LCLUC Abstract

Modeling and Forecasting Effects of Land-Use Change in China Based on Socioeconomic Drivers

<http://www.bu.edu/CEES/lcluc.html>

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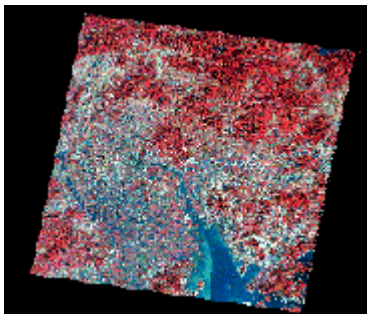
Rapid rates of economic growth in the People's Republic of China over the last two decades have led to the widespread conversion of natural ecosystems to farmland and industrial areas. Moreover, economic development has resulted in the replacement of existing agricultural areas by commercial and residential structures. With 20 percent of the global population and an economy which is estimated to become the world's largest within the next decade, economic development and land-use patterns in China will have environmental effects beyond the country's borders. The size and rate of these significant conversions have the potential to affect the earth's climate and biogeochemistry. This project aims to understand and model the socioeconomic forces which drive land-use changes in the Pearl River Delta of Guangdong Province in Southern China. Quantifying this relation will allow us to predict future land-use conversion and its impact on global biogeochemical cycles and biophysical parameters.



The Pearl River Delta Region of Guangdong Province in Southern China.

This is a Landsat TM scene from 1995, bands 432.

This study will analyze land-use change in the Pearl River Delta in four steps. First, we will use Landsat images to analyze land-use changes from 1973 to 1996. Land-use will be classified into urban areas, agricultural lands, and natural vegetation. Multitemporal maximum and range NDVI values will be used to identify areas which have been converted to urban areas from agricultural and natural terrains. In the second step, we will build a statistical model that identifies and quantifies the effects of socioeconomic variables on land conversion. Model output will generate land conversion factors, which provide information on the direct, short-term effects of various economic activities on land-use patterns. These conversion factors will be used to calculate the multiplier effects of land conversion, which represent the indirect, long-term effects of economic development on land use. In the third step, these land conversion factors and multiplier coefficients will be combined with scenarios of economic development developed by Project LINK to predict the effect of economic growth on land-use patterns. In the last step, we will use these forecasts of land-use change to estimate the corresponding changes in the biophysical and biogeochemical environment. Understanding the driving forces behind human-induced modifications of terrestrial ecosystems provides crucial information for modeling the rate of larger biophysical and biogeochemical changes.