

**Land Use in Temperate East Asia (LUTEA 99): Database
Development for Integrated Analysis of Policy Relevant Global
Environmental Change (APN 99002)**

Project Leader:

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APN Funding

US\$ 90,850

List of participating countries

Austria, China, Japan, Mongolia, South Korea, U.S.A.

Introduction/Background

A working group was proposed to develop an integrated data base of transient climate, land cover, and social-economic characteristics needed to model sustainable land use change for Temperate East Asia. The working group consisted of the following members: Fu Congbin, Chris Daly, Teitaro Kitamura, Liu Chuang, Dennis Ojima, Kuninori Otsubo, Zhao Shidong, Guenther Fischer, S. Khudulmur, T. Chuluun and Dowon Lee. The purpose of working group was to set priorities and determine methodologies for development of pertinent data sets.

Outline of activities conducted

T. Chuluun, Mongolia was hired to coordinate this study and to develop the Mongolian data set. Liu Chuang, China worked on the Chinese socio-economic data base development and Zhao Guangsheng, China was trained in CENTURY model at NREL, CSU.

The first LUTEA database development meeting was hold at Shonan village, Kanagawa, Japan, June 23-26, 1999. The working group We agreed on socio-economic database priority: Database for 1985, 1990, 1995 years and at county (China) and sum levels (Mongolia). It was decided to create following socio-economic database:

- Number of people working in agriculture: number of households by agricultural sector (herder, farmer, forestry, fishery, mixed);
- Amount of land area (land use and land cover): crop (irrigated, paddy, vegetable, irrigated), forest, horticulture (orchard), grassland, infrastructure (roads), water, unused lands, housing and industry;
- Production output: wheat, millet, rice, maize, soybeans, oil seeds, potatoes, other cereals, root crops, cotton, sugar beats, sugar cane, tea, fruits, vegetables;
- For livestock sector: meat, milk, wool (cashmere), power (draft animals);
- Livestock numbers: camels, cattle, sheep, horse, goat, donkey , pig (swine), chicken (poultry).

The second working group meeting on “Database Development on Land Use in Temperate East Asia” was hold in Beijing, China, October 25-27, 1999. At the meeting, regional key drivers of LUCC were identified and working group analysis leading to Kobe, February Meeting was discussed. Population growth, urban expansion, policy issues and agriculture intensification were identified as regional drivers for LUCC. They are causing changes in pastoral and forest systems. We discussed to make a synthesis along the transects as much as we can within our resources: west-east (NECT extended into Mongolia) N42-45, E99-130.5 and north-south (from lake Baikal area to Hongkong area). Following parameters were identified for the analysis: crop yields, forage production, forest productivity, C-stocks, green house gas, economic output, value output / cultivated area, area in production, human complexity index, area of improved pasture, percent of population in agriculture, livestock number change, energy use / area (electric, gas, diesel, renewal energy), irrigated areas, machinery, drought animals, fertilizer (chemical and organic).

The third LUTEA Database Development Working Group Meeting was held in Kobe, Japan, February 21-23, 2000. The main goal of the meeting was to develop a series of working papers focused on the social-economic analysis and associated with physical data sets for the regions of Mongolia and China identified at the Beijing meeting. The meeting was designed to work on the land use data bases for understanding how land use and cover has changed over the past 15 to 20 years, and to develop synthesis papers. Four areas of analysis were:

- A) Regional Physical and Social Economic Characteristics
- B) Land Use Change
- C) Land Cover Analysis
- D) Integrative Analysis

Short presentations were reported in each section. In breakout groups, we evaluated database and model analysis, and reviewed draft set of papers on methodology and preliminary results. We discussed the figures, tables, and maps to be included in the Report to APN.

In joint sections, we discussed presentations from each group. We discussed the draft outlines of the Report to APN and synthesis paper. A working title of the synthesis paper would be “Critical drivers of LUCC in contemporary Temperate East Asia”. There are two other potential papers from RS studies on land cover change detection and monitoring. From integrative analysis, we may produce a paper on “Sensitivity of land productivity to environmental and social variability”. We are aiming to finish all these synthesis papers by the end of April.

We organized a LUTEA/LUCC and Japan Joint workshop, February 21. Objectives of this joint workshop were information exchange on LUCC projects in East Asia, consolidation and promotion of LUTEA network and expansion of joint research projects relevant for LUTEA and LUCC-Japan. Dr. Dennis Ojima and Prof. T. Kitamura opened the joint workshop. Afterwards Dr. Dennis Ojima made an overview of the LUTEA activities and introduction of the LUCC studies in TEA region. G. Fisher made a presentation on “Land Productivity Estimates for China”, H. Morita - on “Land-use Change Model including Driving Force Projection Model”, Li Lin - on “Diffusion-based Urban Expansion in the Southern part of Jiansu Province, China”, Tateishi and Gunin - on “Land cover change studies in Buryat Republic” and Prof. Y. Himiyama - on “The Aims, Achievements and Prospect of LUCC-Japan”. Prof. Kitamura and Dr. Chuluun co-chaired the open discussion session.

Some points raised during the open discussion are:

The LUCC-Japan and the LUTEA can organize a joint training activity;

Since 1950 global warming affected in China. Air temperature increased by half degree. A rice cultivation zone has moved in China for last 50 years. Thus, 15-20 years is too short and we need to study LUCC at least for last 50 years;

May be we should organize the ground truth trip for land cover analysis along the LUTEA N-S transect from lake Baikal to Hongkong area.

The LUTEA Steering Committee Meeting was hold during the Kobe Meeting, February 21, 2000. Dennis Ojima, T. Kitamura, Liu Jiyuang, Y. Himiyama and T. Chuluun participated in the meeting, February 21, Monday morning. Organizational logistics of the LUTEA – Japan/LUCC workshop and the database development working group meeting were discussed. The agendas were revised. The extended LUTEA Steering Committee meeting was hold in the evening of February 22. Dennis Ojima, T. Kitamura, Liu Jiyuang, Y. Himiyama, T.

Chuluun, K. Otsubo, S. Khudulmur and L. Tsedendamba participated. T. Chuluun introduced the pre-proposal draft of the Symposium on “Change and Sustainability of Pastoral Land Use Systems in Temperate East Asia” to be organized in conjunction to the TEACOM meeting in Ulaanbaatar, Mongolia, May 2001. Following suggestions were made:

To organize an open symposium;
To select topics for the parallel sections;
To publish the Symposium Proceeding;
To organize sight seeing field trip;
More suitable time in Mongolia would be the end of May or sometimes in June.

Outcomes/Products

Report with data set and summary of findings by the end of March;
Synthesis papers will be developed from the Report by the end of April.

Future directions

We should focus on methodology and technology aspects of land use and cover changes research such as remote sensing techniques in land cover change detection and monitoring, modeling analysis on sensitivity of land productivity to environmental and social variability etc. The main goal of this research would be the identification of critical regions and places vulnerable to environmental and social variability;

We should focus in topical areas of the LUTEA, which are pastoral systems, rural-urban interface, cropping systems and forest. The proposed Symposium on “Change and Sustainability of Pastoral Land Use Systems in Temperate East Asia”, Ulaanbaatar, Mongolia, May 2001 is one example;

We need to increase temporal and spatial scales for the LUTEA regional activities. We may develop the proposed LUTEA North-South transect from the lake Baikal area to the Hongkong city area, which covers all four topical areas;

We should direct the research community to focus more on big issues such as sustainability, biogeochemical cycles, biodiversity, critical regions and vulnerable places in our region.

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