

Extended Abstract

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Paper/Poster Title	Preferences for replanting subsidy programs among Indonesian oil palm smallholder farmers
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Abstract prepared for presentation at the 96th Annual Conference of the Agricultural Economics Society, K U Leuven, Belgium

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Abstract	200 words max
<p>Indonesia, the largest global oil palm producer, has 40% of its oil palm plantations managed by smallholder farmers. However, smallholders only account for 33.6% of the total production. One of the main reasons for this large gap in productivity is the decreasing productivity of old oil palms. Hence, replanting is required. Unlike big companies, smallholder farmers have limited capital and capabilities to conduct replanting. At the same time, replanting could be a momentum to improve the wellbeing of smallholders through increased income in the long term. Subsidy programs could help increase the current low rate of replanting for smallholders, therefore decreasing the risk of more deforestation. This study aims to determine smallholders' willingness to accept and preferences in replanting subsidy programs. A discrete choice experiment involving a sample of 250 oil palm smallholders was conducted in the five largest oil palm producing regencies in Jambi Province, Indonesia. The unique profiles of the smallholders based on their attitudes towards replanting and subsidy programs are identified with a latent class analysis. The willingness to accept subsidy programs is identified with a mixed logit model. The result of this study is expected to contribute to the future development of replanting subsidy programs.</p>	
Keywords	Oil palm smallholder farmers, willingness to accept, replanting, subsidy
JEL Code	Q120 Micro Analysis of Farm Firms, Farm Households, and Farm Input Markets
Introduction	100 – 250 words
<p>Oil palm is the most efficient vegetable oil crop. It produces a higher amount of oil yield per hectare than any other vegetable oil crop (Qaim et al., 2020). Although planted oil palm covers less than 5,5% of the total global crop area, it accounts for around 40% of the global annual demand for vegetable oil (Meijaard et al., 2020). However, the fact that oil palm is most effective when planted in tropical areas, threatens the existence of tropical rainforests. In Indonesia, smallholders manage 40% of oil palm plantation areas but only account for 33.6% of total production (Nurfatriani et al., 2019). There is a large gap in productivity between smallholders and companies. Most oil palm plantations in Indonesia have reached their peak age of productivity. To fulfill the demand without converting more forests, old plantations must be rejuvenated and made more productive. For smallholders, replanting oil palm plantations is a major decision with two huge challenges: the high costs required and the non-productive phase of young oil palms (Corley and Tinker, 2008). To support them, the Indonesian government has established a replanting subsidy program. However, it has not been effective. Only 7.8% of the funding was disbursed, and the yearly target of replanting was missed (Nurfatriani et al., 2019). So far, there is no information on oil palm smallholders' behavior</p>	

towards oil palm replanting in general and with respect to subsidy programs in particular. The study aims to enhance understanding of prospective replanting behavior of Indonesian oil palm smallholders.

Methodology

100 – 250 words

The data for this exploratory cross-sectional study was collected in the year 2021 involving 250 randomly-stratified selected oil palm smallholder farmers from the five largest oil palm producing regencies in Jambi Province, Indonesia. The interviews consisted of four sections and were conducted in person in one-on-one sessions. The first section consisted of basic personal data and control questions to make sure that the respondents are relevant. Section two consisted of Likert-scale questions on perceptions, knowledge, and attitudes towards replanting and subsidy programs. Section three is a discrete choice experiment (DCE), which was designed based on extensive literature review and expert opinions. The unlabeled DCE consisted of five attributes with two to four levels each. Here, the respondents were asked to think of a situation in a hypothetical scenario where their current oil palm plantation is 25 years old and the known cost for replanting is 35 million IDR. Respondents faced 12 choice sets, with three options (option A, option B, or opt-out) in each set. For the opt-out option, at the end of the experiment, the respondents were asked what was their reason for opting out (e.g. replant without subsidy, selling the plantation, giving the plantation to their children, etc). Finally, section four consisted of questions on financial literacy and socioeconomic information. Latent class analysis and mixed logit model will be used to elicit the willingness to accept the subsidy program.

Results (expected)

100 – 250 words

The data collection was recently completed in the middle of December 2021. We have five attributes in the DCE: the amount of subsidy, source of funding, replanting method, the number of other trees to be planted, and registration method. We expect that older farmers attach more importance to the registration and replanting method, they would prefer to register in groups rather than in individuals and to replant partially rather than all together. We expect that most farmers will attach higher importance to monoculture and not prefer to plant other trees, despite the amount of subsidy that will be given. We also expect that transmigrated farmers would attach more importance to the source of funding. They would prefer to be funded by the government to foreign support due to their level of trust out of the transmigration program. Preliminary results show that in terms of diversification during replanting, farmers are divided into three groups: farmers who incorporate other trees in oil palm plantation (34%), farmers who have proved that planting other trees is not possible because they tried and failed (39%), and farmers who perceive that it is not possible to incorporate other trees although they have not tried it themselves (27%). This will be analyzed further with latent class analysis. We expect that farmers have a higher willingness to accept a replanting subsidy program when the tree requirement is lower, the amount of subsidy is higher, and if they have other sources of income and have higher experience in oil palm cultivation.

Discussion and Conclusion

100 – 250 words

The motive of this study is to support the improvement of smallholders' participation rate in replanting subsidy programs. It is important that a subsidy program should be designed tailored to the unique profile characteristics of the smallholders to fit their capabilities, needs, and preferences. In addition, it is also of interest to investigate to what extent would the smallholders be willing to diversify their oil palm plantation. We therefore provide empirical insights through a DCE. From the study, we understand that replanting is an important decision for smallholders because many of them depend on oil palm as their main source of income. With good planning, design, and execution, not only can replanting increase smallholders' income in the long term, it can also increase the productivity of the land and therefore sustainability of the farm. Our preliminary results show that some smallholders succeed in diversifying their plantations, but some perceived that it is not possible although they have not tried it themselves. We understand that the knowledge of individuals' preferences is critical to understand the decision-making behavior towards replanting. Sociodemographic variables, risk preferences, and financial literacy can define unique profiles of smallholders and explain why they make decisions. Our results are expected to reveal to what extent these factors play role in smallholders' decision making in replanting. While we measure willingness to accept using a hypothetical DCE, we believe that the insights from this study could be an important contribution towards future designs of replanting subsidy programs.

References

- Corley, R.H.V., Tinker, P.B.H., 2008. *The Oil Palm*. John Wiley & Sons.
- Meijaard, E., Brooks, T.M., Carlson, K.M., Slade, E.M., Garcia-Ulloa, J., Gaveau, D.L.A., Lee, J.S.H., Santika, T., Juffe-Bignoli, D., Struebig, M.J., Wich, S.A., Ancrenaz, M., Koh, L.P., Zamira, N., Abrams, J.F., Prins, H.H.T., Sendashonga, C.N., Murdiyarso, D., Furumo, P.R., Macfarlane, N., Hoffmann, R., Persio, M., Descals, A., Szantoi, Z., Sheil, D., 2020. The environmental impacts of palm oil in context. *Nature plants* 6 (12), 1418–1426. 10.1038/s41477-020-00813-w.
- Nurfatriani, F., Ramawati, Sari, G.K., Komarudin, H., 2019. Optimization of Crude Palm Oil Fund to Support Smallholder Oil Palm Replanting in Reducing Deforestation in Indonesia. *Sustainability* 11 (18), 4914. 10.3390/su11184914.
- Qaim, M., Sibhatu, K.T., Siregar, H., Grass, I., 2020. Environmental, Economic, and Social Consequences of the Oil Palm Boom. *Annu. Rev. Resour. Econ.* 12 (1), 321–344. 10.1146/annurev-resource-110119-024922.