

Future Earth, Great East Japan Disaster, and IHDP-Japan

Yukio Himiyama^{1*}

¹Hokkaido University of Education

Global environmental research is currently undergoing major re-structuring under the framework of Future Earth, or a platform for sustainability science initiated by ICSU, ISSC (International Social Science Council), and Belmont Forum. IHDP-Japan is uniquely positioned to implement Future Earth in a broader interdisciplinary perspective incorporating the various lessons of the Great East Japan Disaster. The paper discusses the roles IHDP-Japan can, and should, play for the increment of sustainability of the world which Future Earth aims at.

Keywords: IHDP, ICSU, Future Earth, sustainability science, Great East Japan Disaster, International Human Dimensions Programme

Relationship Between Precipitation and Carbon Dioxide (CO₂) Over Indian Sub-Continent

R.B. Singh^{1*}, Mansi Janmajaya¹

The association between carbon dioxide and rainfall is investigated over the Indian region. The study is performed on fine scale (2 degree, 2.5 degree) grid map for the period of 9 years from 2003 to 2011. Carbon dioxide data from Atmospheric Infrared Sounder (AIRS) and rainfall data from Tropical Rainfall Measuring Mission (TRMM) are used in this study. Data are mapped for both carbon dioxide and rainfall across all the months/ seasons of the study period. The concentration of carbon dioxide is found to be highly variable spatially as well as seasonally. It varies from $\sim 3.68 \times 10^{-4}$ (July-August, 2003) to $\sim 4 \times 10^{-4}$ (January-February, 2009) over land and which is larger than over oceans. It is observed that in the winter months (November to February) the concentration is relatively higher, while during the monsoon season the concentration is low. It seems to be the wash out effect of rainfall over carbon dioxide. Over the oceans the Carbon Dioxide concentration show the slight seasonal changes and the range is less as compared to the land. The rainfall varies from no rainfall to 102 cm/month (July, 2007), on average monthly basis.

The correlation coefficient (R_{xy}) between Carbon Dioxide and rainfall is calculated during all the months from 2003 to 2011, and the values have been mapped and shown using MATLAB. The correlation coefficient is highly variable during different months over the study region, with a wide range. The computed minimum value was in January (-0.8859) and the maximum value in the month of August (+0.8863). The computed correlation coefficients show positive values for the summer months of the sub-continent over land with rise in values of correlation from the month of April, reaching uniformly high value in August over 9 years, and then the coefficient decreases as the autumn sets in. However, over the oceans the fluctuations are not high with the change in seasons. It is discerned that the percentage increase in rainfall is not in direct proportion to the increased carbon dioxide concentration i.e. the relationship is not linear. Moreover, the increased rainfall in response to increasing carbon dioxide concentration in a region is limited which may be attributed to certain regional parameters such as topography of the area, vegetation and emissions of carbon dioxide due to various anthropogenic activities. The study would be extended in future by taking large area and other parameters into account.

Keywords: Carbon dioxide concentration, rainfall, correlation coefficient, TRMM, AIRS, India

Impact of Liberalized Border Trade on Rural Households and Their Land Use: The Case of Laos-China Border Area

Takeshi Sakurai^{1*}, CHIEN, Hsiaoping¹, SAYAVONG, Somboune³, XUAN, Yi⁴, KANG, Yunhai⁴

¹Hitotsubashi University, ²JIRCAS, ³Policy Research Center, Lao PDR, ⁴Yunnan Academy of Social Sciences

In Asia trade liberalization has been rapidly going-on. At the macro-level, liberalized trade should enhance efficiency and promote economic growth. However, it is relatively unknown what kind of impacts the liberalization has on rural households and their land use in remote, border area. In order to answer these questions, this paper utilized household data collected by household survey conducted in Laos-China border area in 2010. The sample size is 120 households in Louang Namtha Province, Laos and 120 households in Xishuangbanna autonomous prefecture, Yunnan, China.

In Laos, rubber planted area of sample households is increasing since 2005. Due to the increasing rubber plantation on upland, forest and fallow land are decreasing. In the Lao study site, rice is grown in lowland, and hence there is no conflict in land use between rubber and rice. However, rice producing area is decreasing slightly since 2005 probably due to labor allocation. In Yunnan, land for staple food crops (rice and maize) is decreasing while that for rubber is increasing in recent years. Farmers now purchase rice including rice imported from Laos. Most of the paddy fields are now leased out to banana growers.

Thus, the border trader between Laos and Yunnan has impacts on agriculture and land use of both sides. In Laos, farmers export rice to Yunnan. In Yunnan, farmers grow rubber on upland and rent-out lowland to banana growers. This is a more efficient resource allocation compared with the situation before the trade liberalization, and households on both sides seem to have become better off. However, concerns are the reduction of biodiversity due to rubber plantation on Lao side and a threat to food security caused by the specialization on Yunnan side.

Keywords: Land use, Trade liberalization, Laos, Yunnan, Border trade, Market integration

Urban development and its implication on land use change of Lanzhou City, China

Haruhiro Doi^{1*}, Chai Yanwei²

¹Oita University, ²Beijing University

Lanzhou City, one of the historical cities of the Silk Road along the river basin of Hwang-Hu River, is a capital of Gansu Province, and it is the westernmost biggest city located in Inland area of China. Land use of Lanzhou has been changed through industrial and residential developments under the national policy, aiming at central role for regional development of inland area.

The population of the city increased when entering the planned economy period. The petrochemical and heavy industry, etc. have been established on the river basin under the national policy named Three Line Construction. The Reform and Open Policy introduced in 1978 has changed the character of the city from the heavy industry city to the integrated central city. Sprawl type urbanization is advanced since the 1990's in the lower terrace of the river basin in the eastern part of the city. The construction of a new residential house is advanced in order to progress redevelopment of an old built-up area. A lot of high-rise residential buildings are constructed in the civic center region as a commercial house. A new urban development is under construction in the area away from one hour by expressway from the city. Lanzhou New District is huge development that the area is 400 square kilometers.

Keywords: regional development, topographical condition, inland area

Protected Forest and its periphery - a Case of Nagarahole National Park, Karnataka, India

Koichi Kimoto^{1*}

¹Hiroshima Jogakuin University

In India, we can divided the trend of forest into two periods, the period of deforestation until the 1980s and the period of well forest protection, i.e. Joint Forest Management, since the 1990s. As a result, we can see the institutional development and a lot of effort in various areas, and the rate of forest has been improved from 10% level to 20.6% (2001). As for the forest and its periphery as forest region, the former has been under strict control as a national park, and the latter has neglected and left the chaotic region consisting of miscellaneous residents. In this presentation, I would like to investigate the possibility of governance in the region spread in a donut shape, with understanding the both region as a forest "region".

Keywords: India, Forest, Forest region, Karnataka

Recent Flood Disaster in Jabodetabek Region: A question toward resilience Megapolitan

Ernan Rustiadi^{1*}, Andrea Emma Pravitasari³, La Ode Syamsul Iman¹, Tutuk Lufitayanti²

¹Center for Regional Systems Analysis, Planning and Development, Bogor Agricultural University, ²Faculty of Agriculture, Bogor Agricultural University, ³Laboratory of Regional Planning, Graduate School of Global Environmental Studies, Kyoto University

Various environmental deterioration in Indonesia has increased the potential for anthropogenic disaster hazards in different regions. Floods in urbanized area such Jakarta City has impact a huge economic loss. Jakarta City and its surroundings (Megapolitan Jabodetabek) is the nation's largest urban agglomeration where more than 11 percent of the population and more than 26% of the national GDP is located. Flood in the city of Jakarta is an annual phenomenon with repeated each year and mainly occurred at the peak rainy season (between the months of December to January). Current flood disaster in Jakarta (January and February 2013) is considered a 5-year flood cycle. Various indications show that an increase in flood potential flood hazard in the region. This Increasing on the frequency flooding hazard raises the question whether the increased frequency of flooding is a result of climate change or by the deterioration of the local environmental conditions that cause the decrease in regional resiliency. This study examines the facts of climate change locally (especially changes in precipitation) as well as a variety of local environmental changes especially due to land use/cover changes that impact of the environmental carrying capacity for over the last 20 years.

Keywords: Flood disaster, Jabodetabek, resilience megapolitan, climate change, land use/cover change

Relationship between Farm Income with Migration Rate of Rural Communities (Case study: Ayah Village, Kebumen Regency)

Agam Rafsanjani^{1*}, Muhammad Iqnaul Haq², Sudrajat³

¹Undergraduate Student, Faculty of Geography, Universitas Gadjah Mada, ²Undergraduate Student, Faculty of Geography, Universitas Gadjah Mada, ³Academic Staff, Faculty of Geography, Universitas Gadjah Mada

Agriculture is the dominant sector in Kebumen. 64% of the population depends on agriculture. However, since the monetary crisis in 1998 weakened this sector. Decline in the agricultural sector is spurring people to look for other alternatives to meet their basic needs. One alternative is to migrate to other areas in search of better jobs. Research on this issue is very important because rural migration greatly affects the economy of the village.

The purpose of this study is (1) Determine the amount of net income of farm households in Ayah Village (2) Knowing the rate of labor migration in each household in Ayah Village (3) Knowing the relationship between farm income with labor migration rate in each household of Ayah Village. This research is experimental research with survey method. Data collected in the form of primary and secondary data. The primary data obtained through structured interviews. respondents were selected using purposive sampling method. Secondary data needed such as agricultural yield data from farmers' groups and data on the number of migrants from the government and local NGOs.

The results showed there is an association between the agricultural income on migration rate of rural communities. The lower income makes the higher migration.

Keywords: Farm Income, Rural Migration, Cost and Benefit of Farming, Migration Rate, Rural Migration

The Potential Role of Formal Insurance in Natural Resources Management: Evidence from Weather Index Insurance in Zambia

Ken Miura^{1*}, Takeshi Sakurai²

¹Graduate School of Economics, Hitotsubashi University, ²Institute of Economic Research, Hitotsubashi University

Poor people in rural areas of developing countries depend on natural/environmental resources for their livelihood. Particularly, once any negative shock happens, their dependence on such resources increases to cope with it. Such behavior creates concerns about the degradation and exhaustion of such resources. The concerns may be mitigated, if formal insurance works well. This is because farmers with an insurance payout will reduce their use of natural resources as an ex post coping strategy in the aftermath of a shock. In order to explore this possibility, we investigate demand for formal weather index insurance in a rural area of Zambia, where people depend heavily on natural resources, and there are no formal financial institutions.

Index insurance, basing insurance payouts on an officially observable index highly correlated with crop yield, has been expected a promising way to insulate the vulnerable against weather shocks. However, previous studies have reported lower take-up rates than expected. Although they also have pointed out impediments to insurance take-ups such as liquidity constraints, further investigation is required to understand them fully. One of potential barriers, which have not been tackled well, is ex ante self-insurance mechanisms employed by farmers for precautionary purpose.

To examine the relationship between the mechanism and insurance demand, this paper utilizes data for two years from a pilot scheme selling index insurance based on rainfall amounts in rural Zambia. Most of the farmers purchased too small amounts of the rainfall index insurance contract to completely shield them from weather risk, although the take-up rates are extremely high (more than 90% in both years). First, this paper presents descriptive evidence on the determinants of rural farmers' demand for weather index insurance. We show that impediments to insurance purchases in the scheme are (1) risk aversion, (2) limited trust in insurance provider, and (3) poor understanding of the insurance contract, all of which are consistent with findings from previous literature.

Then, we discuss the relationship with small livestock saving, one of farmers' essential self-insurance mechanisms in the study site. Even after controlling wealth levels, we find a concave relationship among them, suggesting that farmers in the site have strong demand for further insulating them against weather risks. Given the empirical result, we speculate that only traditional self-insurance mechanisms are not enough to reach the optimal level of precautionary savings. Overall, this paper provides suggestive evidence on the potential role of weather index insurance, allowing farmers to cope with weather shocks without an ex post excess dependence on natural resources. Future research will offer direct evidence on the causal impact of formal insurance provision on farmers' use of natural resources after negative shocks.

Keywords: natural resources management, weather risk, weather index insurance, Sub-Saharan Africa

