

Japan Geoscience Union Meeting 2011

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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

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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

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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

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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

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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