Constraints and Impact of Environmental Capacity on Regional Social-economic Structure in Qinghai-Tibet Plateau: Integrated approach of Ecological Footprint and Human Development Index

Wanglin YAN
5322 Endo, Fujisawa City, Kanagawa Prefecture, Japan
yan@sfc.keio.ac.jp

Abstract

The great economic growth of China has boosted industrial development in the world and brought large impact on local ecosystem. Qinghai-Tibet Plateau, the "rooftop of the world," is one of the regions suffering the ecological deterioration from climate changes and local industrial activities.

The plateau is the fountainhead region of three Asian giant rivers: Yangtze River, Yellow River and Mekong River. The abundant water and mineral resources, unique biodiversity, scenic highland landscape and historic Tibetan Buddhist culture have made the plateau unsubstitutive in the world. However, the limited carrying capacity allows narrow opportunities in making policies for sustainable development.

Although Chinese central and local governments have paid great attentions on environment conservation since the end of last century, such as the establishment of natural environment protection zone as large as 300,000 km2, the lives of 500,000 residents within the protected zone remain poor. Understanding the environmental capacity and grazing load of each land in detail becomes the key to make any practical actions.

This paper aims to clarify interrelation between natural conditions, economic structure and social development in Qinghai Province, the northern part of the plateau, for making sustainable strategies with the support of Digital Asia Platform. Taking county as basic analysis unit, net primary productivity, GDP per employee and ratio of GDP by sector were used as indicators to assess the social-economic structures; Human Development Index (HDI) were calculated by education level, life expectance and GDP to assess the status of social development; Ecological Footprint (EF) was estimated with census data to assess the load of human activities on natural ecosystems.

The results of the integrated analyses show that the pressure of human activity on natural ecosystems is the main obstacle to promote the economic levels of the region. In some counties the land degradation has brought the shrink of primary sector and damaged industrial structure. On the other hand, lower education and GDP level does not necessarily means a short life expectance in the traditional and natural lifestyle. The relationship of HDI and EF reveals that lower HDI does not necessary mean small ecological footprint in the plateau because of the limited primary productivity. This implies that the high grazing pressure in this remote rangeland can only be decreased with certain economic and infrastructure development to mitigate overshoot population. It is concluded that the policies and strategies toward sustainability in the plateau should not be the copy of any regions, and the combination of HDI and EF could be an effective indicators to set up policy objectives considering environmental capacity.

Keywords:
Geospatial data infrastructure, rangeland ecosystem, environmental capacity, grazing pressure, Ecological Footprint, Human Development Index