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The coping strategies of Hausa cultivators for the drought and land degradation in Sahelian Niger, West Africa

Hitomi Kirikoshi[1*]

[1]Graduate school of Asian and African area studies Kyoto university

The land degradation (desertification) 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. *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. Collecting of famine food and livestock fodder is women's work. In that time they use network of parents or siblings. This network supports their livelihood in rainy season or drought.

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