Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

HSC04-01 Room:102A Time:May 23 14:15-14:30

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

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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

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

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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 ˜3.68,10-4 (July-August, 2003) to ˜4,10-4 (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 (Rxy) 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 (-.8859) and the maximum value in the month of August (+.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

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

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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

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

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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

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

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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

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

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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, recilience megapolitan, climate change, land use/cover change