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主　論　文　の　要　旨

論文題目	Effect of Community-Based Natural Resource Management on Conservation and Poverty Reduction: Evidence from Tonle Sap Lake, Cambodia （コミュニティによる自然資源管理の保全および貧困削減に及ぼす効果ーカンボジア・トンレサップ湖からの証しー）
氏　　名	VONG Rylida

論　文　内　容　の　要　旨

Chapter 1: Introduction

After failures of privatization and centralization, community-based natural resource management (CBNRM) has become a forefront in natural resource management. Theoretically, CBNRM aims to achieve both conservation and poverty reduction. However, CBNRM success in achieving both objectives remain doubtful among developing countries including Cambodia. Reasons for CBNRM's failures are different from case to case. In the case of the TSL area, Cambodia, its success remains so doubtful based on two reasons: 1) its large physical boundary and proneness to any development in Mekong River and 2) shortcomings of efforts and practice of the Royal Government of Cambodia (RGC) in granting property rights to local people and unwillingness to create alternative sources of income to reduce poverty of local people.

There has not been any research on the impact of CBNRM on fishery resource conservation and poverty reduction in the TSL area. Therefore, the research aims to: 1) examine if CBNRM has a positive impact on fishery resource conservation by using fishery resource conservation behavior of local people, 2) examine if CBNRM has a positive impact on poverty reduction by using per adult equivalent consumption, 3) identify root causes of success or failure of CBNRM to achieve fishery resource conservation and poverty reduction, and 4) identify determinants of trade-off perception between fishery resource conservation and poverty reduction.

Chapter 2: Literature Review

To evaluate impact of a program or project on conservation, there are two broad types of indicators: direct and indirect. The first type of indicators can be time consuming, high technology demanding, and expensive to conduct. To avoid such problems, the second type of indicators is used

to measure the impact of a program or project on conservation. Those indicators include attitude and behavior. Using attitude to evaluate the impact of a project or program on conservation may not be enough. Positive attitude toward conservation will not automatically lead to positive behavior toward conservation since there can be many factors come in between attitude and behavior. Therefore, behavior should be a better indicator to measure impact of a project or program on conservation.

Two types of measurements can be used to measure poverty of an individual or household: non-material and material. Since the scope of the research and one of CBNRM's objectives in the TSL area in Cambodia is to reduce poverty in terms of material, and there are some fluctuations in fishing income between rainy and dry seasons in the research area, consumption is a more appropriate indicator to measure the impact of CBNRM in the research area.

There are three distinct kinds of debates on the impact of CBNRM on conservation and poverty reduction: 1) its impact on conservation, 2) its impact on poverty reduction, and 3) its impact on both conservation and poverty reduction. The last debate is the most recent iteration in a more extensive debate since it appears to some scholars that to achieve both conservation and poverty reduction at the same time is only rhetoric. Some scholars have acknowledged importance of trade-off between conservation and poverty reduction.

Chapter 3: Methodology

Two communities were selected to fulfill the aforementioned objectives. One research community has been implementing CBNRM, regarded as a treatment in the research. It is called Chivieng community. The other is a community that has not been implementing CBNRM, regarded as a control for the research. It is called Preak Sromoach community.

Three tools were used to collect data: structured interview with local people, key informant interviews, and focus group discussions (FGDs). Convenient sampling was used to collect data for household structured interview. There were 471 households for the overall sample, consisting of 223 households in Chivieng community and 248 households in Preak Sromoach community.

Stata Version 12.1 was used to analyze data quantitatively. For the first and second research objectives, propensity score matching (PSM) was used to analyze data. For the third research objective, the research used directed content analysis. For the fourth research objective, the research used proportional odds (PO) model of ordinal logistic regression to analyze data.

Chapter 4: Institutional Management of Tonle Sap Lake (TSL), Cambodia

There are four levels of institutional management: 1) local, 2) national, 3) regional, and 4) global levels. Before and after the fishery policy reforms (the current situation, that is, CBNRM implementation). There have been some changes for the role of local people and NGOs, changing from advocacy of commercial fishing lot cancellation to involvement of local people in conservation and poverty reduction. In the national level, before the first fishery policy reform, Ministry of Agriculture Fisheries and Forestry had a main role in managing the TSL area. However, after the

second fishery policy reform, its power has been reduced and granted to Tonle Sap Basin Authority. In the regional level after the second fishery policy reform, Asian Development Bank's role has changed from providing technical assistance and fund to the TSL basin to pro-poor sustainable growth and equity in access to natural resources. The role of Mekong River Commission has not affected after the fishery policy reforms. There has been no change in roles global actors including UNESCO and United Nations Development Program before and after the fishery policy reforms in conserving TSL for global significance of biodiversity conservation.

Chapter 5: Impact of Community-Based Natural Resource Management (CBNRM) on Fishery Resource Conservation Behavior

PSM was used to analyze data with the sample size of 471. Fishery resource conservation behavior is the dependent variable, measured by: 1) state fishery law violation in terms of type of fishing equipment, 2) state fishery law violation in terms of quantity, size, and length of fishing equipment, 3) fishing in the conservation areas, 4) extraction of non-timber forest products (NTFPs) for home consumption or for sale, and 5) participation in conservation-related activities.

It was found that CBNRM had negative impact on fishery resource conservation behavior of households in Chivieng community. There are three reasons that may explain the negative impact of CBNRM: 1) more migrants are motivated to exploit fishery resources in the community due to creation of conservation areas, 2) weak enforceability of property rights to exclude outsiders to fish inside the community boundary and enforce bylaws and internal regulations, and 3) ineffectiveness of alternative source of income due to uneven and limited financial distribution.

Chapter 6: Impact of CBNRM on Household Consumption

PSM was used to analyze the same data set as in Chapter 5. The dependent variable is per adult equivalent consumption, calculating by dividing total consumption of household with adult equivalent. Total consumption includes food and nonfood consumption.

It was found that despite not positively affecting per adult equivalent household consumption in Chivieng community as a whole, CBNRM did for those who fished mainly inside the community boundary. Two reasons may well explain why CBNRM had a negative impact on per adult equivalent consumption in Chivieng community as a whole: 1) weak enforceability of property rights and 2) ineffectiveness of alternative source of income. Congruency with Chivieng community's conditions in terms of access to NTFPs and better knowledge in the right to access to NTFPs are reasons that may well explain why CBNRM had a positive impact on per adult equivalent consumption of households fishing only inside the community boundary.

Chapter 7: Root Causes of CBNRM's Failures

Directed content analysis was used to analyze the data derived from FGDs and key informant interviews related to which Ostrom's principles were practiced in the TSL area and root causes of CBNRM failure to achieve conservation and poverty reduction.

It was found that seven of eight principles of Ostrom were being practiced in Chieving

community, except "nested enterprises" principle. It was also found that root causes of CBNRM's failure in fishery resource conservation and poverty reduction are ineffective practices of the first principle (clearly defined boundaries), the second principle (appropriate rules), and absence of the eighth principle (nested enterprises) of Ostrom.

Chapter 8: Determinants of Local People's Trade-Off Perception between Fishery Resource Conservation and Poverty Reduction

PO model was used to examine determinants of perception of local people on trade-off between fishery resource conservation and poverty reduction in Chivieng community. The dependent variable is trade-off perception between fishery resource conservation and poverty reduction.

It was found that seven of eight principles of Ostrom (1990) were positive determinants of trade-off perception in CBNRM except nested enterprises principle. Among the seven principles that were found as positive determines, exclusion and monitoring were two principles that were significantly positive. The reason for "exclusion is a positive determinant" may be due to the fact that local fishermen and outsiders do not focus on the clearly defined boundaries. It is because they think that it is unpractical for them to fish only in a specific fishing ground since fish could move everywhere. Moreover, the likely reason for "monitoring is a positive determinant" is based on the fact that patrollers are local people and are active in patrolling.

Chapter 9: Conclusion

The research has four research objectives. For the first and second research objective, it was found that CBNRM had a negative impact on both fishery resource conservation and poverty reduction. There were two common reasons for the failure: 1) weak enforceability of property rights to exclude outsiders to fish inside the community boundary and enforce bylaws and internal regulations, and 2) ineffectiveness of alternative source of income due to uneven and limited financial distribution. For the third research objective, it was found that seven out of the eight Ostrom's principles, except "nested enterprises principle", were practiced. Root causes of CBNRM's failure were concerned with the first, second, and eighth principles of Ostrom. For the fourth research objective, it was found that three out of Ostrom's eight principles were significant determinants of trade-off perception between fishery resource conservation and poverty reduction. Those determinants include exclusion, monitoring, and nested enterprises. The latter was a negative determinant of trade-off perception, while the former were positive determinants. This research makes the following suggestions:

1) The RGC should strengthen enforceability of property rights in terms of excludability and bylaw and internal regulation enforcement so that they can feel more motivated conserve fishery resources and improve their livelihoods effectively.
2) More alternative sources of income should be created as a means to reduce poverty and act as an incentive for local people to conserve fishery resources.
3) Since the nested enterprises principle was not practiced, there should be more involvement

of local people in fishery resource management, leading to increase their ownership in fishery resources. There should also be more clearly defined duties and responsibilities of government officials from each government institution.