

Impact of the 2011 Japan earthquake and tsunami on the marine leisure use and indirect effect on the coastal ecosystem: a case study in inner Tokyo Bay.

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From a historical viewpoint, there has been a close interrelationship between human activity and the natural environment in coastal areas. Most large cities were built in coastal areas and benefitted from the natural resources there, including living aquatic species, and water-oriented transportation. Although there was no special attention paid to such a human-nature relationship during the era of high economic growth, it has recently been reevaluated and better understood. These relationships were also emphasized in the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), which was established to mainstream biodiversity conservation and build a sustainable society after the decision of the 10th Conference of Parties of the Convention on Biological Diversity (CBD-COP 10) in 2010 and the 2007 meeting of the G8+5 Environment Ministers in Potsdam, Germany.

However, damage from the 2011 earthquake and tsunami in Japan might have damaged those relationships. In order to investigate the effects of the earthquake and tsunami on the use of tidal flats, we used questionnaires to evaluate changes in the number of users for each type of usage of the Sanbanze tidal flat at the innermost part of Tokyo Bay.

As a result, we found that clamming and walking or jogging were the most common uses of the survey area. However, clamming activity decreased after the earthquake. The decrease was confirmed by a field survey, which also showed a greater decrease in the number of visitors (80% decrease) than that suggested by the questionnaires (64%). Many people were anxious about the seawall failure and about land liquefaction, which physically damaged infrastructure. Because other regions showed similar trends in attitudes and usage, we suspect the ultimate cause of the anxiety caused by physical damage which spread universally. Correspond to the change of the human use larger sized Japanese littleneck clam are increased. However the number was decreased subsequently.

Keywords: Great East Japan Earthquake 2011, human behavior, marine leisure use, shellfish gathering, tourism statistics, Tokyo Bay

Human activities and forest transition in Japan Sea Coast area with special references to Lake Hiruga and Lake Kitagata in Fukui prefecture, Japan

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Deforestation was caused by not only utilization of its timbers but also utilization for fuel and land transformation to agriculture. Severe deforestation became obvious throughout Japan in 16th century and conservation law was enacted by Edo government and feudal lords in the 17th century. However, the history of deforestation before the 17th century is not well-known since written documents are rare. In this study, the timing and cause of deforestation are detected in Japan Sea Coast area in Fukui prefecture.

Lake Hiruga is located in the coastal area of Wakasa Bay. Many archaeological sites are distributed around Lake Kugushi adjacent to Lake Hiruga. Paddy fields are observed on planes around Lake Kugushi and salt making was active from the 5th century to the 8th century. From the 11th century, land transformation to agriculture was active. Three major public works were recorded in this area in Edo period (from the 17th century to the late 19th century). Lake Kitagata is located in the coastal area of Japan Sea close to Noto peninsula and a flat large plane spread to southeast and paddy fields have been developed. In the late 19th century, a water gate was constructed to make paddies around this area since blackish water prevented from land transformation to agriculture. Also salt making was active in Heian period (AD794 -1185). In both area, deforestation before the development of paddy field is expected.

A core (14KTG01-2: 450 cm) was recovered from Lake Kitagata using a Russian peat sampler and a core (15HG02: 228.5 cm) from Lake Hiruga using a Meckeleth core sampler. Pollen analysis on the sediments from Lake Kitagata and Lake Hiruga was conducted using recovered cores to detect the impacts of human activities on forests.

Human activities were low and the percentages of arboreal pollen was nearly 90 % in all three regions by the 10th century. The forests of *Castanea* and *Quercus* subgen. *Cyclobalanopsis* mixed with *Q.* subgen. *Lepidobalanus* and *Cryptomeria* were developed in both area. The most severe deforestation started in the 10th century around Lake Hiruga and in the 12th century around Lake Kitagata. In both regions, it was accompanied by the increase of Gramineae pollen. This deforestation was probably caused by the land transformation to agriculture and it was irreversible change. This is the timing and origin of the typical satoyama landscape with paddy fields in Japan Sea Coast area today. The timing was earlier in Lake Hiruga probably because the area is close to the capital city, Kyoto.

Salt making is normally considered to consume large amount of wood for fuel. However, the impacts from it was much smaller than the land transformation for agriculture. *Pinus* pollen increased around Lake Hiruga from the 15th century and around Lake Kitagata from the late 16th to the 17th century. It appeared that the forests recovered from the severe deforestation, but other arboreal species did not increase. It was probably caused by the development of secondary forests or plantation of pine trees in coastal area as shelterbelt. In addition, several constructions were recorded around Lake Hiruga from the 17th century to the 18th century and the increase of *Pinus* pollen was observed in the period. In Lake Kitagata, the increase *Pinus* pollen and Gramineae pollen was also observed in the late 19th century. The increases were probably related to the constructions.

Keywords: Lake Hiruga, Lake Kitagata, pollen analysis, land transformation to agriculture

Residents' Attitude toward Nature Preservation Activities at Hulun Lake Nature Reserve in Inner Mongolia

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Nature reserve system is employed in China as effective measures to protect an ecosystem, diversity of natural creatures, natural resources, and sceneries. It is also required to understand residents' attitudes in order to promote their nature preservation activities. Hulun Lake Nature Reserve is a national nature reserve located in Hulun Buir City in Inner Mongolia. In this study, the purpose thus has been set to understand residents' attitude toward nature preservation activities at Hulun Lake Nature Reserve, and to identify key factors for them to participate in such activities.

Keywords: Nature Reserve, Nature Preservation Activities, Residents, Attitude

Management plans and research needs for Lake Inle in eastern Myanmar

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Conservation and management of Lake Inle and its 3,800km² catchment on the western Shan Plateau in eastern Myanmar have been both local and national concern given the significance of the lake to the economy, environment, and culture. Ministry of Environmental Conservation and Forestry, a focal ministry for nature conservation and environmental management in Myanmar, has prepared an action plan for Lake Inle, entitled '*Inle Lake Conservation 5-Year Action Plan (2015-2016 to 2019-2020)*'. The document identifies critical sites, proposed activities across various sectors, estimated costs and inputs, and monitoring and evaluation plans for future conservation and management of Lake Inle. This paper overviews a draft of the action plan, discusses its relevance to the issues on water and sediment with reference to the field data accumulated since 2004, and draws implications for future research.

Keywords: Baseline data, Sediment, Erosion, Water

The changes in the use and management of agroforestry-parkland in north-central Namibia

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1. Introduction

The characteristic vegetation, parkland landscape, was formed in some rural areas of arid lands in Africa and maintained through the use of trees and the social relationships related to such uses. Tall trees are sparsely distributed inside of crop fields, which is called "farmed parkland" or "agroforestry parkland". The land use of farmed parkland is combined with crop farming and tree uses, and it is classified as one category of agroforestry. Using land in multiple ways is expected to be a major part of solving the issue of land degradation in arid lands and empowering local people through their selling of non-timber forest products. These agroforestry parkland landscape have changed related with livelihood and social changes, land owning system and penetration of market economy in some areas. This presentation aims to clarify the mechanism of forming agroforestry parkland in the society of owambo agro-pastoralists in north-central Namibia, and examine the recent changes in the use and management of trees with land enclosure and social changes.

2. Methods

The data were obtained from fieldwork undertaken in U village in suburban area of north-central Namibia. To clarify how natural resource uses has changed, I interviewed homestead owners and their wives in 30 households of U village and surveyed the economic conditions of the households. The locations of homesteads, fields, trees, and fences were recorded using the hand-held receiver of a global positioning system (GPS). Besides, aerial photos which were taken in different years were compared to analyze vegetation change in the village.

3. Result and Discussion

(1) The vegetation around former kingdom include the U village was different compare with dominant vegetation type in this area, mainly consisting of indigenous fruit trees. Doum palms (*Hyphaene petersiana*) and marula trees (*Sclerocarya birrea*) were main species in the vegetation, and more than half of individuals grow inside of crop field. The main factors of formation of this vegetation were custom law about tree uses, conservative relation to trees by local people and ownership of trees by traditional authority.

(2) From the analysis of aerial photos, the number of trees have increased from 1970 to 1996. The result of vegetation survey, however, the ratio of young trees were low. The reasons were the mechanization of agriculture and removing of young trees from crop field by farmers because of increase the enough area of crop field.

(3) In recent years, the differences of the management ways of trees among households were remarkable. The role of traditional leaders in resource management include land and trees have changed especially around independence 1990, the tree use and management methods have also changed in each household. Then the households choose the different strategies of tree management such as increase the number of fruits trees or decrease them, then the vegetation of farmed-parkland have changed in heterogeneity.

Keywords: agroforestry, tree use, communal uses, land privatization, arid land

Farm forestry and small-diameter trees in Mt Meru areas, Tanzania

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As a means to reduce demand on natural forests and tree plantations and stave off vegetation destruction in tropical countries, timber production outside forests, especially farm forestry by smallholders, has been a focus of attention. Trees managed in farm forestry also serve as a saving bank and support rural livelihoods, and sawmilling and marketing activities by smallholders encourage replanting by value-adding to standing trees, vitalizing local economy with their timber as an input for manufacturing and other activities. The current state of rural sawmilling has therefore attracted both environmental and economic attention. In Tanzania, farmers build the so-called "gereji" (garage) which has a pit on the ground for sawmilling with a large saw manually operated by two workers on top and beneath of the log: this small-scale low-cost pit sawing has been common for many years. This method realizes smaller loss with the narrower kerf of the saw, but its labor productivity is low, and it is not suitable for sawmilling of small-diameter and/or crooked logs, thus with a low log recovery rate. In contrast, chain sawing has a broader kerf with low timber recovery rate, but it does not discriminate log shape, including those with small diameter, and realizes a higher log recovery and portability, thus replacing pit sawing. This presentation reports different types of rural small-scale sawmilling in Mount Meru areas, northern Tanzania, and examines the hypothesis that increasing timber demand and diminishing mature trees have left only small-diameter trees in farms, and that spread of chain sawing has enabled felling and utilization of these trees, shortened replanting cycle, and thus encouraged multiplication of small-diameter trees.

Keywords: Farm forestry, Livelihood, Tanzania

Natural resource use in soil-eroded area under semi-arid climate, central Kenya

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We aim at clarifying landform changes and people's natural resource use under physical environmental condition, driving such short/long term landform changes in the semi-arid pastoral area, Laikipia North sub-county. The investigated area, the Il Polei sub-location (N 0°21'56", E 37°04'32"), has an altitude of 1,750 to 1,850 m. According to previous literatures, a mean annual rainfall at the Mukogodo Station, close to the study area, is 362 and/or 371 mm; tree coverage is extremely low, which comprises sparse woods and shrub consisting mainly of Acacia genus. The area is underlain by Proterozoic gneiss, migmatite, quartzite, and schist, belonging to the Mozambique Belt, and geomorphologically, inselberg-pediment systems are regionally identifiable with widespread distribution of pediplain.

Below piedmont angle of the system, near the central settlement, 1.5- to 2-km long gullies exist on the pediment. On the upper part of the pediment, specific sections of gully are present, where the ratio of depth to topmost width of the gully is relatively high (maximum depth: 10 m, topmost width: 1.5 m), although the ratio is much lower than 1.0 in the many of remaining sections, which correspond to general tendency of gully morphology. It is inferred that active gully erosion continues to dominate especially in and around the high ratio sections, because in those sections several knick points are apparently observable on the gully floor and the channels and deposits indicating rill wash occurring are frequently discernible close to the gully head. Bedrocks on the pediment slope are overlain by about 5-m thick sheetwash deposits which intercalate several buried humic layers. The conventional radiocarbon ages of the humic soils in the lowermost part of the deposits are 1,440±20 BP (602-641 cal AD, IAAA-143886) and 1,690±20 BP (338-393 cal AD, IAAA-143887). In order to make clear the erosional rate of gullies, we started to conduct topographic measurements of gully wall; however, significant amounts of gully wall retreat during 6 months (March-September 2015) could not be observed.

It was reported that 2,850 people and 275 households inhabited the Il Polei sub-location in 2005, where most inhabitants were pastoral Maasai peoples, except a minority of Kikuyu who engaged in store management in the central settlement. On the basis of hearing survey, people recognized eroding landscape including gullies in the whole area as a threat to livestock's survival when heavy rain occurring. This is also considered to be due to heavy downpour happening in 2005, when human lives lost by intense flush from the gully. It is said that the entire area had no gullies when residents began to settle in the mid-1980s and that the gullies rapidly became more widespread in early 1990s and have extended since then.

Domestic water in the settlement is distributed with pipes from a borehole of 1.5 km east, and the cost of Kshs 10 per 20 liters is significantly higher. The water supply system was completed in 1994 and currently has relative vulnerability from the viewpoints of system trouble frequency, seasonality of pump discharge, and occurrence of drought. Recently sand harvesting for construction material gradually becomes active in the regional area including the sub-location, in order that people earn cash income more easily. Harvesting targets are mainly obtained by excavation of the river bed, gully floor, and sheetwash deposits. At present, it can be considered that sand harvest still does not promote gully erosion remarkably in the study area. In 2007, however, Kenyan government enforced "National Sand Harvesting Guidelines", since the harvesting became

environmental problem in the whole semi-arid and arid areas. Also in the study area, we need to pay further attention to whether sand harvest will be connected with land degradation in future, under the condition which securing water is severe environmentally and economically.

Keywords: semi-arid area, soil erosion, gully, sheetwash, sand harvest, Kenya

Distribution of ground water quality and its environmental risk assessment observed in Inner Mongolia

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Mongolian plateau is famous for nomadic life, however, in these days, their lifestyle has been changed. Focused on Inner Mongolia region, governments prevent them to move everywhere for seeking better grass or drinking water in this region. The land has been separated with the fence. Therefore people who living in this region only use the resources which is located in their own land. Beginning of this political measurement, people has been trying to dig the well and they use the grand water for drinking water.

In our research, we sampled the river water, and grand water were sampled more than 60 sampling point with the nomad. Major ion and heavy metal concentration were analyzed. Based on these data, we assessed the human health risk who drink these groundwater in this area.

Keywords: Heavy metal , Human health risk asesment, Groundwater pollution

Heavy metal pollution in river originated from the mine developing in Mongolia

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Increasing large-scale and rampant small-scale mining activity in Mongolia is raising fears about the possibility of regional environmental pollution. To characterize the level of surface water pollution related to large- and small-scale

, we analyzed about 50 river water samples collected from three areas: Boroo mining area, Zaamal area and Uyanga-gaas area. The samples were collected between 26 August and 7 September 2014. Measurements parameters included pH, EC, major ion and trace metal. Principal component analyses, Piper diagrams and enrichment were applied to a set of hydrochemical data. Water samples were analyzed to identify components that may adversely affect the regional environment and human health. Analytical measurements showed that the studies sites were highly affected by trace elements derived from anthropogenic activity. Especially, mercury concentration was very high in the village of NINJA, that is illegal gold mining.

Keywords: mercury, NINJA, illegal small-scale gold mining, major ion, heavy metal

Utilization of Water System of Hulun Lake Nature Reserve (in Inner Mongolia, China) and Relevant Protection Policies

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Lake and river are important components of prairie landscape. Historical changes of water systems and changes of use pattern have an enormous impact on the ecosystem and the life of aborigines. In particular, there are many protection policies for water systems in nature reserves, which have many limitations over residences in nature reserves. Hulun Lake National Nature Reserve is located in Hulunbeier City, Inner Mongolia, China. Hulun Lake water system inside the nature reserve belongs to Ergun River water system, including Khalkhyn River, Buir Lake, Urson River, Wulannuoer, Kherlen River, Dalaneluomuhe and other main tributaries, among which there are 3 rivers more than 100 km in length, 13 rivers within 20-100km and totally 64 rivers below 20km. There are totally 80 rivers and streams in the whole basin, with an overall length of 2374.9km and a total basin area of 3721400 hectare (domestic). Due to the continuous drought in Mongolian Plateau and Hulunbuir Pasture Land, Kerulen River and Urson River and other several main tributaries have got insufficient water recharge since 2000, which results in continual decline in water level of Hulun Lake and thus the ecological environment is facing a crisis. To fundamentally solve a series of problems in Hulun Lake, such as problems on ecological protection, comprehensive treatment and system establishment and the like, Integrated Management Organization of Hulun Lake Nature Reserve has devoted greater effort on ecological protection and comprehensive treatment around Hulun Lake. Focusing on the above problems, in this research, a field investigation was conducted to Hulun Lake National Nature Reserve from the beginning of January to the middle of February 2016, which has cleared up the utilization status of Hulun Lake water system and relevant protection policies.

Keywords: Nature Reserve, Water System, Protection , Policies