

中央ケニア半乾燥土壌浸食地域の自然資源利用

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.

キーワード：半乾燥地、土壌浸食（土壌侵食）、ガリー、シートウォッシュ、採砂、ケニア

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

内モンゴルにおける地下水の水質分布とその環境リスク評価

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.

キーワード：重金属、ヒト健康リスク、地下水汚染

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

モンゴルの鉱山開発に由来する河川の金属汚染

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.

キーワード : mercury、NINJA、illegal small-scale gold mining、major ion、heavy metal

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

中国内モンゴル呼倫湖国家級自然保護区における水系現状と保護政策

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

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1. はじめに

湖、河川は草原景観を構成する重要な要素である。また、水系における歴史的変遷と利用形態の変化は生態系と地域住民の生業に影響を及ぼす。特に、自然保護区における水系の保護政策は地域住民への制限が多い。本研究では呼倫湖国家級自然保護区を対象地域として、水系現状と水系保護のための政策及び利用制限を把握することを目的とした。

2. 研究方法

本研究では、中国内モンゴルに位置する呼倫湖国家級自然保護区を対象地として、2016年1月から2016年2月中旬に文献調査と現地調査を実施した。

3. 結果と考察

1) 水系現状

自然保護区内の呼倫湖水系はエルグナ水系に属する。水系に呼倫湖、ボイル湖、ウラン湖とアルグン川、ケロロン河や烏爾遜河など80条の河川がある。呼倫湖国家級自然保護区内の水系総流域面積3,721,400ha、自然保護区の44%の面積を占める。2000年以来、蒙古高原及びフロンボイル草原の連続乾燥、ケロロン河や烏爾遜河等重要支流の補充量の不足により、呼倫湖水位は持続下降してきた。2003年に呼倫湖水位は歴史最高水位より2.12m下降し、歴史最低水位になった。2013年から、呼倫湖は回復始め、水位は10年以降の下降傾向を変えて1.36メートル上昇した。2013年6月の測量データをよると、呼倫湖水位は504.37メートルになり、水域面積は2006年の面積に回復して、1927平方キロに達し、鳥類、魚類の繁殖地は回復しはじめた。

2) 水系保護のための政策及び利用制限

2014年から呼倫湖管理部門より「呼倫湖2014年—2018年の部分休漁措置実施方案」を実施した。方案実施期間は、2014年4月11日から2018年2月31日 までである。期限内の例年禁漁範囲は呼倫湖国家級自然保護区核心区、烏爾遜河、ケロロン河（中国国内部分）、烏蘭湖など天然水域魚類産卵場と回遊川筋である。禁漁区以外の漁業水域の禁漁期間は毎年5月1日から7月31日までである。

また、呼倫湖水系を保護するために、2002年から生態移民プログラムを始めた。呼倫湖周辺からシンバルフ右旗の移民村へ280世帯が移住した。住民は元の放牧や漁業生活から定住生活することになった。

4. おわりに

本研究では呼倫湖国家級自然保護区を対象地域として、水系現状と水系保護のための政策及び利用制限、を把握した。これらの研究から呼倫湖国家級自然保護区の水系利用による保護地域の管理強化を図り、地域連携を促進する草原管理システムを構築するに役立つと考えられる。

キーワード：自然保護区、水系、保護、政策

Keywords: Nature Reserve, Water System, Protection, Policies