Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

HGG28-01 Room:102B Time:May 23 15:30-15:45

Effects of vegetation recovery and rural development by Grain for Green Project in China

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More than 10 years have past since Chinese government started the Grain for Green project in 1999, for recovery of environment mainly in upper and middle catchment areas of Huang He and Chang Jiang. The policy is characterized by aiming at not only environmental recovery by large-scale afforestation in the catchment area but also promoting development of rural economy through land reclamation and promotion of alternative development projects instead of giving up steep slope cultivation among villages conducting the Grain for Green project.

This paper preliminarily reports present conditions of household economy among rural villages in several districts of Yanan City with special references to alternative development projects and its incomes, based on field observation and interviews conducted in August 2011. The result indicates that there are regional differences in the consequences of rural development plans.

Keywords: Grain for Green Project, rural development, Loess Plateau, Shanxi, China

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Landuse condition and development of commercial farming in Inner Mongolia, China

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Landuse condition and development of commercial farming in Inner Mongolia, China

Keywords: landuse condition, commercial farming, natural resources, Inner Mongolia

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Land rehabilitation methods based on the refuse input: local practices of Hausa farmers in the Sahel, West Africa

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To develop the land rehabilitation methods in Sahel of West Africa, it is necessary to examine the indigenous knowledge and daily practice against desertification. In order to avoid the land degradation and crop failure problems, the Hausa farmers in Niger carry refuse as manure from their homestead into the degraded land of the millet fields. This degraded land is cemented and strongly acidic with poor nutrition and produces no plants or crops. The content of refuse is mainly organic materials such as plant residue and livestock excreta, and it can provide abundant N, C, P and nutritional salts with weak alkalinity.

The author carried out the in situ experiment and put urban trash of 0 kg/m^2 (plot 1), 5 kg/m^2 (plot2), 10 kg/m^2 (plot 3), 20 kg/m^2 (plot 4) and 45 kg/m^2 (plot 5) on the degraded solid sedimentary layer. After one year of trash input, the regenerated plant growth was 16 species of 2.6g/ m^2 on plot 2, 16 species of 33.4 g/ m^2 on plot 3, 35 species of 496.2 g/ m^2 on plot 4 and 17 species of 365.4 g/ m^2 on plot 5, although there was no plant growth on the degraded land of plot 1. According to the field observation, the termites drilled tunnels under the trash and carried up silt and clay from the underground for building their shelters over the organic matter. The rainwater percolated into the ground through the termite tunnels of the cemented sedimentary layer, in spite of flowing away on the sedimentary layer.

Refuse input increased soil porosity as well as termite activity, which promoted moisture retention as well as penetration. The rises of the trash were able to catch the wind-blown sand as well as organic materials provided by sandstorm, and to disperse rainwater running off on the ground. These wind-blown sand, and clay and silt lifted up by the termites were important for improving soil physical property for the millet cultivation. The trash on the cemented sedimentary layer prevented from soil erosion and exposure of the cemented sedimentary layer. refuse input of 20 kg/m2 remarkably improve soil moisture for only the first year as well, whereas land degradation afterwards was somewhat slower.

The Hausa farmer and the Fulbe nomad interviewed for the experiment also agreed that the refuse amount at 20 kg/m2 scattered over Plot 4 was effective in preparing pearl millet fields and grazing grounds. Because the Sahel area has seen rapid population growth, and land use pressure by both cultivators and pastoralists are high, it is critical that degraded land is rehabilitated for new fields and grazing grounds. The critical amount of urban refuse was at least 20 kg/m2. However, the improved soil property deteriorated after two years due to depletion of nutrients through termite activity, grazing, and utilization by people, and sand grain erosion from wind and rain. Land degradation was greater with sloped topography with more soil erosion. In order to maintain plant productivity recovered using urban refuse, it is necessary for continuous input of refuse to compensate for nutrient depletion from wind and rain erosion.

Keywords: Sahel, land degradation, desertification, revegetation, termite, urban refuse

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Tree management in the coping strategies of Hausa cultivators for the drought and land degradation in Sahelian Niger, We

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The land degradation problem and drought bring about crop failure, food shortages and malnutrition to the people in the Sahel region, West Africa. Although the production of the millet cultivation and livestock grazing is limited by the severe aridity and poor soil nutrition, we recognize the rapid population increase, the expansion of the cultivation and the grazing, and deforestation. In Sahel region, the rain-fed agriculture was dominant and the crop yields are strongly depended on rainfall variation. The Hausa cultivators in Sahel region of Niger faced the ecological vulnerability of land degradation and rainfall variation of the unexpected drought and rainfall abundance. This study focused on their coping strategies for ecological vulnerabilities of rainfall variation and land degradation with their ecological knowledge to the tree management.

Hausa people recognize the tree forms by eyesight and classify four categories of tree forms: *mayanchi*,*matashi*,*rabu* and *barau*.*Mayanchi* indicates trees with about 3 m height and one or two trunks. *Matashi* indicates small trees, with cutting lower branches. *Rabu* indicates small saplings, less than a year old without cutting lower branches. *Barau* indicates over two year old trees without cutting branches. *Mayanchi* provide shade, livestock fodder, and food for people. *Mtashi* is excellent at catching sand, which is easily lost by water and wind erosion. *Rabu* and *barau* is used for avoiding land degradation and catching sand. The farmland owners manage the tree location and density, and simultaneously tree forms in the millet field, by judging the field condition and household economy.Trees play important roles for avoiding food insecurity from drought and rainfall variation as well as soil fertility decline, soil erosion, and depletion of fodder during long term dry season.

The landowners have ownership for the trees within their own farmland and utilize trees with their own aims. During rainy season, the tree use is strongly limited by the landowners. The residents are willing to avoid the crop damage by cutting branches and they are not permitted to use trees in the other households' farmland. During the dry season, the natural resources are open to all the residents in the village and they are able to utilize the trees without cutting down trees. In order to sustain their life, they can collect livestock fodder and famine food from all the farmland in the village. *Faidherbia albida* provide important livestock fodder and *Balanites aegyptiaca* provide famine food for the residents during the hunger season. The rich households, called *mai-kudi* in Hausa language own the wider millet fields and provide the livestock fodder and famine food by leaving the trees in their farmland. Although the economic differentials are expanding rapidly in the village, we can recognize the tree use in the farmland as a mode of moral economy at the inside of the village for coping with the severe environmental changes in Sahelian region.

Keywords: tree management, land degradation, moral economy, Sahel, Niger

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Agricultural development on subtropical island ecosystem in Okinawa

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Okinawa, the southernmost part of Japan, was reverted to Japanese administration in 1972 from the United States military administration. With this as a turning point intensified was the government intervention in agriculture of Okinawa. Along with the protection policy for sugar industry enhanced, land improvement project was promoted as the basis of modernization of agriculture of Okinawa. The pioneering land improvement project in Ishigaki Island started in the late 1970s including the construction of full-scale irrigation system and farmland consolidation. It has, however, faced up to the fierce objections by farmers since the late 1980s, which makes it hard to complete it. The objective of this study is to secure the better understandings of this confusing phenomena and to derive policy implications from analyzing what the project has brought to farm managements in Ishigaki Island, paying due attention to the farmers' experiences, learning and evaluations as the project goes on. While short-term effects of increasing productivity brought by land improvement project is unquestionable as to the wet-paddy agriculture in mainland Japan, our analysis showed that, it is not the case in Okinawa where the project mainly targets sugar cane farming; the farmers insufficiently appreciate short-term effects of the projects as follows. 1) The irrigation is not the prominently critical factor affecting the yield of sugar cane. 2) Although the farmland consolidation certainly improved working conditions and accessibility to the field, in the consolidated farmland the negative effect to the yield of crops is observed and especially it is crucial to the cultivation of tropical fruits such as pineapple and mango, one of the promising sectors of agriculture of Okinawa. The result of this study implies continuing the same idea and substance of land improvement project up to now would not lead to the promotion of promising agriculture in the specific physical and social conditions of Okinawa.

Keywords: Okinawa, subtropical region, island ecosystem, agricultural policy, land improvement project, irrigation

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The Relationship between the change of Satoyama in Japan and Forest in Southeast Asia: A Case Study of Incense Material

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In the mountainous areas of mainland Southeast Asia, local residents have actively used various forest resources since old times. In Laos, from the middle of 1990s, people have started to gather one species of tree bulk in response to Thai middlemen of agro-forest products. The tree bulk was *Tabunoki* trees (*Machilus* spp.), which is used as glue for incense such as joss stick and mosquito coils. As natural Tabunoki trees are now hard to find in the forest, people are trying to plant it in their land. In Laos, many *Tabunoki* bulks are purchased by foreign middlemen and then sent to China and Japan.

In Japan, originally *Tabunoki* trees were collected from *Satoyama* environment mainly in Western Japan, especially the coastal regions of Kyushu. However, *Satoyama* in Japan had been decreasing its use because of conversion energy from wood and coal to fossil fuel from 1950s. At the same time, conversion of forest species from broad-leaved trees to conifer has been implemented by forest policy in Japanese government. As a result, few locals use *Satoyama* and decrease in production of wood powder made from *Tabunoki* trees.

In this presentation, I would like to focus on *Tabunoki* tree to understand the relationship between forest use in Southeast Asia and forest demand in Japan, and try to clarify the structure of mutual dependence between the regions.

Keywords: forest resource, Satoyama, Machilus spp., incense stick, resource chain