

Research Activities on Land Use in Temperate East Asia (LUTEA)

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LUTEA Training and Database Development Workshop “GIS/Remote sensing/modeling techniques for land use/cover change analysis”

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Final Report

LUTEA Training and Database Development Workshop, partially funded by the APN, was held in Ulaanbaatar, Mongolia, June 1 - 13, 1998. The Ministry of Nature and Environment hosted the meeting during the two weeks. We used the opportunity to interact with the Mongolian scientific community involved in land use and land cover change studies. We organized a joint Meeting of the Mongolian scientists and workshop participants to discuss the LUTEA activities and how to promote it in conditions of Mongolia. 27 people participated in this Meeting. The participants came from China, Korea, Mongolia, Russia and the United States and 5 instructors from various institutes. Funding for the workshop was provided by START and APN. Additional support came from NASA, USGS, US Embassy and the Mongolian Ministry of Nature and Environment. The objective of the workshop was to provide an integrated set of research tools for land use studies and provide a platform for synthesizing information derived from different disciplines and sectors.

The training workshop provided an opportunity to learn various techniques used in land use and cover change analysis. The topics included remote sensing, geographical information systems, and ecosystem modeling. Each of the participants were given an opportunity to use databases provided to develop land use maps, develop land cover maps from AVHRR data, and to model various ecosystems. The participants were successful in completing the training tasks and enjoyed learning from each other, as well as from the instructors.

The remote sensing sessions were instructed by Jesslyn Brown (Sioux Falls, EROS Data Center, USGS) and Jacqueline Kendall (Goddard Space Flight Center, NASA). The students were given an opportunity to develop land cover maps based on AVHRR data provided by the scientists at the Ministry of Nature and Environment at Ulaanbaatar and brought from Goddard and EROS Data Center. Techniques in working with remote sensing data and developing land surface images were presented by Jesslyn Brown. Use of AVHRR and other remote sensing data for detection of land cover change due to fires, drought, cropland conversion was illustrated. The students were provided

hands-on experience with current software used by other satellite receiving stations such as the NASA Goddard Center.

The Geographic Information System portion of the workshop was taught by Dr. Liu Chuang. She provided instruction on how to prepare various map layers using a portion of China data base provided by CIESIN. Land cover maps, roads, water ways, and political boundaries were used at the workshop to develop new maps of land use potential and vulnerability of different regions to land use changes. Issues related to scaling of political or geographical data with physical data were discussed and the students were given examples of how these data sets can be integrated. The students were asked to prepare a series of maps for the China data sets and these analyses were used to discuss the merits of using remote sensing data and social data for land use studies.

The ecosystem modeling component was taught by Dennis Ojima and Chuluun Togtohyn and presented material that developed the need information and techniques for modeling various ecosystems and land use management practices. The participants were introduced to concepts related to integration of field studies with modeling, model verification and validation, and scaling from site to regional analysis. The participants were provided copies of the Century model and files which were prepared for modeling different Temperate East Asian ecosystems from deciduous forests, grasslands, deserts, and croplands. The participants were asked to develop a study that developed a hypothesis related to land use and global change and to use Century to develop model experiments to evaluate the hypotheses. Presentations of these studies were made on the last day. Examples of the papers presented included grazing studies in the Mongolian steppe, forest succession in Korean mountains, conversion of degraded cropland to a grassland in the semiarid region of China. The participants included material in how these modeling studies would incorporate the remote sensing and geographic information techniques as part of the experimental design.

In addition to the hands-on training, the course also made a short field trip to a Mongolian camp in a mountain area outside of Ulaanbaatar. We spent a day learning about Mongolian pastoral life and the natural beauty of the Mongolian landscapes. We were able to learn about various grazing systems and to learn about the forest-steppe ecosystems which include larch as the forest species.

We were fortunate to donate several workstations to the remote sensing group in the Ministry of Nature and Environment through a joint Japanese and US donation, and to leave several PC computers for LUTEA studies with the Ministry and other Mongolian institutes of the Mongolian Academy of Sciences. We hope to see the workshop fellows to continue to collaborate in the future and will attempt to facilitate this with additional research efforts.