

Abstract of Resilience Seminar in FY2009

The 27th Resilience Seminar

Date & time: July 8th 2009, 15:00-16:00

Place: RIHN Seminar Room 3, 4

Title: Quantifying the impact of climatic change on yields and yield variability of major crops and optimal land allocation for maximizing food production in different agro-climatic zones of Tamil Nadu, India: An Econometric Approach

Speaker: C.R. Ranganathan (Affiliation: Professor, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India)

Language: English

[Abstract]

This paper provides a framework for optimal land use planning in the context of climate change. All agricultural activities are very sensitive to climate change resulting in variability in crop yields. Hence it becomes necessary to study the effect of climate change not only on mean yield but also on variability in yield. The quantitative information so obtained should be used for optimal land allocation in order to utilize natural resources in a judicious way.

Previous studies using regression techniques concentrated on the estimation of average productivity only but little attention was given for optimal land allocation to competing crops with climate change induced productivities. The problem becomes more important in the context of gradual decline in available land area for agriculture due to urbanization.

The present study focuses on these issues for major crops grown in Tamil Nadu State. It employs econometric modelling for estimating the mean yield and yield variability and also covariance between yields of different crops. The mean yields so obtained which reflect the impact of climate change are then used in multi-objective linear programming models for meeting objectives like maximum food grain production, maximum paddy production and minimization of agricultural land area for maintaining at least the current level of production of crops etc. Finally the study attempts to link the optimal food grain production with the projected population of Tamil Nadu for 2020 to determine the quantum of food grain availability per individual.

The study shows that precipitation and temperature have varying effect on productivity and variability of crops. Trend has positive impact on most of the crops. Also, climate change, as dictated by HADCM3A2a scenario, will have modest impact on crop productivities across the five zones of Tamil Nadu. Zones where paddy is grown traditionally may witness modest increase in productivity followed by increase in variability while many other crops may have decrease in productivity and there is no uniformity in changes in their variability. The study indicates that when land is the only constraint, with climate change induced productivities, optimal allocation of crop area will result in increased production of food grain. These results will be useful for policy makers in finding the gap between supply and demand of food grain for projected population.

The 28th Resilience Seminar

Date & time: August 3rd 2009, 15:00-16:00

Place: RIHN Seminar Room 3, 4

Title: A Spatial Structure for the Institutional Analysis of Common Pool Resource Systems

Speaker: Tom Evans (Associate Professor, Department of Geography, Indiana University, Indiana, USA)

Language: English

[Abstract]

Dynamics within common pool resource (CPR) systems are the product of a diverse array of socio-economic and biophysical processes. The spatial structure of these systems often influences the management of resources (e.g. forests, water, fish) including the institutional rules that are developed governing how these systems can be used. Prior work has developed frameworks to describe social-ecological systems (SES) to investigate the institutional contexts that make SESs resilient or sustainable, but without articulating the spatial relationships inherent in these systems. The objective of this paper is to develop an ontology designed to describe the actors, resources and relationships within an SES, with an emphasis on the spatial relationships inherent in human-environment interactions. The field of computer science uses the term "ontology" to refer to an implementation of a conceptual framework. From an analytical perspective, ontologies can be used to translate data compiled for case studies into a formal database that enables cross-site analysis. Many elements of SESs have explicitly spatial characteristics that in part affect the dynamics within those systems such as the proximity of actors to a resource, or the size of land holdings. The ontology presented here emphasizes the actors and resources in a system as well as the spatial characteristics and relationships that relate to the institutional factors affecting system dynamics. A series of three distinct case studies (a community forest in Midwest United States, an irrigation network in southwest United States and a fishery system in Mexico) are used to demonstrate how this ontological framework can be applied to specific CPRs and social-ecological systems more generally.

The 29th Resilience Seminar

Date & time: October 30th 2009, 17:00-18:00

Place: RIHN Lecture Hall

Title: Agriculture and Rural Community of Africa as Object of Technical Cooperation

Speaker: Yoshitake Shinbo (Managing Director, Technical Support Office for Rural Development in Kinki District, Ministry of Agriculture, Forestry and Fisheries, Japan)

Language: Japanese

[Abstract]

In sub-Saharan Africa, farming system is largely a small-scale rain-fed agriculture. This is in sharp contrast to the well irrigated systems in which large-scale commercial plantations, especially

those in southern Africa, are using. The productions of subsistence crops of small scale farmers are diverse. Maize, wheat, millet, sorghum and other grains are main staple food in the sub-Saharan. In Uganda and the surrounding countries, non-sweet banana is their staple food. Rice including the upland rice is increasing in its importance in many African countries.

It is argued that a well managed irrigation system is a key to improve livelihood and food security of the small scale farmers. Existing community irrigation systems such as well and pond in many African countries tend to be small in capacity and not as efficiently managed as of those water users' associations in the monsoon Asia. The Japanese technical cooperation has targeted irrigation system that will allow the farmers to cultivate horticulture in the dry season to supply to the market for additional income. Although it is important to have stable yield of cereal and staple crops, their prices under government-operated market are generally too low to be profitable to increase production of cereal crops. In order for technical assistance to be effective, it is important to consider technology, tools or means that are appropriate within the context of ecological and market environment semi-arid of sub-Saharan Africa, which may probably be different from successful technical development experiences of monsoon Asia.