

早稲田大学審査学位論文

博士（人間科学）

概要書（英文）

Toward development of desirable REDD-plus  
implementation system: how sustainable forest  
management can be achieved by dealing with  
socio-economic diversity in local communities

望ましい REDD-plus 実施体系の構築に向けて：  
コミュニティの社会経済的多様性を踏まえた  
持続的森林管理の達成

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This thesis provides a practical implementation system for “reducing greenhouse gas emissions from deforestation and forest degradation with forest management (REDD-plus)” at the local level through analyses and discussions by utilizing an aspect of Capability Approach (CA).

### **Chapter 1. Introduction**

Under the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement came into force in November 2016. Its aim is to strengthen the global collaboration against the threat of climate change by setting common objectives. As a mitigation measure for climate change, the mechanism of REDD-plus has been proposed and discussed. Elements of REDD-plus have been accelerated in developing countries in the tropics, and appropriate preparation and implementation should be undertaken at the local level, focusing on the diversity of communities as well as mitigating negative social and environmental impacts. Based on these challenges, this thesis aims to provide a practical REDD-plus implementation system ensuring effective safeguards and sustainability for tropical forest conservation. To understand various socio-economic factors in local situations, an aspect of CA was utilized for analyzing the results of the studies.

### **Chapter 2. Study area and methodology**

Four studies were conducted in the area around the Gunung Palung National Park (GPNP) in West Kalimantan, Indonesia. In addition to development activities accelerated mainly by population growth and oil palm plantations, the complex socio-economic conditions in the area make it difficult to identify drivers of deforestation and forest degradation. Thus, there is a need for various measures and the potential for REDD-plus implementation. Survey questionnaires were distributed to 870 households throughout 11 villages. They were planned and conducted by getting an approval by the Ethics Review Committee on Research with Human Subjects of Waseda University (No. 2015-232). Multivariate analyses, mainly principal component analysis (PCA) and canonical discriminant analysis (CDA), were applied to data obtained from the survey. According to the objectives of the four studies presented in Chapters 3 to 6, other methodologies such as interviews, satellite imagery analyses, and forest plot surveys were integrated.

### **Chapter 3. Identification of agents and drivers of deforestation**

An appropriate way of identifying the agents and drivers of deforestation was studied through surveys in the sample village, which has several ethnic groups and livelihood activities. The results of CDA indicated that it was more appropriate to distinguish the agents based on uses or non-uses of the forest rather than on differences in ethnic groups. The PCA was utilized to extract the principal components that helped to integrate plural socio-economic variables through the scatter diagram. These results explained that various agents and drivers of deforestation could be identified by the multivariate analysis.

### **Chapter 4. Identification of the structure of diversity in communities**

Based on the findings in Chapter 3, a similar multivariate analysis was applied to six villages. In addition to the satellite imagery analysis for estimating the forest cover changes at the macro level, socio-economic surveys were also used to identify the factors for these changes. The results of CDA revealed that the community livelihoods and forest uses were

too diverse for distinguishing the agents by ethnic group or geographical location. Because disparities in income and assets among households in a village were recognized, it is essential to take measures at the household or group level rather than at the village level.

#### **Chapter 5. Influence of people's forest use in the forest ecosystem**

The influence of forest use on forest resources was compared by analyzing data from the socio-economic and forest inventory in the two villages. A relatively diverse tree species and biomass increase were confirmed in the village through traditional practices and usage of non-timber forest products. On the other hand, expansions of degraded forests and rubber plantations were observed in the other village for growing rubber for commercial purposes, exhibiting the importance of raising awareness for forest conservation and promoting alternative livelihoods.

#### **Chapter 6. The role of government in diversified socio-economic situations**

The changes in forest use practices were analyzed through a socio-economic survey in the eight villages that are active in forest use. The results of a multiple regression analysis helped identify that farm and rubber expansions are related to the lack of farmland and confusion regarding land tenure. In response to those changes, the importance of appropriate management activities such as building trust and addressing the safeguards for securing tenure and governance were convincing from the findings.

#### **Chapter 7. General discussions and conclusions**

Four practical measures of the REDD-plus operation were drawn out from the findings: 1) by considering the variety of peoples' livelihoods and capabilities, agents and drivers of deforestation can be appropriately identified for undertaking comprehensive technical and policy measures; 2) inherent safeguards can play an effective role in enabling communities to implement REDD-plus by securing rights and participation in decision-making; 3) more appropriate carbon and non-carbon benefits for communities can be provided by considering customary rights and respecting traditional knowledge; and 4) for ensuring the effect and sustainability of these measures, local governance development with multiple stakeholders will be critical. At the same time, outsiders should provide support, including building bridges among stakeholders.

Previous activities for tropical forest conservation implemented under the UNFCCC have caused concerns about excluding rural people without securing legal standing from forest areas. Such approaches could not achieve sustainability even though they enabled forest conservation in the short term. For this thesis, practical ways for securing the rights and participation of the community in the decision-making process to manage forest resources were studied. Through the analysis of socio-economic data by using an aspect of CA, this study shows that the enhancement of community well-being and capabilities has a significant impact on forest conservation. These practical findings from the study indicate that the approach of human science can contribute to developing solutions for global environmental issues, such as the protection of tropical forests to mitigate global warming.