

HRE032-01

Room:203

Time:May 22 16:30-16:45

Issues on the use and management of water and forest resources in East Africa

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In rural East Africa, it has been a matter of grave concern that the problem develops of scarcity in natural resources, and of smallholders' differential access to these resources. This study presents cases of irrigation water and forest resources with a view to pointing out some of more general issues to be examined concerning natural resource use and management.

The first two cases are of irrigation water use and management in Central Kenya and Northeastern Tanzania, and relate to (i) the impact of globalization, (ii) the socio-economic stratification among resource users, and (iii) the potentiality of their self-organised governance system for common pool resources. Commercial horticultural production is widespread in semi-arid areas in Central Kenya. Contract farming of various vegetables for the European market has collectively reached a considerable size, hardly fitting into the existing rotation system of water distribution at the research area. The unequal distribution of water has accentuated socio-economic stratification, and a new management system is yet to be agreed, allowing individualised water use and potential overuse. In Northeastern Tanzania, economic liberalisation policies stimulated the mining sector for export that created a huge demand of workers on food. The smallholders in the irrigated research area started to supply them with food crops, well exceeding their subsistence production level. In contrast to the Kenyan case, however, temporary reallocation of land among the water users has alleviated unequal land and water distribution at least partly, and the entire irrigation system continues to be managed collectively.

Next two cases are concerned with forest resource use in the same two research areas. For these several years, both countries have institutionalised Participatory Forest Management (PFM) in order to attenuate forest degradation. The issue is more broadly around (iv) the dichotomous prescription of total acceptance of local knowledge on resource use or simplistic exclusion of resource users, and (v) the legitimacy of both the existing resource use and the introduced forest management system, in addition to the above issues (i), (ii), and (iii). In the research area, Central Kenya, the local people have degraded the forest reserve, maximising short-term benefit at the expense of longer-term resource sustainability. An optimistic application of the notion of "ecologically noble" local institutions for communal resource management is clearly untenable. With no sign of "community forest association" formation stipulated by the forest act, the authorities argue that the declining economic value of the degraded forest reserve reduces the economic incentive for the local to be actively involved in PFM, even implying the denial of their resource use right. Meanwhile, the Tanzanian case has undergone institutional reform at the local level, thus introducing joint forest management between the local users and the authorities on the one hand, and a system of community-based forest management by a village committee for environment and forest, on the other. Although the new system has faced problems and the forest and wood resource use of the local people are differentiated by their socio-economic status, the need of land poor households which have no choice but to rely on wood resources from governmental forest plantation has been accommodated in the new institutional situation. This is realised through "domesticating" the PFM system in the local context and giving it legitimacy, which is again in a stark contrast to the Kenyan case.

All of these five issues and factors that create differences concerning these issues, as well as "scale gap" between detailed case studies and broader perspectives, are to be examined for sustainable use and management of natural resources, and for users' right, and more equal access, to natural resources.

Keywords: water resources, forest resources, co-management, East Africa

HRE032-02

Room:203

Time:May 22 16:45-17:00

What is sustainability of swidden agriculture?

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The purpose of this study is to discuss on the conditions under which forest resource use and management are kept sustainable or not, with special focus on temporal analysis of location of swidden fields as well as their impact on the forest under various socioeconomic conditions, from the case of South-Western Ethiopian forest, where a small scale society (the Majangir, a Surmic speaking ethnic group) have been engaged in swidden agriculture (shifting cultivation) as well as honey collecting and hunting.

The Majangir used to live in small settlements which they often abandoned and moved within several years. They would clear swidden fields adjacent to their huts. Though their settlements and swidden fields were dispersed in the forest, reconstructed settlement location data in the last 100 years suggest that they had repeatedly settled at limited area while the rest of the forest had been kept uncleared, because several factors including water supply limited their settlement location. This traditional settlement and land use pattern greatly changed the recent 30 years in which they had settled into newly shaped large scale sedentary villages under the government policy. Sedentarization brought concentration of population and land use of agriculture around large villages and as a result, fallow period was shortened in such areas. However, most of small settlements that had been once dispersed in the forest were abandoned and reforested, so in effect sedentarization didn't make deforestation totally. As swidden agriculturalists generally prefer labor productivity to land productivity, it is reasonable to suppose that they preferred proximity for land selection at the expense of land productivity caused by fallow shortening.

It seems obvious that forest resource use among the Majangir had been sustainable both before and after sedentarization. It is probably not because they were aware of vulnerability of forest so that they consciously practiced limited resource use. Rather, it can be said that they fundamentally behave so as to maximize their labor productivity. It is likely that absence of market incentive and ethnic occupation of forest resource use (absence of ethnic competition over the same resource) were advantageous to make sustainable use of the forest. Recent movement such as resettlement of Ethiopian highlanders to villages in the forest and a plantation project planned by a foreign enterpriser, however, could menace indigenous sustainable resource use in the near future.

Keywords: swidden agriculture, sustainable forest resource use, commons, ethnic relations, Ethiopia

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

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HRE032-03

Room:203

Time:May 22 17:00-17:15

Changes in Land and Forest Resource Uses of Rural Laos

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Rural residents of Laos in mainland Southeast Asia obtain essential commodities such as food, materials and biological resources for the main cash income source from their natural surroundings. They had been getting along better with nature for many centuries. From the end of 20th century, however, Laos has faced the powerful tide of globalization and implemented economic reform as in many other socialist countries. As a result, forest in Laos is rapidly started to develop by promoting foreign direct investment due to the transition to a market economy. At the same time, by increasing momentum toward environmental conservation, the government created national biodiversity conservation areas and enforced the Forest Act and the Land Act in order to control swidden agriculture in the late 1990s. At present, forest use by rural residents was heavily restricted. The change of the relationship between nature and human activities that Laos is experiencing presently represents the environmental issues among developing countries.

In the presentation, the mechanism that occurs problems related land/natural resource uses would be discussed from the viewpoint of political ecology in addition to clarifying the current status of diversified natural resource uses of rural residents in Laos.

Keywords: land use, forest resource use, political ecology, laos

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HRE032-04

Room:203

Time:May 22 17:15-17:30

Use of natural resources in traditional charcoal production

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The purpose of this study is pointing out the characteristics on forest use for charcoal production, in terms of natural resource management, based on a few field data from hilly area near Sendai, northeast Japan. Former charcoal production worker made a charcoal producing kiln selectively on concave break of slope, because such location in hillslopes satisfies various requirements from working processes of charcoal production. Material for making kiln was sandy clay and gravel collected from topsoil in surrounding slopes. Woods were gathered from slopes situated on upside of the kiln. These characteristics suggest that former charcoal production in hills multifariously utilized natural resources, such as forest, microlandform, and surface geology.

Keywords: fuelwood forest, natural resources, hilly area

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HRE032-05

Room:203

Time:May 22 17:30-17:45

Geomorphic Changes and Agricultural Landuse: Cases in the Inner Mongolia and the Kenyan Central Highlands

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Land condition of tillage areas, one of physical environmental resources for agriculture, essentially has an important role in agricultural landuse and management. The objectives of this presentation are to discuss actual relationships among geomorphic processes, intensity of geomorphic changes, and landuse in the several areas, the middle to west of the Inner Mongolia and the Kenyan central highlands.

In conclusion, detailed relationships between ethnopedological knowledge and geomorphic processes in each area, should be further clarified, and it is expected that the importance of land condition as physical environmental resource increases due to these.

Keywords: Land condition, geomorphic process, agricultural landuse, Inner Mongolia, Kenya

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HRE032-06

Room:203

Time:May 22 17:45-18:00

Terraced paddy development by ethnic minorities in northern Vietnam: a preliminary study

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Ethnic minorities in Sapa, Lao Cai Province, in northern Vietnam are developing terraced paddy at a large scale. Facing a rapid population increase of about 3% per annum, the agricultural system of the region shifted from slash and burn cultivation to wet rice production; Boserupian agricultural intensification occurring in one go. This study reports results from our recent interviews to farms in this region. We attempt to demonstrate that (1) number of male siblings determines the area of new developments, (2) development through mutual labour exchange reduces income disparity among households, but (3) subject to availability of land for new development.

Keywords: terraced paddy development, agricultural intensity, ethnic minority, South East Asia

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HRE032-07

Room:203

Time:May 22 18:00-18:15

Agricultural Land- use and Sunflower Cultivation of Eastern Margin desert in the Yellow River Basin

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The purpose of this research is to figure out the issues on current agricultural land- use, and the formation of sunflower producing area in Alashan zuo qi Bayan Xigui village. This village is located between eastern margin of the Ulan Buh desert and Yellow River basin. There are sunflower cultivation areas in the east side of the village. On the other hand, the west side is troubled area that attacked by sand- buried since desertification 1980s.

Keywords: sunflower, desertification, agricultural land-use, Inner Mongolia

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HRE032-P01

Room:Convention Hall

Time:May 22 14:00-16:30

Trends and Forms of Timber Production Dealing in Okukuji Area, Fukushima Prefecture, Japan

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We undertake this study to (i) investigate trends in Japanese forestry, (ii) investigate changes in forestry policy considered in the Okukuji area and related regional action, (iii) investigate changes in the distribution of logs and timber, and (iv) document the current situation regarding log production dealers and sawing dealers. Log production dealers in the Okukuji area are divided into those with a business focus on national forests and those with a focus on private forests. Many dealers changed the forest to aim at it, and have changed their business objectives. While this has involved decreasing deal with national forests as other opportunities arose, different dealers reacted differently to new situations. When resources are rare in the Okukuji area, a dealer must be active outside the Okukuji area, but there are many dealers who market logs to the Okukuji area. Many sawing dealers source logs from the binary log market (OTDC, HSLM) in the Okukuji area, while, some dealers source logs without a clear market channel. Such dealers fulfill a customer order by direct and flexible log purchases. The themes of the Okukuji area are the monogenesis administration from the production to sales that "Valley Control System" aims at on the one hand, and the consistency with original corporate activity of dealers on the other. In addition, as the Government and the private forest owners are owners of the forest, the decline in timber serviceability in privately owned forests, in particular, creates a serious bottleneck in the forestry sector.

Keywords: forestry, log production dealer, sawing dealer, Okukuji area

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HRE032-P02

Room:Convention Hall

Time:May 22 14:00-16:30

Study on Geomorphic processes forcing the establishment of continuous agricultural land use method in the central Kenya

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This is the continuous study to clarify the changes in Earth Surface Environment in the Laikipia Plateau of central Kenya. In highland of central Kenya, the farmer's behaviors maintaining livelihood are controlled not only by socio-ecosystem condition but also by the land condition of cultivated site, in particular, the natural environmental factors. Understanding of the natural environmental factors of land condition, therefore, is important for the farmer's land use and control of the agricultural land.

On this point of view, we illustrated the maps of micro-landforms, based on aerial photograph interpretation and surface geological fieldworks, at an agricultural area in the Laikipia Plateau. In addition, we made clear the mode of predominant slope processes, such as surface and deep-seated landslides, soil creep, and soil erosion, acted on the each micro-landform unit.

Subsequently, we carried out the survey the slope forming materials on the slopes in Ngobit Settlement, where sheeting erosion are dominated on the slope surface, to clarify the geomorphic process changes on the agricultural land.

We identified the two sediment layers formed by the sheeting wash on the slope surface, each layer called IA layer and IIA2 layer. Although both layers contain many gravels, a layer between the both sediment layers, called IIA1 layer, has less gravels. Therefore, we conclude that increasing in the magnitude of the sheeting wash occurred twice on the slope. Former occurred at around 2700 to 1900 cal BP. Sheeting wash process acted heavy again on the slope since 600 cal BP.

Keywords: Kenya, land use, Geomorphic process, Slope erosion, Radiocarbon dating

HRE032-P03

Room:Convention Hall

Time:May 22 14:00-16:30

Forest Resource Use and Livelihood Strategies of Smallholders in Central Kenya

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African countries, which have been forced to introduce neo-liberal structural adjustment with a view to solving the economic crisis, have been concerned about livelihood strategies adopted by smallholders, especially the state of livelihood diversification, in order to investigate and alleviate the poverty problem. Each household is trying to realize their livelihood security, not by specializing in a single activity, but combining multiple activities. However, the existing researches tend to underestimate the economic value of forest resources. It is therefore hard to say that livelihood status and/or livelihood strategies are properly understood. To capture livelihood strategies with properly estimating forest resource use by smallholders is essential in African countries that are seeking to implement community-based forest management (CBFM) to avoid depletion of forest resources.

Therefore, this study discusses the role of forest resource use in the livelihood strategy of smallholders, quantitatively measuring the dependency of their livelihood on forest resources in Central Kenya. In addition, this study clarifies where and how much smallholders extract forest resources, and the extent to which the forest resource use contributes to earn cash income that exceeds the level of subsistence. Forest resource use and livelihood strategies adopted by the households reflect their geographical conditions and socio-economic stratification. Thus, this study employs a comparative research method in two settlements adjacent to two Forest Reserves which are accordingly different in terms of resource management and geographical conditions. Smallholders' dependence on forest resources is estimated by the calculation of annual production flow of various activities, and compared and discussed by following three points: 1) The proportion of forest resources to the total annual production (forest resources dependency rate); 2) Own consumption/commercialization rate of forest resources; 3) The relative importance attached to different sources of forest resources (forest reserve own land ratio). After that, it discusses; 4) The factors with which this study differentiate a variety of forest resource use by classification of net income components. As for source of forest resources, this study pays attention to; 5) Management of Forest Reserve; 6) Farm forestry management by smallholders.

As a result, I obtained the following results: 1) Production overall percentage of forest resources is on average 20 percent each strata, but the absolute quantity is a big difference; 2) Own consumption rate of all strata about forest resources exceeds 90 percent, which indicates forest resources contribute to sustaining their livelihood; 3) The character of settlements, geographical conditions and household stratification correspond to the relative importance attached to different sources of forest resources; 4) The data show a high correlation between on-farm activities and firewood obtaining activities of sample households, which indicates that the nature of on-farm activities is the main factor controlling forest resource use; 5) The relative importance attached to different sources of forest resources changes according to the management of Forest Reserve, which shows the importance of considering not only geographical and socio-economic conditions of smallholders but also the existence of their self-help groups; 6) In the drought-prone settlement, smallholders plant more trees. Regardless of their socio-economic stratum, the households plant more trees in their own land, stocking up more firewood obtainable from pruning. The findings of this study indicates that the prevailing underestimation of forest resource contribution to rural livelihood is untenable, and that with focusing on the relative importance attached to different sources of forest resources, livelihood strategies and the role of forest resource use can be evaluated by quantitative data.

Keywords: Forest resources, Livelihood strategies, Farm forestry, Forest reserve, Republic of Kenya

HRE032-P04

Room:Convention Hall

Time:May 22 14:00-16:30

Irrigation and socio-economic stratification in the semi-arid Laikipia Plain, Central Kenya

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Horticultural production is an important sector of rural livelihoods in East Africa, and commercial practice of frequent and year-round irrigation is widespread. In semi-arid areas of Central Kenya, contract farming of various vegetables for the European market has collectively reached a considerable size, and is an influential factor in the issue of scarce water resources. This study investigates the socio-economic stratification caused by, and the global nature of, horticultural production in a newly opened settlement in a semi-arid area, with a view to assessing the potentiality of smallholders' self-organised governance system for common pool resources (irrigation system) as a more stable and equitable way of resource management, facing the market and state failure.

In the study area, the rotation system of water distribution collapsed in the face of commercialised horticulture, and only temporarily reappears in acute water shortage at the request of those located in the lower section of the gravity-fed irrigation scheme. A series of fieldwork found that, first, there is a general and remarkable difference in the dry-season water use among different sections in the scheme, where those located in the upper section use more water and practice commercial horticulture. It is highly likely that the current unequal distribution of irrigation water have accentuated socio-economic stratification. Second, the newly introduced contract farming of French beans for the EU market exhibits a clear relationship between the socio-economic stratification among water users (as evidenced by the ownership of individual irrigation means, especially portable engine pumps for the upland irrigation) and their total volume of production. However, the relationship between the socio-economic stratification and the net income from the contract farming is not necessarily mutually enhancing, because the latter is subject to fluctuating global conditions, seasonality, and demanding harvest task, all of which incur risks in production expansion. Therefore, many vegetable growers adopt the risk-averse strategy of small-scale sowing, and ensure continuous money flow by a variety of year-round horticulture so as to keep their livelihood at the subsistence level. Meanwhile, the cases of temporary reallocation of land and labour among the water users are not so frequent, and the system regarding these two production factors has no salient correcting effect on the undesirable relationship between the socio-economic stratification and unequal allocation of irrigation benefit. All of these have hampered the farmers' efforts to collectively control the irrigation system, entailing individualisation of irrigation.

Keywords: water resource, water users' association, horticulture, socio-economic stratification, Kenya

HRE032-P05

Room:Convention Hall

Time:May 22 14:00-16:30

Desertification in Xilinguole grassland, Inner Mongolia, Based on Remote Sensing Data

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Xilinguole grassland in Inner Mongolia exemplifies that grassland degradation has increased significantly in recent years. Several large-scale projects aimed at combating desertification have been initiated since 2002. However, analyses in many previous studies were limited to annual data, and conclusions on the progress and causes of desertification were drawn from particular year data.

In this study, the normalized difference vegetation index (NDVI) derived from long-term satellite datasets (AVHRR/GIMMS [1981-2006] and MODIS/TERRA [2000-2010]) was used to estimate vegetation changes in the Xilinguole grassland. To investigate the causes of the vegetation change, we analyzed the temperature, precipitation data, and statistical data regarding the grazing pressure and afforestation area approximately 30 years. Moreover, a field survey was conducted to investigate the changes in the vegetation type, which is difficult to assess by remote sensing.

The findings of this study are as follows. The NDVI values during a period of luxuriant growth were highly correlated with the June-July precipitation and May temperature of the same year, and the April-June precipitation of the previous year. Over the consecutive dry years in 1999-2001, the increase in grazing pressure and intensity sand storms and locust infestations led to a dramatic decrease in the NDVI. However, over the subsequent consecutive wet years, the decrease in grazing pressure and increase in the coverage of bushes and annual grass species, led to an increase in the NDVI.

Keywords: desertification, climatic change, human activity, remote sensing, vegetation index