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Analyses on Cultivated Land Changes in North-East China by Satellite Remote Sensing

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In China, shortages of fresh water and food resources in 21st Century will become very serious. To avoid food shortage problems, the increase of the yield of grain must take first priority. Therefore, the redistribution of existing farmland is essential, being followed by expansion of cultivated land area. The North-East China is most important food producing area. But at the same time, those are also the area of limitless grassland and forest. Therefore, in the near future, it is expected that vast area will be utilized to the limit as farmland and the grassland will be converted into grain yielding fields. Land use and land cover have changed and keep changing in the foreseeable future, which would cause to environmental problems, such as, climate warming and biodiversity loss as well as land degradation. The land use and land cover change and its driving forces become a worldwide important issue. Many studies address this subject, in which the socioeconomic driving forces are dealt as most important factors for land-use changes. The land use in North-East China has largely changed in recent decade due to rapid population increase and socioeconomic growth.

In this paper, we try to identify both spatial and temporal land-use changes and to analyze the relationship between land-use change and socioeconomic growth in North-East China using the state Statistic data and Satellite Remote Sensing data. Here, the North-East China includes Liaoning, Jilin and Heilongjiang Provinces.

This study calculated NDWI (Normalized Difference Water Index), NDVI (Normalized Difference Vegetation Index) and NDSI (Normalized Difference Soil Index) of SPOT/VEGETATION Data. NDVI at cultivated land is characterized by sharp increase in early summer. In 2000, NDWI had increased at 14th ten-days. NDWI had Decrease at 18th ten-days. NDVI had increased at 16th ten-days. This signal can be used to extract paddy field form sequence of NDVI imageries. Based on the rice phenology, the area of paddy field is extracted by SPOT/VEGETATION NDVI and NDWI imageries, and changes between 1999 and 2007 are examined. In 2000, NDSI had increased at 10th ten-days. NDSI had Decrease at 17th ten-days. NDVI had increased at 16th ten-days. This signal can be used to extract field form sequence of NDVI imageries. the area of field is extracted by SPOT/VEGETATION NDVI and NDSI imageries, and changes between 1999 and 2007 are examined. This study uses the SPOT / VEGETATION data from 1999 to 2007 to make the spatial distribution chart of cultivated land in North-East China. The area of cultivated land educed from the distribution chart the is roughly the same as the area of that calculated according to agricultural statistics.

Keywords: remote sensing, North-East China, cultivated land, LUCC, agriculture