Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HGG21-01 Room:101A Time:May 27 14:15-14:30

Evaluating domestic timber distribution after the Great East Japan Earthquake: A case from Northeast Japan

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This study evaluates the damaging effect of the Great East Japan Earthquake in Northeast Japan, where the plywood industry is a key driver of domestic timber use, on domestic timber distribution. The study analyzes the changes before, during, and after the earthquake by interviewing major distributors and managers of forest owners' co-operatives and by examining statistical data.

Before the earthquake, domestic timber distribution was restructured because the plywood industry changed its product materials from foreign to domestic timber in the early 2000s. The industry maintained timber production and its groups by contracting national forest management and forming a group to supply domestic timber to plywood factories. Additionally, the volume of domestic timber supply to plywood factories increased because a woodlot, which is less prevalent in Northeast Japan, produces timber for lumber (class A) and timber for plywood (class B).

After the earthquake in Iwate Prefecture, two plywood factories were bankrupted by the tsunami disaster, and one plywood factory and some wood chip biomass power plants were established inland. Therefore, domestic timber distribution has changed in terms of increased volume of supply and the restructuring of supply management groups.

Akita Prefecture, where no physical damage was caused by the earthquake, has experienced expansion of class B timber production because of high spec machine installation. A large-scale lumber factory, which uses class A timber, contributes to class B timber production. Therefore, domestic timber supply in Akita Prefecture has increased since the earthquake.

Domestic timber distribution was suspended after the earthquake in Miyagi Prefecture because plywood, fiberboard, and paper mill factories were damaged by the tsunami and were temporally refused domestic timber supply. However, the volume of plywood products increased because of high demand from earthquake recovery reconstruction and the last-minute demand before the consumption tax hike. Therefore, timber companies could resume production with increasing volumes of domestic timber mainly supplied from Iwate Prefecture where some timber was lost in shipment factories. Overall, domestic timber distribution is more stable currently than domestic timber distribution before the earthquake.

The domestic timber distribution system in Northeast Japan has experienced various changes during the earthquake recovery. Some changes were directly triggered by the earthquake damage but most were caused by the increased demand for domestic timber from the plywood and the lumber industry. By restructuring domestic timber supply groups, and because of the rapid recovery of timber production, domestic timber distribution has remained stable before and after the earthquake. Therefore, this system is currently resilient. This case provides lessons to stakeholders in the establishment of stable domestic timber supply systems.

Keywords: the Great East Japan Earthquake, domestic timber distribution, plywood

Japan Geoscience Union Meeting 2015
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HGG21-02 Room:101A Time:May 27 14:30-14:45

Changes in farmland use and management of forestation land in Nishiaizu-town, Fukushima Prefecture

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Serious problems in rural areas are aging of farmers and expansion of abandoned cultivated land. So that, management of farmland and forestland by the children of the farmers who live outside the area is important.

Nishiaizu-town is characteristic by the decline of sericulture and low production efficiency of agriculture and the aging of farmers. Population of Nishiaizu-town has been flowing out to neighboring cities. In addition, the road accessibility is well due to the highway system. Therefore, the children of the farmers who live outside the area can easily come to support them to farm.

This presentation tries to explain the changes in farmland and management of farmland and forestland in Nishiaizu-town.

Keywords: Farmland use, Forestation land, Sons who help farm work, Nishiaizu-town

Japan Geoscience Union Meeting 2015
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HGG21-03 Room:101A Time:May 27 14:45-15:00

Factors of damages by wild animals from the perspective of the characteristics of villages in Iida city, Japan

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In recent years, it can be seen that the damages to agriculture, forestry injuries by invasion of wildlife to human dwellings (hereafter called animal damage) have become evident. In particular, studies on damage management, from the point of view of environmental improvement of village wild animal is less likely to appear, it has been emphasized that analysis of the Natural and Human environment at the micro scale related to appearance point of wild animals. However, the regional characteristics of factors where the wild animal's damage occured, have not been studied.

Therefore, the objective of this study is to clarify the factors of damage by wild animals analyzing the changes of the natural environment and the human activities from the perspective of the characteristic of settlements.

This study area is Iida city, Nagano prefecture. Iida city can be divided into three characteristic areas (Ryu-sai, Ryu-to and Toyama) and the trend of animal damage and issues of measures differ in these areas. Therefore, this study selected three case study districts, Kamisato, Chiyo, Kamimura, one from each area. And this study targets Japanese deer and Japanese black bear by the distribution of wild animals causing damages, the ecological features and the characteristics of damage.

Furthermore, major occurrence factors of animal damages can be summarized by the following two points: 1.Feed which deer and bears can take exists in a village all throughout the year and 2.Due to the aging population or depopulation, deserted cultivated land and abandoned houses have increased and farmlands are adjacent to forests and as a result, invasions pathways for wildlife exist in a village and its surrounding areas.

However, this study shows that the patterns of damage factors by wild animals are different by features of a village. A suburban village of an urban area like Kamisato district, the amount of farm produce is large by large scale agriculture. Therefore there are many farm products which wild animals can get as a feed from the village. Moreover, since it is close to an urban area, its altitude is relatively low and the forest area is small. In addition, a secondary forest is no longer functions as a buffer zone separating settlements and deep mountains. Since there is also no buffer zone between the habitats of wild animals and the life sphere of human beings damages by wild animals occurs. In the village such as Chiyo district, which is between suburban village and underpopulated village due to depopulation and an aging population, agriculture has declined and management of deserted cultivated land and measures against damage have been difficult. Therefore, the situation where wild animals can easily invade. Moreover, despite the decline of agriculture, there are still large amounts of farm products which wild animals can feed in a village, thus wild animals are attracted into the villages. As a result, damage is more. An underpopulated village such as Kamimura district is far from an urban area and is surrounded by forests. Moreover, depopulation and aging population are remarkable and the production of farm products is relatively low and the scales of agricultural damages are also low. However, due to depopulation and aging population, the counter force for wild animals in a village is weaker and fruit such as persimmons cultivated in gardens and fields for private use in a village are also get damaged. It can be pointed out that the underpopulated village used to be in the forefront of damage by wild animal, as depopulation preceded, its forefront shifted to other villages. Under the present situation where the power of the underpopulated village to counter damages by wild animals is weakening, it is significant for each village to take measures against damages by wild animals.

Keywords: Characteristics of villages, Factors of damages by wild animals, Iida city, Nagano prefecture, Japan, Japanese Deer, Japanese Black Bear, Wildlife Management

Japan Geoscience Union Meeting 2015
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HGG21-04 Room:101A Time:May 27 15:00-15:15

Improvement of spatial resolution for anthropogenic carbon dioxide emission inventory in Osaka Prefecture

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1. Introduction

To promote strategic reduction of carbon dioxide emission, MRV (Measurement, Reporting and Verification), which assess, disclose and validate the national emissions, is indispensable. Recently, nations predict the emission by the statistics of fossil fuel consumption, besides the complemental validation methods by satellite and atmospheric observations and inversion models are developed, where emission inventory methodology in the finer spatial and temporal resolution is required to bridge them. Hestia Project in Indiana Polis, US predicting the emissions from every streets and buildings, is the one achieved the finest resolution at present, and EAGrid2010-Japan having the resolution of 1 km is the finest in Japan. This study developed the carbon dioxide emission inventory, MORI-Grid2014 (Multiscale Osaka-Resolving Inventory for Greenhouse gas information and diagnosis), having the variable spatial resolution of 500 m and the finer in Osaka Prefecture, Japan.

2. Method

MORI-Grid2014 classified emission sources into point, line and distributed sources. The point sources consisted of thermal power plants, waste incineration plants and aircrafts (in airports), line source of road traffics (major regional roads and the higher), and distributed sources of road traffics (prefectural roads and the lower), the sectors of manufacturing, construction and mining, agriculture and forestry, business and residents. Annual emissions from the point and line sources was predicted by a bottom-up approach using generated power, the amount of waste by types, the landing and take-off number by aircraft types, the traffic amount by segments and car types, for the power plants, incineration plants, aircrafts and road traffics, respectively, and their unit emissions. Geographic positions of the point sources were determined by air photos on the Google Map, and those of the line sources by National Land Numerical Information. Annual emissions from the distributed sources was predicted by a bottom-up approach dividing the Prefecture total emissions by sectors proportionally to resident number (for road traffics and residents), labor numbers by sectors (for manufacturing, construction and mining, and agriculture and forestry), and total labor number (for business), where the total emissions by sectors were determined by multiplying the energy consumption by sectors and fuel types by carbon dioxide emission coefficients. The resident and labor numbers were based on the fine scale edition of the National Census, where the numbers in the 500 m grid were employed instead in the case the area of cells was the coarser than the 500 m grid. The statistic years of the data were not unified because the study utilized the most recent sources.

3. Result and discussion

The Prefecture total annual emission by MORI-Grid2014 was 73.75 Mt-CO_2 y^{-1}, which was 1.7% smaller than that of 74.99 Mt-CO_2 y^{-1} by EAGrid2010-Japan, and the difference is probably because in statistic years. Annual emission by sources was 39.79, 5.04 and 28.92 Mt-CO_2 y^{-1} from the point, line and distributed sources, respectively. Annual emission by sectors was 26.72, 12.49, 12.85, 0.58, 8.33, 0.05, 0.74, 8.18 and 3.81 Mt-CO_2 y^{-1} from the power plants, incineration plants, road traffics, aircrafts, manufacturing, agriculture and forestry, construction and mining, business, and residents, respectively. Spatial resolution was 0.044 km^2 in average and 0.265 km^2 at maximum showing a remarkable improvement from that of 1.059 km^2 in average by EAGrid2010-Japan.

MORI-Grid2014 improved the accuracy in positioning the point sources (power and incineration plants). Distance between the positions determined in this study and EAGrid2010-Japan, which utilized postal addresses, was 168 m in average. This difference in positioning caused the error of annual emission from the point sources by 22.68 Mt-CO_2 y^{-1} in total on the 1 km gridded map occupying 30.9% of the total emission.

Keywords: point source, line source, distributed source, bottom-up approach, top-down approach

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HGG21-05 Room:101A Time:May 27 15:15-15:30

Indications of changes to use the local resources in Inner Mongolia, China

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This study discuss about the change of the use of the local resources in dynamics of society economy seen in Inner Mongolia Autonomous Region after 2000's.It focus on the change of agriculture and the cattle breeding, transformation of the living environment,and consider the indication of the change to be seen in the use of local resources.

Keywords: human resources, regional/local resources, aging, depopulation, Inner Monmgolia, China

Japan Geoscience Union Meeting 2015
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HGG21-06 Room:101A Time:May 27 15:30-15:45

Problem of Grassland Use in Inner Mongolia, China

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Inner Mongolia Autonomous Region is located at more than 1,000 meter elevation and belongs to the arid and semi-arid regions when viewed from the natural conditions. Annual rainfall does not exceed 350 millimeter in many areas. The rainfalls decrease from the southeast to the northwest and also the width of precipitation is also wider. In addition, the amount of available groundwater is also limited and regional differences in holdings is also large. This leads to the livestock damage caused by regional drought and snow damage. Therefore, for stock farming in grassland area, it is the major issue to utilize native vegetations while retaining them for management and business.

However, grassland region of Inner Mongolia have made significant change during the half-century to the present day from the establishment of the People's Republic of China. For example, a decrease in available grassland by the deterioration of grassland ecological environment and a progress of desertification due to land farming in areas for disadvantaged farming conditions. Those are the symbols of the change during this period. For the pressure against population increase, more focusing on the food supply than the conservation of natural resources made this circumstance.

Moreover, people were tried to develop stock farming by settlement and specifying the area for grassland to segment in the Inner Mongolia grassland.

Therefore, for the sustainable usage of greenland, there is a issue between conservation of natural resources and increasing food supply. The purpose of this report is to study the current usage management and the problem to be solved for grass land considering the transition of grassland utilization system in Inner Mongolia stock firming.

Keywords: Stock Farming, Grassland Use, Grassland Areas, Inner Mongolia

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HGG21-07 Room:101A Time:May 27 15:45-16:00

Tourists and residents awareness for their traveling hulun lake nature reserve

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Travel for environment and sustainable development is a useful tool to help interpret the natural and cultural values of protected areas.In this research, Hulun Lake Nature Reserve, which is located in the Hulunbuir Grasslands has been selected as a study subject. The Hulun Lake Nature Reserve is China' national level of nature conservation area and is 740,000 hectares in area. The number of tourists has been increasing every year, and the number of visitors in 2012 in the Reserve totaled 562,000. In this study,the purpose has been to clarified evaluation item of the Travel at the Hulun Lake Nature Reserve, by studying the attitude of Tourists and residents.

Keywords: travel, environment and sustainable development, nature reserve, grasslands, nature conservation area, evaluation item

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HGG21-08 Room:101A Time:May 27 16:15-16:30

Physical geographic land condition of livestock areas in the semi-arid Laikipia Plateau, Central Kenya

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In this presentation, we discuss on the physical geographic environment and geomorphological land condition of semi-arid livestock areas in the Laikipia Plateau, Central Kenya. The investigated areas are situated in the eastern part of the Laikipia County, the former Laikipia District, and at an altitude of approximately 1,800 meters. Annual precipitation is 300 to 400 mm, and the areas are widely covered with poor vegetation. In the investigated areas, the Proterozoic gneiss and quartzite crop out and inselberg-pediment complex is regionally distributed. Particularly in the uppermost pediment, including settlement sites, relatively active gully/sheet erosion is geomorphologically discernible, where the depth of gully heads reaches 10 to 15 meters in many cases and relatively narrow gullies predominate. In addition, we plan to mention of existing state on the land use and local people's cognition of land environment in our presentation.

Keywords: semi-arid area, gully, land condition, Kenya

Japan Geoscience Union Meeting 2015
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HGG21-09 Room:101A Time:May 27 16:30-16:45

Policy and research focusing on fine sediment delivery to the Great Barrier Reef lagoon, northeastern Australia

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The Reef Water Quality Protection Plan 2013 (State of Queensland, 2013) stated that over the past 100 years, the land catchment areas adjacent to the Great Barrier Reef (GBR) World Heritage Area have undergone extensive development for agricultural production, urban expansion, transport infrastructure, tourism and mining, and this has led to elevated levels of pollutants leaving these catchments and entering the reef, with the largest contributor being agricultural land use activities. A multidisciplinary group of scientists reviewed the advances in scientific knowledge of water quality issues in the GBR and reported their views in the 2013 Scientific Consensus Statement (State of Queensland, 2013). The overarching consensus was that key GBR ecosystems were showing declining trends in condition due to continuing poor water quality, cumulative impacts of climate change and increasing intensity of extreme events. One of their conclusions highlighted nitrogen discharge, fine sediment discharge and pesticide discharge from the adjacent catchments as the greatest water quality risks to the GBR. Nitrogen is associated with crown-of-thorns starfish outbreaks; fine sediment reduces the light available to seagrass ecosystems and inshore coral reefs; and pesticides pose a risk to freshwater and some inshore and coastal habitats. Based on the 2013 Scientific Consensus Statement, the Reef Water Quality Protection Plan set water quality targets for 2018, which, in priority areas, aimed to reduce anthropogenic end-of-catchment loads of dissolved inorganic nitrogen, sediment (and particulate nutrients) and pesticides by 50%, 20% and 60%, respectively.

Rationally driven by these policy contexts, particularly in recent years, an increasing number of hydrological, geomorphological and sedimentological studies have investigated sediment movement in the GBR adjacent catchments and subsequent sediment delivery to the GBR lagoon. Frameworks of studies include identifying sediment sources and erosion processes, estimating sediment loads, characterizing sediment transport processes both in the catchments and lagoon, and constructing sediment budgets. A series of studies published by Christopher Fielding and colleagues in the late 1990s and early 2000s provide a notable mass of knowledge on sediment movement, sedimentary features and related landforms in the GBR adjacent catchments and near-shore lagoon (e.g. Fielding et al., 1996, *Terra Nova* 8, 447-457; Fielding et al., 2006, *Journal of Sedimentary Research* 76, 411-428). More recent studies, Kroon et al. (*Marine Pollution Bulletin* 65, 167-181, 2012) estimated a 5.5-fold increase in current total suspended solids since the European settlement in the late 18th century. Lewis et al. (*Earth and Planetary Science Letters* 393, 146-158, 2014) revealed that most fine sediment from the Burdekin River, the largest single source of sediment to the GBR lagoon, was retained within 50 km of the river mouth into the lagoon, rather than advected northwards via longshore drift processes. While the 'whole-of-catchment' approach is guided by the Reef Water Quality Protection Plan and recent catchment-scale studies have significantly accumulated knowledge of sediment movement and delivery in the GBR adjacent catchments, hydrogeomorphic studies at finer scales in major source areas that consider transport routes would further reveal important and key mechanisms of sediment movement and delivery processes.

Keywords: water quality, management policy, Great Barrier Reef, sediment movement, sediment delivery, hydrogeomorphology