccprague.cz has not been prolonged and does not belong to us anymore. Thus, commission does not have own website right now. But we presume that after vote of new commission’s chair in IGC Beijing 2016 brand new IGU Lucc website will come into being. Nevertheless, e-mail address of IGU Lucc secretariat still remains the same – igu.landuse@gmail.com (at least until the vote of the new chair).

2. MEETINGS

A. + B. Commission meetings and themes addressed

Below you can see brief summary about all conferences, meetings etc. connected with IGU Lucc commission. Detailed information about each event was published in regular annual IGU Lucc newsletters.

2012:

IGU LUCC commission activities were divided into several parts during **International Geographical Congress in Cologne 2012**: a scientific program and congress business meeting. Four scientific LUCC sessions was attended by 80 researchers (and not only from IGU LUCC commission members) and over 30 papers were presented and discussed during these meetings. There were also realized two business meetings in Cologne.

2013:

IGU LUCC regional Prague meeting (June 20 to 22) – was organized by IGU LUCC commission in cooperation with Charles University in Prague (Faculty of Science). About 25 researchers from european countries (Czechia, Slovakia, Romania, Poland, Spain, Russia and Hungary) visited this event. During this meeting there were also presented papers by two leaders of newly formed network SCERIN – Petya Campbell and Garik Gutman (NASA). The idea of connect IGU LUCC meeting with SCERIN activities was very fruitful and evolved in cooperation next years.

The International Geographical Union (IGU) realized **Regional Conference in Kyoto, Japan, August, 4-9, 2013**. The IGU Commission on Land Use and Cover Changes organized five sessions on which were presented about 25 papers, altogether attended by more over than 50 researchers, mostly from Japan and Eastern Asia, but also from Europe.

Kyoto IGU LUCC meetings themes:

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.

2014:

The 2014 IGU LUCC Regional Meeting “Land Use – Land Cover Changes and Land Degradation (LUCC&LD)” was held in Bucharest, Romania on June 23-26. The event was organized by the Romanian Academy’s Institute of Geography, the Romanian Space Agency – ROSA, and the University of Agronomic Science and Veterinary Medicine Bucharest. The Symposium focused on land use and land degradation related to soil erosion, landslides, desertification and climate change. The topics also included land-use transformations connected with economic, social and political changes. The Symposium gathered nearly 40 researchers from the European countries (the Czech Republic, Bulgaria, Romania, Austria, Italy, and Russia) and Australia

IGU Regional Conference was held in Kraków in August 18-22, 2014. Land use/land cover topics under the heading of LUCC commission were presented in five thematic sessions:

1. Land Use Changes in Metropolitan Areas
2. Historical/Dynamic Changes of Land Use
3. Landscape (re)Construction
4. Land Use of Towns and Villages
5. Natural Changes by Human Activity I, II, III

According to their abstracts finally ca 55 papers were divided into these sessions. Another 23 applications were recommended to present as posters. Because of high number of planned papers some sessions were divided into several separate parts. Therefore, commission meetings organized in the new and beautiful Campus of Jagiellonian University (in Central Europe the second oldest after Charles University) were realized in 7 separate sessions.

Moreover, land-use theme was presented in another thematic sessions focused on local and regional development, natural hazards, sustainable development of rural regions etc. We can summarize that land-use topics analyzed by different methods and techniques show very supporting tendency in contemporary geographical research.

2015:

During the **IGU regional conference (Moscow, Russia, 2015, July 17-22)** where was possible to visit session „Problems and consequences of land use/land cover changes“ organized by IGU LUCC commission there was held also the meeting of the IGU LUCC steering committee. Current and former members of the steering committee (I. Bıcık, Czechia, E. Milanova, Russia, Y. Himiyama, Japan) discussed the results of the IGU LUCC commission in the last years; but very important part of the meeting also consisted of discussions on the future work of the commission.

Over 40 participants from 13 countries were present at the **3rd workshop “SCERIN” in Brasov, Romania (2015, July 13-18)** focused on Earth observation and land cover/land use changes with emphasis on forests. The meeting was organized by GOF-C-GOLD (Global Observations of Forest and Land Cover Dynamics), NASA Land-Cover and Land-Use Change Program, START initiative together with Transylvania University of Brasov.

2012-2016

Each year there is also **conference in India**, focused on land use/cover change topics. These conferences are widely attended, participants come usually from South and South-east Asia, Russia and Japan. It will continue also in 2016: 9th IGU conference on Land Use Change, Climate Extremes and Disaster Risk Reduction is going to be in March 18-20, 2016, in New Delhi.

C. Future meetings:

IGU Commission on Land Use and Land Cover Change will join workshop **“Advancing horizons for land cover services entering the big data era” organized in Prague, Czech Republic in May 6–7th 2016**. This workshop is a chance to involve IGU/LUCC into wider scientific network. The workshop is organized around four representative sessions, covering the latest advances; trending activities and future challenges in land-cover services in the big data era. Eight renowned keynote speakers will guide a vivid discussion, while contributions are attracted among the key enabling actors of Earth Observation in Europe (e.g. EEA and ESA), USA (e.g. NASA) and the World (e.g. GEO). The four sessions are:

1. Harmonization of Sentinel-2 and Landsat products
2. Mapping Land Cover and Land Use with cross-scale and cross-sensors approaches
3. Challenges of Land Cover and Land Use Monitoring with Dense Time Series of EO Data
4. EO benefits for ecosystem services and human wellbeing

The IGU/LUCC commission will organize a special **thematic excursion** to Prague surrounding after this workshop on Sunday **8th May 2016** named “25 years of transitional changes of the LUCC around Prague”.

There will be 5 thematic sessions organized by Land Use and Cover Change Commission during **International Geographical Congress in Beijing, China, 2016, August 21-25**:

- 1) Comparative Study on Land Cover and Land Use Change (LCLUC) and Their Driving Forces in Different Regions
- 2) Evaluation of Dominant Trends of Human Impact On Land Use/Land Cover (LU/LC) Changes as in Multi-Levels (/State as Regional and Local Levels)
- 3) Policies and Economic Conditions Impact on Urban, Agricultural and Forestry Landscapes Change
- 4) Land Use/Land cover (LU/LC) Change Mapping in Multi-Scales: Data and Methodology
- 5) Land Cover/Land Use Databases and Data Sharing

SCERIN-4 will take place 18-22 of July in Zvolen, Slovakia and will be hosted in collaboration by a partnership among three Slovakian institutions. The Slovakian National Forest Centre (where the meeting will be hosted), the Slovak Academy of Sciences and the Technical University in Zvolen.

The capacity building workshop SCERIN-4 will focus on the current LCLUC challenges in the SCERIN region connected with climate change and anthropogenic influence on ecosystems, addressing their significance and influence on ecological and social processes and ecosystem functioning. The meeting will have capacity building focus and will be held in coordination with a Trans-Atlantic Training (TAT4), jointly organized by NASA, ESA and START for graduate students and young professionals usually together with SCERIN meetings

3. NETWORKING

A. Collaboration with other IGU Commissions and Task Forces

Not realized.

B. Collaboration with other international and inter- and multi-disciplinary groups

The 4th Prague LUCC meeting (June 2013) combined sessions with special network LUCC for Middle and East European Countries (some 50 participants), some speakers participated as in SCERIN as in IGU/LUCC meeting. **Network SCERIN** was founded by ESA and NASA, and that event was the second after Sofia 2012. In this event there was realized lesson for participants about activity of IGU/LUCC and also about investigation realized in Czechia in LUCC after 2010.

Also in next years there was strong connection with SCERIN workshops, where the land use/land cover change topics were presented and discussed. This connection is very fruitful and very important especially for young land use researchers, because one part of these events is based on training sessions, where it is possible to learn new approaches and techniques of LUCC research.

C. Cooperative efforts with ISSC and with ICSU programs

Not realized.

4. PUBLICATIONS

Newsletters, books etc.

- Newsletter No. 14 (2012)
- Newsletter No. 15 (2013)
- Newsletter No. 16 (2014)
- Newsletter No. 17 (2015)
- Newsletter No. 18 (2016)

BICIK, I., HIMIYAMA, Y. (eds.) (2012): **Land Use / Cover Changes in Selected Regions in the world: Volume VI.** IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa

BICIK, I., HIMIYAMA, Y., FERANEC, J., ŠTYCH, P. (eds.) (2012): **Land Use / Cover Changes in Selected Regions in the world: Volume VII.** IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa

BICIK, I., HIMIYAMA, Y. (eds.) (2013): **Land Use / Cover Changes in Selected Regions in the world: Volume VIII.** IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa

BICIK, I., HIMIYAMA, Y., FERANEC, J., KUPKOVA, L. (eds.) (2014): **Land Use / Cover Changes in Selected Regions in the world: Volume IX.** IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa

BICIK, I., HIMIYAMA, Y. (eds.) (2014): **Land Use / Cover Changes in Selected Regions in the world: Volume X.** IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa

BICIK, I., HIMIYAMA, Y., FERANEC, J., KUPKOVA, L. (eds.) (2015): **Land Use / Cover Changes in Selected Regions in the world: Volume XI.** IGU/LUCC, Faculty of Science, Charles University in Prague and Hokkaido University of Education, Asahikawa

BICIK, I., KUPKOVA, L., JELEČEK, L., KABRDA, J., ŠTYCH, P., JANOUŠEK, Z., WINKLEROVÁ, J. (2015): **Land Use Changes in the Czech Republic 1845-2010 – Socio-Economic Driving Forces**, Springer International Publishing, Switzerland.

Detail information about these publications has been presented in IGU LUCC Newsletter No. 18.

Period's publications

The Commission has been extremely active, and successful, in publication. The above list only shows those that have been published by direct involvement of the Commission. The number of publications by each member far exceeds it. As a sample of period's publications we present studies of Institute of Geography, Slovak Academy of Sciences, focused on land-use:

Identification and assessment of landscape changes in Central Europe

Results are published by: Feranec, J., Soukup, T., Taff, N. G., Stych, P., Bicik, I.: *Overview of changes in land use and land cover in Central Europe* (the text and seven general maps: Spatial distribution of urbanisation; intensification of agriculture; extensification of agriculture; afforestation; deforestation; water bodies construction; other changes in Central Europe for the periods 1990-2000 and 2000-2006); the chapter prepared for the book: Gutman, G. (Editor): *Land cover and land use change in Eastern Europe 1990-2010: Impacts of the breakup of the Soviet Union*. The book would be published by Springer.

Semantic similarity between land cover classes

Results are published by: Feranec, J., Solin, L., Kopecka, M., Otahel, J., Kupkova, L., Stych, P., Bicik, I., Kolar, J., Cerba, O., Soukup, T., Brodsky, L. (2014). Analysis and expert assessment of the semantic similarity between land cover classes. *Progress in Physical Geography*, 38 (3), 301-327.

Spatial determinants of abandoned arable lands and grasslands in Slovakia

Results are published by: Pazur, R., Lieskovsky J., Feranec, J., Otahel, J. (2014). Spatial determinants of abandonment of large-scale arable lands and managed grasslands in Slovakia during the periods of post-socialist transition and European Union accession. *Applied geography*, 54, 118-128.

More detailed mapping of urban areas using high-resolution remote sensing data

Results are published by: Vatsava, R., Kopecka, M., Feranec, J., Rosina, K. (2014). Classification of urban areas by geographic object-based analysis of very high resolution remote sensing data. *South-Eastern European Journal of Earth Observation and Geomatics*, 3(2S), 671-675 (e-journal).

Detail information about these studies has been presented in IGU Lucc Newsletter No. 17.

5. ARCHIVAL CONTRIBUTIONS

IGU Lucc commission report 2012-13

IGU Lucc commission report 2013-14

Newsletter No. 14 (2012)

Newsletter No. 15 (2013)

Newsletter No. 16 (2014)

Newsletter No. 17 (2015)

Newsletter No. 18 (2016)

6. CONTINUATION

The commission wishes to continue its mission as an IGU commission.

A. The name of the commission:

Unchanged.

B. Statement of the mission of the Commission

The major aim of the Commission is the enhancement of research on land use/cover change. Geographers can, and should, make a variety of contributions in this field, from both natural science and socio-economic perspectives. To foster their efforts in this fields, networking is encouraged, both between individuals and groups of members of the Commission, and between geographers and practitioners in other fields and disciplines. The objectives of the Commission are as follows:

- To promote geographical research on land use/cover changes, at scales ranging from the local to the global
- To stimulate the production and the use of land-use information bases of both the present and the past
- To coordinate the comparative study and the model study of land use/cover changes and their driving forces in different regions

C. Steering committee 2016-2020:

During 33rd International Geographical Congress in Beijing, China (August 2016) the changes in steering committee will be done. Our commission will continue in its mission, but steering committee for period 2016–2020 will be partly modified, included vote of the new chair. Some members of the steering committee are rather passive, therefore the changes are necessary and they will have positive effect for the work of the committee. It is supposed that some current members will continue (e.g. J. Feranec, Slovakia, M. Gabrovec, Slovenia, K. Kimoto, Japan, L. Rizzo, Italy), from new nominated members we can name e.g. L. Kupkova, Czechia, N. Dronin, Russia. Precise composition of the steering committee (incl. names mentioned above) will be discussed during spring 2016 and mainly during IGC in Beijing 2016.

Dear steering committee members! If you want to continue as a member of steering committee (or become a new committee's member), please send us your brief CV (maximum of 4000 characters), or please send this information to your colleagues who are interested in the IGU LUCC activities. Also send us a summary of your at least 7 publications which you value most and which have been published since 2007. Please send it to Ivan Bičík (bicik@natur.cuni.cz) and Ján Feranec (feranec@savba.sk).

D. Work plan 2016-2020:

During the IGU regional conference there was held also the meeting of the IGU LUCC steering committee. Current and former members of the steering committee (I. Bicik, Czechia, E. Milanova,

Russia, Y. Himiyama, Japan) discussed results of the IGU LUCC commission in the last years; but very important part of the meeting also consisted of discussions on the future work of the commission.

When we look at the **commission's activities in the last years**, they can be summarized into five main groups:

- Regular participation and coordination of LUCC topics in regional conferences and world congresses
- Organizing LUCC seminars (almost) each year – last one was realized in Bucharest (Romania) in 2014, previously in Prague (Czechia) in 2013, 2012 etc.
- Preparation of eleven volumes of atlases "Land use/Cover Changes in Selected Regions in the World" in cooperation with prof. Himiyama (from 2001 till 2015)
- Reviewing of books, articles for scientific journals
- Some members of the commission were very active in (inter)national seminars caring topics oriented on the LUCC.

But there is always way how to intensify and improve commission's activities. It will be the main task for renewed steering committee with a new chair, because topics of the LUCC are very important from a scientific point of view as well as from application reasons. Long-term interest in LUCC topics in contemporary research is clearly depicted in the table below:

Tab. 1: Chosen terms in abstracts and key words in articles in Web of Science and Scopus databases (1970-2010)

Database	Key words	1970	1980	1990	2000	2005	2010
Web of Science	Landscape ecology			21	114	119	177
	Landscape metrics				15	57	74
	Land use	65	132	228	1350	2563	4335
	Land cover		3	28	361	810	1267
Scopus	Landscape ecology			15	159	174	408
	Landscape metrics				13	60	73
	Land use	19	48	256	1456	2373	4102
	Land cover		1	9	295	603	1119

Source: Balej, 2012

As a base for discussion about activities of the IGU LUCC commission in the future, prof. Bicik and prof. Feranec prepared **scheme of activities in 2016-2020** (to be discussed during IGC Beijing 2016), which can be focused on six main aims:

- 1) More intensive cooperation
 - a. Collaboration must be more intensive at universities and research institutes as well;
 - b. It is necessary to strengthen international contacts for preparing international research project, supported by sources from the EU and others;
 - c. Besides IGU Conferences there should be organized special LUCC seminar annually zoomed on actual topics;
- 2) Evaluation of trends and comparison of different parts of world
 - a. Evaluation of dominant trends of human impact on land use/land cover (LU/LC) changes should be studied at different levels (state/regional/local);
 - b. In the whole world LU/LC is strongly affected by political and economic conditions with particularly visible outcomes in urban, agricultural and forestry landscapes;

- c. Presentations from different parts of the world may help to detect the relevant human impacts on LU/LC changes.
- 3) Using of databases
 - a. There is need to use LC databases (e.g. CORINE Land Cover – CLC, National Land Cover Dataset – NLCD, etc.) derived of satellite images for identification, analysis and assessment of LU/LC changes;
 - b. The data derived from satellite images provide information about LU/LC and its changes for substantial parts of the world. Availability of these data may contribute to new approaches to the assessment of the landscape, for instance in the context of environmental and economic accounting, diversity, modelling of its properties, etc. Presentation may provide an overview of examples with used databases obtained by application of satellite images.
- 4) Publishing in general
 - a. Map presentation of LU/LC changes. The effort of LU/LC change mapping in different regions of the world and different scales has been also documented by atlases published under the umbrella of the IGU LUCC;
 - b. In particular, this initiative aims to promote studies on LC/LU changes all over the world as a geographical research focus;
 - c. There is need to stimulate the production and the use of LC/LU information acquired from datasets with temporal resolution;
 - d. It is good to coordinate the comparative studies of LC/LU and their driving forces in different regions. Papers may show map presentations of LC/LU changes in different parts of the world.
- 5) Publishing of Atlases
 - a. It is crucial to collect, review and prepare next Volumes of the IGU/LUCC Atlas;
 - b. These Atlases (each of them in ca 100–200 pieces) gave a chance in last 15 years to publish ca 50 chapters about dynamic land use/land cover in different parts of the world;
 - c. It is necessary to find external sources for the next Volumes of Atlas IGU/LUCC publications and their dissemination around the world;
 - d. New Volumes could be “monothematic”, concerned e.g. on suburbanization, preserved areas, urban landscape, new wilderness, abandoned military areas etc.
 - e. The next two volumes (Vol. XII and XIII) will be published in Czechia and Japan during 2016.
- 6) Dissemination of publications
 - a. We discussed about possibility to obtain agreements from all authors for another form of publication. We plan after these agreements to realize other form – publish all chapters also in IGU/LUCC website;
 - b. This second form of publication will bring a better chance to disseminate our works in other lands and continents and will bring better chance to inform about our methods and investigational results;
 - c. We believe this form of publishing influence investigators of the LUCC topics towards higher activity and collaboration.

Ivan Bičík, Ján Feranec