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SUMMARY OF DOCTORAL THESIS

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Title: A Comprehensive Study on Food Security among Rural Farming Households in Southern Laos
（ラオス南部における農家世帯のフード・セキュリティに関する包括的研究）

Food insecurity remains a major concern for developing countries, including Laos. The ratio of food insecurity in upland areas—where people rely on shifting cultivation and collecting wild foods— has increased from 26% in 2003 to 38% in 2008 due to poor roads, acidic soils and chronic food shortage. Food insecurity is a problem not only in upland areas but also lowland areas. Many rural lowland farmers are at risk to become food-insecure owing to the intensity of natural disasters (flooding), caused by climate change and uncertain weather. Addressing the issue of food security in both upland and lowland rural areas as well as flood-prone areas is therefore crucial.

The main objective of this study is to analyze household food security using different food security measurements focusing on different agro-ecology zones in rural areas of Laos. In order to achieve this objective, the study focuses on the following specific objectives: 1) to identify the most reliable alternative indicator of food security; 2) to investigate the coping strategies and factors affecting household food security in rural upland area; 3) to examine how livelihoods change and determine the factors influencing on household income in the post-resettled area; 4) To investigate the determinants of food security among rain-fed lowland rice farming households; 5) to examine the effect of traditional home gardens on household food security, measured by dietary diversity and 6) to assess the effect of floods on household food economy and food security in the flood-prone rice growing areas.

The study was mainly based on primary data carried out with 309 households from different agro-ecology zones in Sekong and Champasak Provinces, Southern Laos, from 2013 to 2015. This study used calorie intake (CI)—which is considered as the benchmark indicator—to measure household food security. In addition, three alternative indicators; food consumption score (FCS), food consumption expenditure (FE) and the U.S. food security/hunger survey module (U.S. FSSM) were used. Several analytical methods, such as sensitivity-specificity analysis, a logistic regression model, OLS regression and panel regression analysis, were applied based on specific objectives.

The results showed that the percentage of food-secure households measured by CI accounted for 38.5%, which was relatively low compared to U.S. FSSM (40.9%) and FCS (52.9%), while the FE indicator categorized 30.8% of households as food-secure. The sensitivity-specificity analysis revealed that FE was the most reliable indicator of

household food security (instead of CI) because its good match of classification was considerable high (80.7%) compared with U.S.FSSM (70.7%) and FCS (56.8%). Considering different agro-ecology zones, the findings showed that nearly 90% of households in the rural upland area experienced rice shortage. To overcome food shortage, many households coped with the situation by reducing the number of meals from 3 to 2 times a day and limiting the amount of food intake of adults in order to provide for children during months with food shortage (July to October). Educational level of household heads, livestock ownership and household size had significantly influenced food security in upland areas. With regard to livelihood in resettled area, the findings highlighted that farming activities changed from shifting cultivation to lowland rice cultivation after resettlement. The average household income increased from 650 USD in 2012 to 1,278 USD in 2014. At individual households, however, some households reported that their income decreased steadily when compared to the first year of the survey. Number of adult labor, occupation, areas of lowland rice field, and participation in logging activities were positively associated with household income

In rural lowland areas, more than 50% of households were food-insecure measured by CI. An empirical model analysis showed that dependency ratio, rice yield, number of relatives and friends, and rice-farming experience significantly correlated to food security. In addition, having a home garden can significantly improve food security and nutrition through food diversification. However, home gardening are practiced using traditional methods, many farmers used uncertified seed, less amount of fertilizer, inappropriate fencing to protect the crops from domestic animals. The study conducted in the flood-prone areas showed that flooding reduced household income by 24%, and the ratio of food insecurity increased from 8% in a normal year to 16% in a flood year. To deal with food insufficiency, 50% of farmers relied on food and financial support from friends and relatives, and nearly 30% reduced amount of food intake.

The findings of this study recommended that FE was the most suitable alternative indicator for measuring food security instead of CI. However, it is slightly complicated to use FE owing to the cost of data collection and the skills needed for estimating food spending. Thus, U.S. FSSM should be considered as an alternative indicator instead of CI and FE. Policymakers should be aware of the dimensions of each food security indicator, as well as the advantage and disadvantage of using them prior to the survey. It is important to note that different agro-ecology zones have different priorities to improve food security. In upland areas, promoting non-formal education, family planning programs and veterinary services would be helpful, while addressing the role of social networks, enhancing per-hectare yield and raising the awareness about the importance of NTFPs on food security is crucial in rain-fed lowland areas. For diversifying the diet of rural people, policy interventions should promote the cultivation of home garden by providing additional water sources and knowledge on home gardening practices. The findings derived in the flood-prone areas recommended the policymakers to seek long-term countermeasures, such as improving irrigation systems and establishing rice banks for emergency needs.