

Introduction

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In its China-related research activities, IIASA's Sustainable Rural Development (SRD) Research is trying to understand major driving forces for the growing discrepancies between the rapidly developing urban-industrialized coastal zones and the predominantly rural hinterland in central and western China. Our research includes six key dimensions: (a) the development of the human resource base, (b) conditions of natural resources and environmental change, (c) development of the economic structure, (d) expansion of infrastructure, (e) promotion of science and technology and (f) the adaptation of political and administrative arrangements.

The YSSP students in SRD have chosen the following research topics:

Wenyan Chen is analyzing **the inter-regional redistribution of agricultural land** in China. There is strong economic pressure on agricultural land – especially in the rapidly developing coastal regions of China. Local governments of municipalities have great economic interests in transferring farmland into commercial land, which can be sold to (foreign) investors or used for the expansion of urban settlements. While the farmers of a village own the agricultural land collectively, commercial land is owned by the State. For a transfer of collectively owned (agricultural) land into state-owned (commercial) land the Central Government has established certain rules. For instance, local governments cannot change the land-use of “primary” agricultural areas. Other agricultural land, however, can be transferred into commercial sites, if appropriate compensatory areas can be found for agriculture *in the same region*. In rapidly developing regions this is often not possible, because there is such a huge demand for commercial land that almost all areas would be needed. Therefore, local governments often try to find compensatory agricultural land *outside* their region – in some more rural part of the country. This inter-regional land compensation is currently not allowed according to the Chinese land-use laws, but still widely practiced. Wenyan Chen's analysis will show, why there is such great economic advantage in adopting this practice. She will be using a game theoretical approach to analyze the mutual benefits of the various players (village leaders, municipal government, investors) in using *inter-provincial* land compensation practices. Thus, her study contributes to the analysis of socio-economic dimensions in China's regional development.

Xiaozi Liu is analyzing the **dynamics of environmental quality and economic growth** in Shenzhen – China's first “Special Economic Development Zone”. This area is of particular interest, because there are few places in China that have seen a more rapid development. Originally, a small village, Shenzhen has essentially become one large urban-industrial agglomeration in the Hinterland of Hong Kong. The enormous expansion of infrastructure, industrial sites and urban settlements has completely changed the local environment. Only recently, a NASA study found that the sealing effect of the infrastructure and housing has led to a remarkable change in the local “climate” - with a significant increase in average temperature (“hot spot effect”). Ms. Liu will look into a range of other environmental statistics to study the trends of economic growth and environmental impacts. She will apply a widely used economic model (Kuznet's curves) to describe the relationship.

Abstracts:

Game theoretical approach to inter-regional agricultural land redistribution in China

Wenyan Chen

It is a common problem all over the world that some of the agricultural lands will be converted to other uses as regions develop. In China, however, the situation is very serious due to the rapid economic growth. The severity of decline in both quantity and quality of agricultural land led to people's concern about food security in China. To stop this trend, the government has introduced legislation demanding that agricultural land, which doesn't include the primary agricultural lands whose conversion is strictly controlled, can be transferred to non-agricultural land – but only if there is comparative compensation within a region. But it is hard to implement this law in reality, especially in the more developed regions due to huge economical pressure.

Based on the assumption that the opportunity costs of preventing agricultural land from being converted into other uses are different for regions at different development levels, a framework for agricultural land redistribution between more and less developed regions is established. The paper proposes to redistribute agricultural land through buying development rights at inter-regional, instead of intra-regional level. In this paper, the cities of Wuxi and Jinzhou are chosen to exemplify the framework, with the former representing one more developed and the latter a less developed region.

Game theory is used to explain the negotiation between different land stakeholders when considering agricultural land compensation. It treats each player as a node among the social network he faces in a certain event. His payoff depends not only on his own decisions but also on that of others'.

The paper begins with games between the agricultural and non-agricultural actors within each region separately. Then studies are made to see changes of different actors' payoffs when an offer of cooperation is given. That is, if a more developed region buys agricultural land development right from the less developed one, how will the payoff change? Nash's theorem for cooperation is used to judge when cooperation is likely to happen. Recommendations on the current agricultural land tenure system are given based on the above analysis.

Keywords: land legislation, land compensation, economic development, Game Theory

The dynamics of environmental quality and economic growth in Shenzhen, China's first special economic development zone

Xiaozi Liu

Shenzhen is one of the first special economic development zones in China since the country introduced opening up and reform policy. In less than two decades, Shenzhen developed from a small fishing village into a highly developed municipality. It represents one of most wealthy areas of the country in term of its per capita income. (NBS, 2003) Simultaneously, the city is awarded as environmental protection model city due to its remarkable efforts on relieving pollution pressure. Therefore it is interesting to find out how the developing trends of environmental quality related to the economic growth in this most early developed city of China, the largest developing country in the world.

The paper investigates the trend of environmental quality in Shenzhen city from 1994 to 2003. The main reason of choosing this specific period is due to the validity and the availability of data. We have used monitoring data to indicate the dynamics of river water quality, near-shore water quality and ambient air quality of the city. We also use statistics data to study economic growth and social-environment related improvements in the city, such as environmental awareness and environmental policy.

An environmental Kuznet curve predicts a turning point after economic growth reaches a certain climax. (Grossman, Krueger,1993) It is argued most developing countries are still in the upward curve and environmental quality is continuously getting worse. The objective of the paper is to find out whether or not an environmental Kuznet curve operates in Shenzhen and to analyze whether the arrival of turning point can be accelerated with a result of active environmental measurements in the city.

Keywords: economic growth, environmental quality, Environmental Kuznet's curve