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学位論文内容の要旨

博士 (環境科学)

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学位論文題名

Savannah disturbances and human-wildlife coexistence inside and around East African protected areas

(東アフリカの自然保護地域内外におけるサバナの攪乱と人間・野生動物の共存)

The increased human population, ineffective management systems, and habitat disturbances have led to the isolation and shrinking of core protected areas (PAs) in African savannah landscapes, especially in East Africa. Habitat disturbances such as fragmentation have resulted in an increase in human-wildlife interfaces and consequently an increase in human-wildlife competition for space and resources. Where such competition affects people's livelihoods, wildlife is persecuted, and conservation is at risk. In this study, savannah disturbances, their implication on wildlife habitat utilization, and the potential of human-wildlife coexistence in the unprotected surroundings of the Ruaha–Rungwa landscape (Ruaha National Park, RNP; Rungwa–Kizigo–Muhesi Game Reserves, RKMGR; and unprotected surroundings) in Tanzania were investigated. Thereafter, the conceptual framework for human-wildlife coexistence was developed.

The results show that the savannah disturbances occurred significantly in the surroundings compared to within the PAs. The spatial-temporal pattern was more pronounced in the 10-km and 20-km zones closest to the RKMGR boundary, with 57% and 52% total disturbed area, respectively. The savannah disturbance severity in the RKMGR was significantly higher compared to that in the RNP due to the expansion of agricultural activities. The lower rate and severity of disturbance in the surrounding zones closer to the RNP may be due to the ongoing incorporation of parts of the surrounding areas into community-based conservation schemes, i.e., the Wildlife Management Areas (WMAs). The temporal distribution indicates a consistently increased savannah disturbance in the most recent decade (2010–2019), probably reflecting the continuous prevalence of anthropogenic activities due to an increase in the human population. Generally, savannah within the PAs fares better than in its surrounding landscape, and the minor disturbance severity was observed within the borders of the RKMGR and RNP, suggesting that habitat in the PA is effectively conserved.

Results from the analysis of habitat utilization revealed spatial distribution of the home range of elephants to extend within and outside the PAs ranging between 620 km² to 6249 km² comparable with most PAs in East Africa. The density core area of the elephant was higher inside the PAs especially in the RNP compared to the

RKMGR. However, a significant population of elephants uses the unprotected areas in the western RKMGR which overlaps with the area where human use. The observed increase in the human use of the surroundings and the overlapping elephant utilization are potential sources of human-elephant conflicts in the landscape.

Results from the literature review illustrated that, in East Africa, the unprotected areas adjacent to PAs are utilized by a significant wildlife population which translates to more interaction between humans and wildlife. However, there is little involvement of surrounding communities in PA management plans. This limited interaction has led to widespread human-wildlife conflicts due to competition for space, water, and food, with the most common cause of conflicts being crop raids from elephants. Human-wildlife coexistence approaches were still lacking, and the burden of conflicts was heavily accrued by the residents who use various methods to deter wildlife and was rarely addressed by the PAs managers. Finally, this study developed a framework that emphasizes the potential role of the surrounding communities in the conservation, through empowering the local communities to be in charge of the wildlife on their land, using the benefits to boost livelihoods, and reducing poverty through the formation of semi-protected areas where both wildlife and human thrive.

Looking into the future, the edges of the PAs are likely to be further fragmented by human activities. To ensure the sustainability of the habitat, wildlife conservation, and well-being of people, it is important to develop management plans that consider the involvement of surrounding communities as part of the ecosystem. This finding may help in the mapping of biodiversity conservation efforts linking biodiversity maintenance and local development, which would be particularly relevant in the sustainability of PAs in East Africa.