STUDY ON DETERMINANTS AND IMPACT OF OIL PALM EXPANSION ON FARMERS' LIVELIHOOD IN INDONESIA

アルアリツ, ウィヂィア

Name   : Widya Alwarritzi

Title   : STUDY ON DETERMINANTS AND IMPACT OF OIL PALM EXPANSION ON FARMERS' LIVELIHOOD IN INDONESIA

（インドネシアにおける油ヤシ経営規模拡大の決定要因と農家生活に及ぼす影響に関する研究）

Category：Kou

Thesis Summary

The increasing yields of the oil palm have led to a rapidly expanding world industry with South East Asia, particularly Indonesia as the most productive country for its plantation. The aim of oil palm development in Indonesia is to reduce poverty in rural area by attracting its community to actively participate in agricultural sec-tor as source of income. However, a significant challenge for the oil palm agricultural sector is the large productivity gap among the farmers that still exist. Despite of productivity gap, since rapid expansion of oil palm as one of government policy that play a significant roles rural income generator, the impact of oil palm expansion to farmers' livelihood is needed to be explored whether the expansion strategy improving its or not.

However, the study on evaluating impact of oil palm expansion on farmers' livelihood in Indonesia is very rare. As the first study on providing the impact analysis of oil palm expansion, it is expected to show the determinant and effect of oil palm land expansion particularly on productivity, agricultural adoption, poverty reduction and food security enhancement in Indonesia. Previous studies on livelihood analysis of oil palm cultivation mostly focus on comparing the oil palm grower with other crops. Hence, it may lead to undirected implication on how to enhance the future oil palm expansion program. It is important to understand whether the oil palm land expansion, which is one way of agricultural adoption on increasing farmers' income, have impacts on the welfare of households in the rural area. Based on the background, this study aim to 1) investigate the determinant that affect decision on expanding oil palm farmland based on performance analysis and to 2) evaluate the impact of oil palm expansion to the farmers' welfare.

Known as one of productive area for oil palm in Indonesia, Riau Province, which represent a total 271 of respondents from NES Trans and independent group, were purposively selected on this study in 2013 and 2015. We set up several models to analyze various factors to achieve the purpose of the research. To estimate the efficient frontiers of farming productivity, a stochastic frontier analysis, SFA was utilized in Chapter 3. On the other hand, Chapter 4 investigated probability of farmers' decision on expanding oil palm farmland using probit model. A propensity score matching approach (PSM) was applied in Chapter 5 to estimate the impact of expansion on farmer's income and poverty status. In order to understand the effect of land expansion and socio-economics background on household's food security status, OLS model and quantile regression were used in Chapter 6.

Based on the SFA analysis, technical efficiency indexes with average of 83 percent indicate that there was a scope for further increasing oil palm productivity by improving farmers' resources use efficiency and

technology. Variance parameter results confirmed the effect of inefficiency exists. The coefficient of fertilizer was positive and highly significant to oil palm productivity. Negative and significant of WPT (weighted of oil palm tree) coefficient suggested that ageing oil palm tree might reduce the output. The result was in line with the nature of oil palm tree, which its yield-peak periods were reported in between 9 – 19 years and decreased after 20 years of planting. Insignificant of labor coefficient arise from the effect of family labor that still actively involved on farming activity because oil palm was accounted as the main source of income. Analyzing the determinant factor affecting technical inefficiency indicated that the estimated coefficient of farmer group, education and diversification activity were negative to inefficiency. However, the variable of age of farmers and farm location were positive to inefficiency.

Furthermore, we examined factors underlying the probability of smallholder farmers expanding oil palm farm size over two decades. In order to analyze the reason behind farmers to expand their oil palm farmland, we divided the sample into two groups; expansion and non-expansion. The result pointed out that 73 per-cent of farmers in the study site expanded their oil palm farmland from 2 hectare to 4-16 hectare. It was found that the income, number of family member, land ownership status, farmer organization, extension program and soil type of oil palm farmland have positive impact on probability of farmers' decision on expanding oil palm farm size. Result of probit model estimated income earned from oil palm as the most important factor relates to farmers' decisions to expand oil palm farmland.

With the aim to estimate the causal effect of oil palm expansion on farmers' livelihoods in Indonesia PSM was employed. In the first step of the model, logit estimation results indicated that number of family members actively involved in oil palm cultivation, farmers' financial assets, contract farming, and distance to the market were significantly associated with likelihood for expanding farm size. The average treatment effect represented that farm size had a positive and significant effect, increasing oil palm income per year for the expansion and non-expansion group, it was found that their income would increase if they expand their land. The results also show that the effect of poverty reduction, as proven by the higher percentage of farm households with per capita expenditures significantly above the poverty line. These results implied that expanding oil palm farmland was the right decision for both groups. Hence, positive and significant impacts of crop income from oil palm and per capita expenditures, confirmed that oil palm expansion help reducing the problem of job opportunity and poverty in Indonesia.

OLS and quantile regression models were applied to find the socioeconomic factors that influence farmers' food expenditure and calorie intake, and to examine whether the effect of oil palm expansion on food security differs across quantiles. The OLS result revealed that the increasing percentage of farmers expanding farmlands, increasing income from oil palm, education, number of adult equivalent and food self sufficiency program might lead to improve household food security status. The quantile regression results indicated that the effect of expanded farmland had a negative impact on food budget across quintiles. This negative effect on food budget was because the expansion farm household spends much of their budget on non-food expenditure, particularly on the oil palm farmland, education, etc. while food self-sufficiency exists as farmers produce food products from their available gardens (such as vegetables, poultry product, and livestock). The calorie consumption effects were positive and consistent across quantiles. This represented that land expansion and income earn from the oil palm may increase the total calorie from food and total calorie from nutritious food.

As the conclusion, result of this study highlighted that oil palm cultivation in the study area was experienced with the inefficient farming practice that lead farmers to expand their farmland. Furthermore, oil

palm expansion was determined by economics motive, land ownership certification, financial assets, human capital, contract farming, and market access. The positive and significant impacts of oil palm expansion have been proven to generate income, per-capita expenditure and food security of farmers' household. Hence, it is important that government should provide accessible financial, land ownership scheme and market access, particularly for small-scale farmers to expand their oil palm farmland. In order to enhance the effect of oil palm expansion on farmers' welfare, government have to invest more on education, family planning program and food self sufficiency pro-gram for rural household.