

**International Geographical Union
COMMISSION ON LAND USE/COVER CHANGE**

NEWSLETTER

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PROGRESS OF IGU-LUCC

Since the publication of the Newsletter No.5 in August 2001, IGU-LUCC has enjoyed further progress and has been involved with a number of important events. The IGU General Assembly held during the IGU 2002 Regional Congress in Durban abolished the distinction in status between a commission and a study group. This means that IGU-LUCC is now the 'IGU Commission on Land Use and Land Cover Change' (C00.29). This change will have positive effect on the promotion of LUCC studies in the world geographical community, which as a whole is not yet fully co-operating with global environmental research programmes.

IGU-LUCC conducted an informative pre-congress excursion from Johannesburg to Durban as well as several interesting paper/poster sessions during the IGU 2002 Regional Congress, thanks to the efforts of Professor Coleen Vogel and her colleagues. Professor Vogel, who has been the vice chair of the IGBP/IHDP LUCC Programme, has become the new leader of IHDP (International Human Dimensions Programme on Global Environmental Change). This is a good sign for a greater involvement of IHDP in LUCC, with a potential consolidation of human/social studies of land use/cover changes, and a greater role for LUCC in the global environmental community.

The Commission's commitment to the promotion of comparative studies of land use/cover changes has been demonstrated in various ways. The publication of *Land-use Changes in Comparative Perspective* by Science Publishers in November 2002 is a memorable milestone. Most of the papers in the book are the results of the Commission's symposium in Japan in 2000. The book contains nineteen papers from eleven countries/regions. The papers are classified into five major themes, namely i)

data and methods, ii) urbanisation, iii) sustainability of rural land use, iv) land reclamation and coastal change, and v) land-use change in peripheral areas. The structure and contents of the book will be useful for further development of comparative case studies worldwide.

The establishment in August 2001 of CJLUC (China-Japan Comparative Study of Land Use/Cover Changes) Project with the support of JSPS Science Fund is another notable achievement. It is a cross-national historical comparative study of land use/cover changes. The project, which lasts till 2005, conducts comparative case studies at roughly ten selected areas distributed widely from the north to the south in Japan and China. The objectives of the project are to carry out comprehensive comparative LUCC research in Japan and China in general. In addition, there are several specific objectives: to compile information bases; to study the inter-relationships between structural changes; land use/cover changes and environmental changes and their problems; and to predict future changes and propose recommendations towards sustainable development of the two countries. It is hoped that this project will stimulate similar efforts worldwide and will lead to the establishment of larger research networks.

Historical and data issues continue to attract the attention of the Commission, as evidenced by the publication of *Land Use / Land Cover Changes in the Period of Globalization*, and the publication of the Atlas *Land Use/Cover Changes in Selected Regions in the World – Vol. 2*. The former is the proceedings of IGU-LUCC conference in Prague in 2001. The two books not only contain rich information on various aspects of historical land use/cover changes in a number of countries/regions, but also give stimulation and clue to those who are willing to become involved in the Commission's activities. The publication of the Atlas Volume 3 is scheduled for November 2003. Those who are willing to contribute to the Atlas are requested to contact me for more detail.

In July 2003 the Commission holds its meeting in Moscow-Barnaul, Russia. One of the issues of the meeting is to review and evaluate the achievements thus far of LUCC in general, and IGU-LUCC in particular, and to discuss the direction and priority issues for further study. I hope many of you come and join this meeting, which is not only important, but will also be very interesting in many respects.

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Recent Meetings

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- Pre-congress excursion, IGU-2002 Regional Congress; Johannesburg – Pretoria – Drakensberg – Durban, South Africa; July 31 – August 3, 2002; 16 participants from 8 countries; organized by Prof. Coleen Vogel, University of Witwatersrand. This four-day tour was designed to illustrate some of the interesting LUCC issues in the country, including past and present drivers of LUCC (e.g. political and socio-economic policy impacts); water management issues, cultural and other human-dimension issues, and the awe and majestic wonder of the KwaZulu Natal Drakensberg National Park, a World Heritage Site.
 - Main-congress symposia on land use/cover changes, IGU-2002 Regional Congress; Durban, South Africa; August 4-7, 2002; 17 papers and 5 posters. Session themes: 'Socializing the pixel': historical dimensions of land-use and land-cover change; Rural land-use and land-cover change; Ecological land-use and land-cover change; Urban land-use and land-cover change: planning implications; Searching for sustainability: land-use and land-cover change; Mapping and modelling land use and land cover.
 - The Commission sponsored the 'International Symposium on LUCC: Contribution to Asian Environmental Problems', Tokyo, Japan; December 13-14, 2001; 166 participants; 19 papers and 55 posters. The Commission Chair worked closely with LUCC-Japan Committee and LUCC Focus 2 Office in order to draw attention to the importance of application aspect of LUCC in easing environmental problems in Asia.

Forthcoming Meetings

The Commission organises the 'Workshop on Global and Regional Land Use/Cover Changes' during 18-20 July 2003 in Moscow, Russia, under the framework of the 'International Conference on Society-Environment Interaction under Conditions of Global and Regional Changes' (Moscow – Barnaul/Altai, 20-30 July 2003). The Moscow workshop consists of two days of paper/poster sessions and a one-day excursion. The Workshop topics are as follows:

- global trends of land use/cover changes and their backgrounds;
- integration of environmental and socio-economic knowledge of land use/cover changes;
- regionality of land use/cover changes;
- problems and topical issues of land use/cover changes in Eurasia;
- land use management and policy in different regions.

Following the Workshop, the International Conference begins in Moscow on 20-21 July, and then transfers to Barnaul, where there will be an opportunity to undertake excursions in the Altai. This rarely-visited region is of major interest in relation to biodiversity, and also for cultural reasons. Lying in the centre of Asia, near the boundaries between Russia, China, Kazakhstan and Mongolia, it is an area of

interaction between several ethnic cultures and is in the zone of contact between three floristic provinces.

For further information and registration, please contact:

Moscow Workshop: Professor E. Milanova emilanova@iscmoscow.glasnet.ru

Moscow-Barnaul Conference: Dr. Larisa S. Mokrushina igras@igras.geonet.ru

Publications

Bičík, I., Chromý, P., Jančák, V., Janů, H. eds. (2002) *Land Use/Land Cover Changes in the Period of Globalization*. Charles University in Prague Faculty of Science & IGU-LUCC. ISBN 80-86561-04-6

Himiyama, Y., Hwang, M. and Ichinose, T. eds. (2002) *Land-use Changes in Comparative Perspective*. Science Publishers. ISBN 1-57808-213-7

Himiyama Y., Mather, A., Bičík I. and Milanova, E. V. eds. (2002): *Land Use/Cover Changes in Selected Regions in the World – Vol. 2*. IGU-LUCC. (IGU-LUCC Research Reports IL-2002-01)*. ISBN 4-907651-03-8

* The book will be ready for shipping in January 2003. Those who wish to have a copy are requested to contact Professor Himiyama.

Educational Activities

IGU-LUCC keeps its support to the Children's Environmental Map Contest held in Asahikawa, Japan in October each year. For information about the Contest, see <http://www.asa.hokkyodai.ac.jp/research/staff/himiyama/chizuten/>

The Commission is willing to promote educational activities relevant to its objectives. Those who wish to get its support are requested to contact Professor Himiyama.

CJLUC Workshop in Kanazawa, Japan

The CJLUC (China-Japan Comparative Study of Land Use/Cover Changes) Project held a three-day workshop in Kanazawa, a historical city in Japan, in September 2002 on the occasion of the autumnal conference of the Association of Japanese Geographers. The Workshop consisted of the following three parts:

i) A session on 'Modernisation, Land Use Change and Environmental Change in China' was organised on the first day of the conference, and eleven papers were presented. There were over fifty attendants, reflecting a high level of interest in the theme. The presentations, particularly those by the Chinese delegates led by Liu Jiuyan & Lu Qi (IGSNRR) and Shi Peijun (Beijing Normal University) had a great

impact on the audience, and the AJG decided to issue a special volume of *Geographical Review of Japan* for this session theme.

ii) An open project meeting was held jointly with the AJG Study Group on Land Use and Environment on the second day. A. Mather, the Vice-chair of IGU-LUCC, gave a special lecture entitled 'Towards an understanding of LUCC with particular reference to forests: comparisons and difficulties'. The lecture was followed by a business meeting, which discussed priority issues of this academic year, such as systematic comparison of urbanization in China and Japan.

iii) The third day was devoted to a field trip in the suburbs of Kanazawa City and in the Noto Peninsula, a mountainous peripheral area jutting out into the Japan Sea. It was designed so that some of the key themes in understanding landscape change in Japan, such as traditional vs. modern, core vs. periphery, and socio-economic vs. environmental, could be demonstrated and developed.

The CJLUC Project wishes to consolidate its network for comparative studies not only within East Asia, but also in other parts of the world, and welcomes your suggestions and contribution.

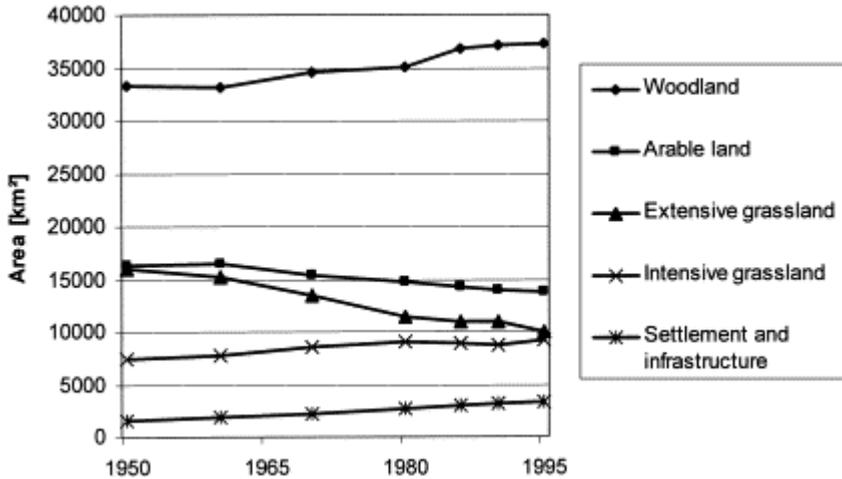
Recent papers of interest to the LUCC community

Recent growth of interest in LUCC is reflected in a great increase in related research and publication. Here are some short summaries of just a few examples of the kind of work that has recently appeared or is about to appear. These examples illustrate something of the richness of variety of approaches and foci that characterises recent work. There is no doubt that we are at present in the midst of an exciting and fruitful period in LUCC-related activities, and given our traditional interests, it is important that we as geographers should participate fully in these activities.

'Land-use change in Austria'

A paper by Krausmann et al* highlights trends that are typical of many industrial countries, with decreasing arable increasing forest areas. The paper shows that there is an intimate relationship between changes in socio-economic metabolism and changes in land use and land cover. Understanding this relationship is important for the inter-relationship between population growth and land-cover change. For example, the analysis suggests very different relations between population growth and land-use change in societies characterised by subsistence agriculture and those in industrial economies. In agricultural societies, population growth leads to an expansion of cropped area as long as potential areas are available, followed by an intensification of agriculture based primarily on increasing human workloads. In industrial societies, on the other hand, agricultural yields are primarily raised through fossil-energy inputs, also permitting great increases in output per agricultural worker. In Austria,

agricultural output per worker increased from 25 GJ in 1950 to 388 GJ in 1995. Moreover, industrial societies can feed their population through food imports even if they do not produce enough food domestically.



The analysis shows that industrialisation changes the function of land use for society's metabolism. In agricultural societies, land use is the main source of energy and materials used as inputs for socio-economic metabolism. The process of industrialisation can be characterised by the substitution of area-independent sources of energy and materials (fossil fuels and minerals) for the area-dependent source of biomass. As a consequence, the delivery of net energy is no longer the main function of agriculture in socio-economic metabolism. Instead, other criteria, such as the output per unit area and per agricultural worker, or the production of luxury goods (e.g. meat) or industrial raw materials, gain importance. On the one hand, agriculture changes from a net-energy delivering economic sector to one consuming net energy. On the other hand, the yield increases associated with this transformation mean that biomass production and 'human appropriation of net primary productivity' (HANPP) can be decoupled to a considerable extent. This is contrary to often repeated but oversimplified interpretations of HANPP as an indicator of ecological limits to growth. This change in the role of agriculture for socio-economic metabolism is associated with profound changes in spatial patterns in agriculture: processes of concentration break up previously integrated chains of production, consumption and decomposition of biomass in almost closed regional loops and cycles. Cropping, and livestock farming are segregated into different regions. This phenomenon not only dramatically alters cultural landscapes and breaks up regional nutrient cycles, but also requires

ever-increasing volumes of freight transport of intermediate and final agricultural products over ever-increasing distances.

*Krausman, F et al. (2003) Land-use change and socio-economic metabolism in Austria—Part I: driving forces of land-use change: 1950–1995, *Land Use Policy* 20 (1) 1:20

'Land cover in South Africa'

In contrast to Austria, the area under cultivation in South Africa is reported by Biggs and Scholes* to have more than trebled during the twentieth century, while plantation area increased more than tenfold. These land covers now constitute 12% and 1.5%, respectively, of the country's surface area. The paper describes the changes that have occurred in relation to the production and yields per hectare of major crops (maize, wheat, sorghum and sugar cane) and discusses the factors that contributed to the changes. Both domestic and global population growth partly underlie the increased demand for crop products over the past century. Increased production was initially achieved mainly by expanding the area under cultivation, and, from the 1960s onwards, principally through enhanced yields per hectare. In the latter period, nationally averaged productivity in a given year was related to fertilizer use, irrigation and the proportion of the country experiencing dry conditions. The crops grown and the yields per hectare differed significantly between the predominantly commercial, former white-owned areas and the mainly subsistence, former homeland areas. Independent estimates of historical cultivated area at the national level were derived from estimates of production and productivity per hectare, presenting a method that could be used to obtain improved historical land-cover estimates in data-poor countries.

*Biggs, R and Scholes, R J (2002) Land-cover changes in South Africa 1911-1993, *South Africa Journal of Science* 98: 420-428

'Moving beyond the myths'

A third paper of interest is a multi-authored article* that examines some of the major myths on driving forces of land-cover change and proposes alternative pathways of change that are better supported by case study evidence. Cases reviewed support the conclusion that neither population nor poverty alone constitute the sole and major underlying causes of land-cover change worldwide. Rather, peoples' responses to economic opportunities, as mediated by institutional factors, drive land-cover changes. Opportunities and constraints for new land uses are created by local as well as national markets and policies. Global forces become the main determinants of land-use change, as they amplify or attenuate local factors.

* Lambin, E et al. (2001) The causes of land-use and land-cover change: moving beyond the myths, *Global Environmental Change* 11:261-269

'How do land-cover mapping projects develop?'

Finally, a paper by Comber and colleagues considers how land-cover mapping projects develop*. It focuses on the example of the Countryside Survey of the United Kingdom: this is a monitoring programme that has quantified the extent of change in the natural environment at irregular intervals since 1978. The Surveys of 1990 and 2000 are introduced and their methodological or ontological differences described. Actor-Network Theory examines the processes by which individual scientific claims are supported, debated and constructed by determining the interactions, connections and activities of the actors involved. The actors and their networks for the Countryside Surveys of 1990 and 2000 are compared. Such an analysis provides a description of *why* science evolves. Changes in the commissioning context behind scientific results and the process by which empirical facts are established are clearly illustrated. This type of analysis goes beyond the technological developments that would be revealed if only the scientific elements were examined. It provides a useful tool to those seeking to reconcile ontological and semantic differences between scientific data.

*Comber, A, Fisher, P and Wadsworth, R (2003) Actor Network Theory: a suitable framework to understand how land cover mapping projects develop? *Land Use Policy* in press

Advance Notice

The International Geographical Congress in 2004 will be held in Glasgow, Scotland. The Commission on Land Use and Land Cover Change will be holding paper sessions, and there will be a pre-Congress study tour that will be shared with the Commission on Sustainable Rural Systems. Numbers of participants will have to be limited for logistical reasons: early booking will therefore be essential. The excursion will begin in Aberdeen, in north-east Scotland, and thereafter proceed through the Scottish Highlands to Loch Ness, the Isle of Skye and Glencoe. Among the themes will be land-use change in an upland environment, the impact of a new national park, and the inter-relationships between economic development and environmental conservation. The first circular will be issued early in 2003.