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# Influence of Farmers Characteristic and Managerial Capacities on Rice Farmers Welfare

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## Abstract

Kubu Raya is one of the largest rice-producing regency in West Kalimantan. However, unfortunately, the success of rice farmers in the area is not followed by an increase in the welfare of farmers because the strategy of increasing income is one of the indicators of welfare that is not used appropriately. This research aims to determine the influence of farmer's characteristics and managerial capacities on the rice farmer's welfare in Kubu Raya Regency. The research is in Kubu Raya Regency, considering that this location is one of the rice farming development regions in West Kalimantan. The data source contains primary and secondary data. The variables of research contain farmer's characteristics, managerial capacities, and farmer's welfare. The data analysis uses SEM (Structural Equation Model) analysis. The result of research indicates that the farmer's characteristics do not influence the farmer's welfare, while the managerial capacities influence the farmer's welfare. It means that farmers need to increase the cultivation technique ability, the management ability, the ability to improve the business, and the ability to adapt to increase their welfare.



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## INTRODUCTION

The agricultural sector is significant and becomes a mainstay in the economic development in most developing countries in the world (Awotide et al., 2016). The agriculture development program should focus not only on the increase in farming production and productivity but also on the increase in farmers' income and welfare. Most of the actors in the agricultural sector are farmers with small enterprise-scale, and they still have low levels of welfare. Resource ownership is closely related to the welfare of farmers (Mi et al., 2020; Moeis et al., 2020). For example, the narrow land area on rice fields generates an investment that can not result in sufficient surplus so that farmers' lives remain indigent. These conditions worsen the farmer's welfare (Syafruddin et al., 2018). The data of BPS noted that there had been a decrease in rice plant production during the period 2011-2015, which amounted to 12.8% (BPS, 2019). The decline in rice farming production certainly will give implications for the decline in income and farmers' welfare.

Aside from the land area, production and food security also positively influence the farmers' welfare (Kadiri & Eze, 2015). The land expansion and the increase in planting intensity through the increased availability of irrigation facilities and the agricultural production facilities can also improve the farmers' welfare (Darwanto, 2005). The farmers' welfare can also be increased by increasing farmers' selling prices and controlling production input prices. So that farmers can increase their purchasing power ability, that is, farmers' ability to meet their household consumption needs using their income. In other words, through improving their welfare, the farmers are expected to meet the food needs of agricultural households and reach a much better standard of living. The farmers' level of welfare also depends on their household income sourced from on-farm, off-farm, and non-farm activities (Danso-Abbeam et al., 2020). The contribution of the on-farm source is higher than the other sources.

Many previous studies which identify the determinants of farmers' welfare have been carried out using different variables. The main factor that is often discussed in earlier studies as a determinant of farmer welfare is the individual characteristics of farmers because the farmers' characteristics will distinguish the type of farmers' behavior in the specific situation. In the light of Kubu Raya Regency is coast region which has the potential of enormous agricultural resources. So, farmer character must utilize that potential with various constraints on resource availability and ownership, natural resources, human resources, and economic resources. However, when farmers' characteristics are related to small farmers, farmers' constrain appears: (i) low education. Of 100 farmers, 20% of farmers receive education, remains 80% of farmers do not receive an education. (ii) narrow land ownership, even farmers, do not have land (Naeem-ur-Rehman & Anwar, 2008) and (iii) Low access to capital, technology, and markets (Mi et al., 2020; Syafruddin et al., 2018). This situation will make low productivity, income, and farmers welfare. It indicates that the farmers' characteristics and the low level of farmers' capability will decrease food security and household welfare.

It is similar to the results of research (Susilo, 2011), stating the same thing that some factors influence the farmers' welfare as the farmers' characteristics those are the farmers' educational level having a positive influence on farmers' welfare (Awotide et al., 2016; Paltasingh & Goyari, 2018). Ages, farming experience, and family members also influence farming actors' welfare (Fruscalso et al., 2017; Igweoscar, 2014; Syafruddin et al., 2018). The individual characteristics and the application of technology directly influence the farmers' work productivity and the farming household welfare (Kuntashula & Mungatana, 2013).

Another factor that also plays an essential role in determining the welfare of farmers is the capacity of farmers. One of the abilities of farmers' managerial such as the role of farmers' ability to adopt the agricultural technology, can also influence the farming productivity and the farmers' level of welfare (Ehiakpor et al., 2019; Mariyono, 2019; Tambo & Wünscher, 2017; Yang et al., 2021).

Some researches related to the agricultural sector development also state that farming

performance and farmers' welfare can improve through some efforts covering: 1) capacity improvement in farmer organizations (Bachke, 2019), 2) capacity improvement in farmers' managerial (Mariyono, 2019), 3) capacity improvement and farmer access (Tijani et al., 2014; Utami et al., 2018), 4) improvement of ownership structure and land management (Issahaku & Abdulai, 2020), 5) adoption of sustainable agricultural practices (Oyetunde-Usman et al., 2021), and 6) institutional strengthening of agricultural mechanization (Rusastra & Suryadi, 2004). Previous studies looked at the effect of individual characteristics and farmer capacity on farmer welfare separately, while in this study, both factors simultaneously include seeing their effect on farmer welfare. This research is very beneficial for policymakers to formulate some strategies and policies in increasing the farmer's welfare. The research object is to determine the influence of farmers' characteristics and managerial capacities on the rice farmers' welfare in Kubu Raya Regency.

## RESEARCH METHODS

The research method is explanatory, descriptive research to describe, examine the relationship and influence among the variables, referring to the hypothesis formulated previously (Singarimbun, 2011). The main observation of the research is to determine the influence of farmers' characteristics, the use of production input, and farmers' capacities on the farmers' welfare in Kubu Raya Regency.

The data collecting method uses a questionnaire, interview, observation, test, documentation, and others (Sekaran, 2006). The data source includes the primary data taken from the results of observation and interview and the secondary data taken from literary studies and previous researches.

Determination of the sample is through two stages. The first stage is to determine the sample of regency and district, namely at Sungai Kakap District in Kubu Raya Regency. The location is selected based on the following reasons: 1) Kubu Raya Regency has positive growth amounted 5.73% in the agricultural sector, 2) Sungai Kakap District is a central region of rice farming development in Kubu Raya Regency, 3) this region has the highest level of productivity for rice farming at Sungai Kakap District that is 4,18 ton/ha 4) most significant production contribution of Sungai Kakap District, that is 39,07% to the total production of rice plants in Kubu Raya Regency (BPS, 2019).

Then the second stage is sampling respondents, namely all rice farmers in Sungai Kakap District. The sample measure suggested in the SEM analysis to find reliable results is 100-300 respondents. The sampling technique uses simple random sampling, and the samples of farmers are determined 100 rice farmers at Sungai Kakap District. The measuring scale uses the Likert scale to measure someone's or groups of people's attitudes, income, and perception of social phenomenon (Sugiyono, 2012).

Variables observed in this research are adopted from some previous studies (Cahyono & Adhiatma, 2016), cover: 1) farmers' welfare variable (Y1) including farmers' income (Y1.1), household consumption (Y1.2), and family health (Y1.3), 2) variables of farmers' characteristics (X1) covering ages (X1.1), education (X1.2), experience (X1.3) and the number of family members (X1.4), and 3) variables of farmers' capacities (X2) covering cultivation technique ability (X2.1), managerial ability (X2.2), ability to increase the business (X2.3), cooperation ability (X2.4) and ability to adapt (X2.5). The data processing and analysis use inferential statistics that are Structural Equation Models (SEM) with SMART-PLS, SEM analysis based on components with formative construct nature (Haryono, 2017). The following is the structural equation of the model.

$$Y = Pyx1\ X1 + Pyx2\ X2 + e \quad \text{.....(1)}$$

## RESULTS AND DISCUSSION

The SEM method used in this research uses the Smart PLS approach. In this approach, the analysis conduct in two steps: the outer and inner models.

The outer model analysis aims to ensure that each construct and indicator used to measure

is reliable and valid by seeing the results of indicator validity and construct reliability (convergent validity and discriminant validity). Convergent Validity conduct by three measures those are (i) standardized loading factor, (ii) Composite Reliability (CR), and (iii) Average Variance Extracted (AVE). The standardized loading factor describes the great correlation among each item of indicators with the constructs. The value of loading factor ≥ 0.5 is said to be valid (Vinzi et al., 2010). Based on PLS results for the first running, some indicators are not valid, as seen in Table 2. The invalid indicator is X2.4 (cooperation ability) because the value of the loading factor from the variable amounted to 0.485 is smaller than 0.5, so it should be taken out of the model. The results of the second running indicate that all the values of loading factor ≥ 0.5, which means that all indicators have a good correlation with their constructs.

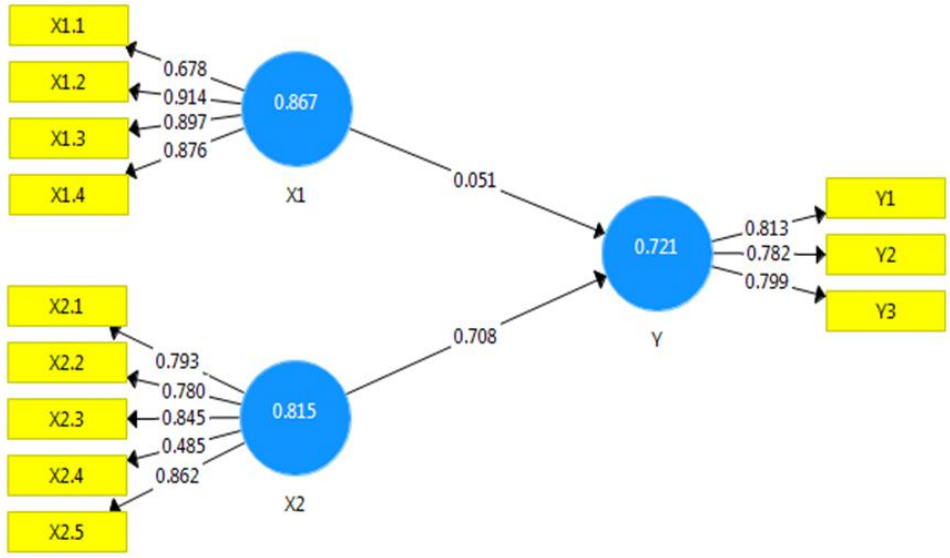


**Figure 1.** PLS Result for First Run

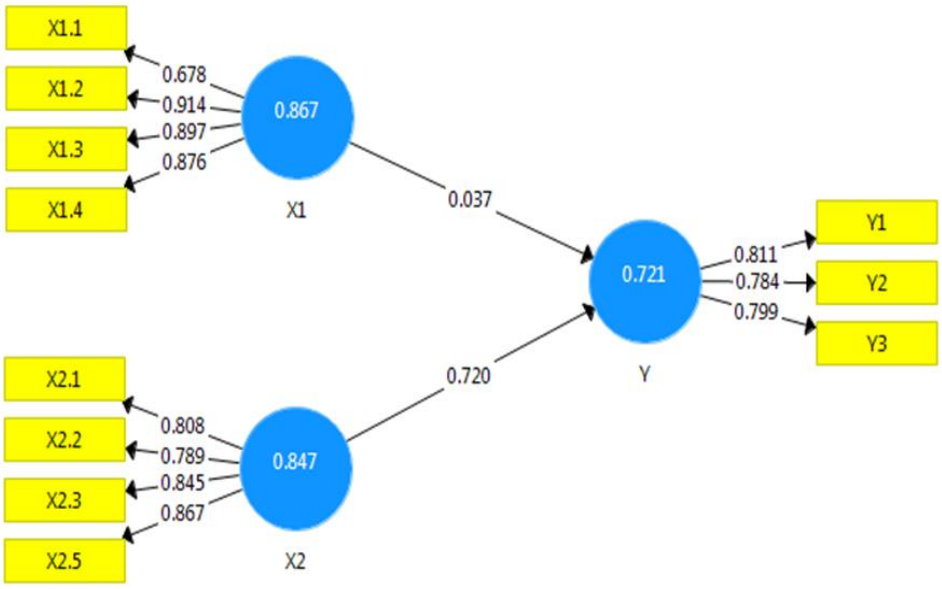


**Figure 2.** PLS Result for Second Run

**Table 1.** Result of Validity Test

| PLS First Run | | | | PLS Second Run | | | |
|---|---|---|---|---|---|---|---|
| Variable | Indicator | Loading Factor | Conclusion | Variable | Indicator | Loading Factor | Conclusion |
| X1 (Farmers' Characteristics) | X1.1 (ages) | 0.678 | Valid | X1 (Farmers' Characteristics) | X1.1 (ages) | 0.678 | Valid |
| | X1.2 (farmers' education) | 0.914 | Valid | | X1.2 (farmers' education) | 0.914 | Valid |
| | X1.3 (farming experience) | 0.897 | Valid | | X1.3 (farming experience) | 0.897 | Valid |
| | X1.4 (number of family members) | 0.876 | Valid | | X1.4 (number of family members) | 0.876 | Valid |
| X2 (Farmers' Capacity) | X2.1 (cultivation technique ability) | 0.793 | Valid | X2 (Farmers' Capacity) | X2.1 (cultivation technique ability) | 0.808 | Valid |
| | X2.2 (farmers' managerial ability) | 0.780 | Valid | | X2.2 (farmers' managerial ability) | 0.789 | Valid |
| | X2.3 (ability to improve business) | 0.845 | Valid | | X2.3 (ability to improve business) | 0.845 | Valid |
| | X2.4 (cooperation ability) | 0.485 | Not valid | | | | |
| | X2.5 (ability to adapt) | 0.862 | Valid | | X2.5 (ability to adapt) | 0.867 | Valid |
| Y (Farmers' Welfare) | Y1 (farmers' income) | 0.813 | Valid | Y (Farmers' Welfare) | Y1 (farmers' income) | 0.811 | Valid |
| | Y2 (household consumption) | 0.782 | Valid | | Y2 (household consumption) | 0.784 | Valid |
| | Y3 (family health) | 0.799 | Valid | | Y3 (family health) | 0.799 | Valid |

Source: Data Processed, 2019

The next step is to ensure that the Values of Composite Reliability (CR) and Average Variance Extract (AVE) meet the requirement if CR is above 0.7 and AVE is above 0.5 (Bagozzi and Yi, 1988). Table 2 indicates that the CR value of all constructs is satisfying, which means that the indicators are consistent in measuring their constructs. While the AVE value also indicates that convergent Validity is good, the variable of constructs can explain the average of more than half variants of the indicators.

**Table 2.** Construct Reliability Test based on Convergent Validity

| Construct | AVE | Composite Reliablity | Cronbach's Alpha |
|---|---|---|---|
| X1 (Farmers' Characteristics) | 0.717 | 0.909 | 0.867 |
| X2 (Farmers' Capacity) | 0.685 | 0.897 | 0.847 |
| Y (Farmers' Welfare) | 0.638 | 0.841 | 0.721 |

Source: Data Processed, 2019

The following construct reliability test evaluates the discriminant validity by seeing the cross-loading and comparing the root value of AVE with the correlation among the constructs. Based on Table 3, the value of cross-loading indicates that almost all indicators have a more significant correlation coefficient with each construct compared to the correlation coefficient value of the indicator in the constructing block of other columns. Thus, it can be concluded that each indicator in the block is the construct constituent in the column.

**Table 3.** Results of Cross Loading Discriminant Validity

| | X1 | X2 | Y |
|---|---|---|---|
| X1.1 (farmers' ages) | 0.678 | 0.428 | 0.336 |
| X1.2 (farmers' education) | 0.914 | 0.771 | 0.540 |
| X1.3 (farming experience) | 0.897 | 0.750 | 0.574 |
| X1.4 (number of family members) | 0.876 | 0.762 | 0.622 |
| X2.1 (cultivation technique ability) | 0.547 | 0.808 | 0.609 |
| X2.2 (farmers' managerial ability) | 0.728 | 0.789 | 0.555 |
| X2.3 (ability to improve business) | 0.725 | 0.845 | 0.655 |
| X2.5 (ability to adapt) | 0.725 | 0.867 | 0.660 |
| Y1 (farmers' income) | 0.570 | 0.703 | 0.811 |
| Y2 (household consumption) | 0.468 | 0.563 | 0.784 |
| Y3 (family health) | 0.448 | 0.498 | 0.799 |

Sources: Data Processed, 2019

The next checking is to prove the square root value of AVE of each construct variable higher than its correlation with other construct variables (Fornell & Larcker, 1981). Based on table 4 about the AVE root and correlation among constructs, it can be explained that the AVE root for construct XI (farmers' characteristics) is 0.847. The maximal correlation of XI with other constructs is 0.822, so the AVE root of construct XI is bigger than the other construct correlation values. This indicates that the other discriminant validity requirement is fulfilled. This is similar to the other constructs indicating that the AVE root is bigger than the construct correlation.

**Table 4.** AVE Root and Correlation among Constructs

| *Construct Variables* | *AVE Root* | *Correlation among Constructs* | | |
|---|---|---|---|---|
| | | X1 | X2 | Y |
| X1 (Farmers' Characteristics) | 0.847 | 1.000 | | |
| X2 (Farmers' Capacity) | 0.828 | 0.822 | 1.000 | |
| Y (Farmers' Welfare) | 0.799 | 0.629 | 0.751 | 1.000 |

Source: Data Processed, 2019

In inner model analysis, the first step is by observing the significance of correlation among the constructs. This can be seen from (i) R2 value, (ii) path coefficient, and (iii) t-statistic. While the R2 value for the "Farmers' Welfare" construct is 0.564. Chin (1998) categorizes the R2 value as the weak level, which means the farmers' welfare variable that can be explained by the variables of farmers' characteristics and managerial capacity is 56.4%, while the other factors outside the model explain the rest. The next is to have tested the path coefficient value and t-statistic from each existing construct correlation on the research model (Table 5).

Based on the table, it can be seen that the farmers' characteristics influence their welfare. This can be known from the path coefficient value of 0.037, the t-statistic value of 0.304 with the P value of 0.761 that are statistically proved insignificant to the significant level of 1%. It is different from the farmers' managerial capacity that positively influences and is significant to the welfare. This can be known from the path coefficient value of 0.720, the t-statistic value of 6.491 with the P value of 0.000 that statistically proved to be significant to the significant level of 1 percent.

**Table 5**. Path Coefficients

| | *Original Sample* | *Sample Mean* | *Standard Error* | *T Statistics* | *P Values DF = 147* | *Description* |
|---|---|---|---|---|---|---|
| X1 -> Y | 0.037 | 0.029 | 0.123 | 0.304 | 0.761 | Insignificant |
| X2 -> Y | 0.720 | 0.730 | 0.111 | 6.491 | 0.000* | Significant |

DF=N-K (150-3=147), N=number of K sample =number of variables (construct)
*Significant level on 1%

These research findings show that the farmers' characteristics do not influence their welfare. These findings are not in line with Maramba, (2018) research, stating that farmers' characteristics, namely ages, experience, and land, are the main factors determining the welfare. The finding research from Awotide, Karimov and Diagne (2016); Paltasingh and Goyari (2018) state that farmer education having a positive influence on farmers' welfare, and the finding research from Igweoscar (2014); Fruscalso Antillón and Hötzel (2017); Syafruddin et al. (2018) state that age, farming experience, and family members are influencing the farmers' welfare. Other research, namely Daulay and Sanny (2019); Nasution (2020); Suandi, Damayanti, and Yulismi (2012), also state that farmers' characteristics influence their welfare.

Based on the research findings, the farmers' characteristics covering ages, education, experience, and family members are not the construct constituent of the farmers' characteristics. This indicates that education, experience, ages, and family members are not the right indicators for the farmers' welfare. The nonconformity of the result of research with the actual one is possible because the research instruments only measure the internal characteristics and do not include the variables related to the external characteristics. Therefore, the farmers' characteristics are limited to certain parts so that their influence on the welfare is not significant. Besides, the different context of measure scale with the condition of research object (the difference of business scale) can also be the cause.

The other research findings show that farmers' capacity positively influences their welfare. In other words, the more increased the farmers' capacity is, the higher the farmers' welfare will be. The high increased farmers' capacity is required to make the farmers able to increase their productivity and income (Mariyono, 2019; Utami et al., 2018). These findings research are in line with Tambo and Wünscher (2017); Ehiakpor et al. (2019); Mariyono (2019); Yang et al. (2021) research, stating that farmers' capacity is having a positive influence on productivity and farmers' welfare.

From these research findings, we can infer that capacity is the main factor in reaching a business's success, especially in the agricultural sector. Farmers' capacity or ability is one pre-requirement for the farmers to participate in agricultural development. Farmers' capacity is regarding self-ability: First, cultivation technique ability from seeding, sowing, planting, weeding, fertilizing to handling plant pests. Second, farming managerial ability covering the planning aspect to farming evaluation. Third, improving the business includes providing the capital, reading the market opportunity, and increasing the added value through post-harvest processing. Fourth, cooperation ability in farming. Furthermore, fifth, the ability to adapt or select strategies to handle the risk of rice farming.

Based on the indicators from farmers' capacity, the ability to adapt (X2.5 = 0.867) has the most dominant role in building the farmers' capacity construct. The construct having the weakest role is farmers' managerial ability (X2.2 = 0.789). Thus, the better the ability is to adapt in handling the production facilities, cultivation, market, and capital, the better the farmers' capacity to increase their welfare will be. In other words, the farmers must have skills in risk management. Good risk management is helpful to anticipate potential problems and plan to

reduce their detrimental impact (Kahan, 2008; Thomas, 2018).

Extension workers can make farmers regenerate their skills of risk management. They can help farmers identify and understand their problems and contribute to making better farm management decisions so that the proper use of production facilities based on the level of farmers' knowledge will increase the level of farmers' welfare sustainably (Ardika & Budhiasa, 2017). Mariyono (2019) also strengthens this research in which farmers are lack access to the utility of natural resources, credit facility, technology adoption, and market. Such conditions will lower the farmers' productivity, income, and welfare.

If further examined from the welfare indicators, namely food consumption, income, and health of rice farming families in the study locations, they are still far from prosperous. This is indicated by (1) the high food consumption of farming families, which is around 84% of the total consumption; (2) as well as the average income of farmers is still far from the prevailing minimum wage, which is Rp. 1,511,000 per month (3) the health of the family of farmers is also not good, this can be seen from the existence of diseases that are complained of every year. Therefore, increasing the managerial capacity of farmers to improve technical cultivation, production, and markets will determine the improvement of the income of rice farmers. From the previous research, we can learn that farmers with high capacity can access information and share knowledge from various sources (Utaranakorn & Yasunobu, 2016). Farmers with a better understanding of crop diseases can choose appropriate solutions to control the disease and increase farm productivity (Islam et al., 2020). The research of Abdul-Razak and Kruse (2017) and Solano et al. (2006) also state that farmers' managerial capacity has a significant relationship with farming performance.

The findings of this study indicate that management capacity is essential and must be owned by rice farmers to improve their welfare. These findings are expected to assist in making the right decisions regarding the ability of their farm management. This research is beneficial not only for rice farmers but also for the government in taking attitudes and policies related to facilities and infrastructure, such as program support related to increasing the capacity of rice farmers

## CONCLUSION

The increase in farmers' welfare can be conducted by increasing the farmers' capacity to adapt in handling obstacles, challenges, and threats in the farming business. Therefore, as the main actors in running the farming, farmers should identify the farming potential, opportunity utility, handle the farming problems, and maintain the sustainable farming resource they have. The farmers' capacity of knowledge, attitude, and skill needs to be increased to overcome any issues quickly related to the production facility, cultivation, technology, market, and capital. The ability to adapt can improve the farmers' access to input, capital facility, and market.

Based on the result of discussion and conclusion, some recommendations of policy that the regional government can conduct to increase the farmers' capacity in their effort to increase their welfare are as follows: (1) holding guidance and training following the needs in farming; (2) facilitating various agribusiness activities such as adequate fund provision, supporting facilities, and innovation and information provision following the farmers' need; (3) increasing learning experience through nonformal education, increasing inter-communication intensity with more advanced farmers, and providing innovation need related to the understanding and ability of farming management following the problems faced. Those three things are the proper steps to increase the farmers' capacity to determine their farming object in the right way and reach the object at the right time.

## REFERENCES


Abdul-Razak, M., & Kruse, S. (2017). The adaptive capacity of smallholder farmers to climate change in the Northern Region of Ghana. *Climate Risk Management*, *17*, 104–122. https://doi.org/10.1016/j.crm.2017.06.001

Ardika, I. W., & Budhiasa, G. S. (2017). *[Analisis Tingkat Kesejahteraan Petani di Desa Bangli Kecamatan Baturiti Kabupaten Tabanan]. Jurnal Piramida, XIII(2), 87–96.*

Awotide, B. A., Karimov, A. A., & Diagne, A. (2016). Agricultural technology adoption, commercialization and smallholder rice farmers' welfare in rural Nigeria. *Agricultural and Food Economics*, *4*(3), 1–24. https://doi.org/10.1186/s40100-016-0047-8

Bachke, M. E. (2019). Do farmers' organizations enhance the welfare of smallholders? Findings from the Mozambican national agricultural survey. *Food Policy*, *89*(February 2018), 101792. https://doi.org/10.1016/j.foodpol.2019.101792

BPS. (2019). *[Kabupaten Kubu Raya Dalam Angka 2019]. In Badan Pusat Statistik Provinsi Kalimantan Barat.*

Cahyono, B., & Adhiatma, A. (2016). *[Peran Modal Sosial Dalam Peningkatan Kesejahteraan Masyarakat Petani Tembakau Di Kabupaten Wonosobo]. Conference In Business, Accounting, And Management (CBAM), 1(1), 131–144.*

Danso-Abbeam, G., Dagunga, G., & Ehiakpor, D. S. (2020). Rural non-farm income diversification: implications on smallholder farmers' welfare and agricultural technology adoption in Ghana. *Heliyon*, *6*(11), e05393. https://doi.org/10.1016/j.heliyon.2020.e05393

Darwanto, D. H. (2005). *[Ketahanan Pangan berbasis Produksi dan Kesejahteraan Petani]. Ilmu Pertanian, 12(2), 152–164.*

Daulay, M. T., & Sanny, A. (2019). Analysis of Structural Equation Modeling Towards Productivity and Welfare of Farmer's Household in Sub-District Selesai of Langkat Regency. *International Journal of Research and Review*, *6*(11), 117–123.

Ehiakpor, D. S., Danso-Abbeam, G., Dagunga, G., & Ayambila, S. N. (2019). Impact of Zai technology on farmers' welfare: Evidence from northern Ghana. *Technology in Society*, *59*(August), 101189. https://doi.org/10.1016/j.techsoc.2019.101189

Fruscalso, V., Antillón, G. O., & Hötzel, M. J. (2017). Smallholder family farmers' perceptions, attitudes and choices regarding husbandry practices that influence performance and welfare of lactating dairy calves. *Ciência Rural*, *47*(11), 1–7. https://doi.org/10.1590/0103-8478cr20170184

Haryono, S. (2017). *[Metode SEM untuk Penelitian Manajemen AMOS LISREL PLS]. PT. Luxima Metro Media.*

Igweoscar, O. (2014). Effect of Contract Farming on Productity and Welfare of Cassava-Based Farmers in South Eastern Nigeria. *European Journal of Business and Management*, *6*(7), 334–339.

Islam, A. H. M. S., Schreinemachers, P., & Kumar, S. (2020). Farmers' knowledge, perceptions and management of chili pepper anthracnose disease in Bangladesh. *Crop Protection*, *133*(March), 105139. https://doi.org/10.1016/j.cropro.2020.105139

Issahaku, G., & Abdulai, A. (2020). Household welfare implications of sustainable land management practices among smallholder farmers in Ghana. *Land Use Policy*, *94*(January), 104502. https://doi.org/10.1016/j.landusepol.2020.104502

Kadiri, F., & Eze, C. (2015). Effects of Paddy Rice Production on the Welfare of Farmers And The Determinants of the Achievements of Paddy Rice Farmers In Niger Delta Region Of Nigeria. *Journal of Economics and Sustainable Development*, *6*(4), 202–209.

Kahan, D. (2008). *Managing Risk in Farming*. Food and Agriculture Organization of The United Nations.

Kuntashula, E., & Mungatana, E. (2013). Estimating the causal effect of improved fallows on farmer welfare using robust identification strategies in Chongwe , Zambia. *Agroforestry Systems*, *87*, 1229–1246. https://doi.org/10.1007/s10457-013-9632-y

Maramba, U. (2018). *[Pengaruh Karakteristik Terhadap Pendapatan Petani Jagung di Kabupaten Sumba Timur (Studi Kasus: Desa Kiritana, Kecamatan Kambera, Kabupaten Sumba Timur)]. Jurnal Ekonomi Pertanian Dan Agribisnis, 2(2), 94–101.*

Mariyono, J. (2019). Stepping up from subsistence to commercial intensive farming to enhance welfare of farmer households in Indonesia. *Asia and the Pacific Policy Studies*, *6*(2), 246–265. https://doi.org/10.1002/app5.276

Mi, Q., Li, X., & Gao, J. (2020). How to improve the welfare of smallholders through agricultural production outsourcing: Evidence from cotton farmers in Xinjiang, Northwest China. *Journal of Cleaner Production*, *256*, 120636. https://doi.org/10.1016/j.jclepro.2020.120636

Moeis, F. R., Dartanto, T., Moeis, J. P., & Ikhsan, M. (2020). A longitudinal study of agriculture households in Indonesia: The effect of land and labor mobility on welfare and poverty dynamics. *World Development Perspectives*, *20*(October), 100261. https://doi.org/10.1016/j.wdp.2020.100261

Naeem-ur-Rehman, K., & Anwar, H. (2008). An analysis of socioeconomic profile of rural rice farmers in district Swat. *Sarhad Journal of Agriculture*, *24*(2), 377–390.

Nasution, D. P. (2020). Analysis of Factors Affecting Rice Farmer's Welfare in Sirampit District. *American Journal of Humanities and Social Sciences Research*, *4*(4), 168–172.

Oyetunde-Usman, Z., Olagunju, K. O., & Ogunpaimo, O. R. (2021). Determinants of adoption of multiple sustainable agricultural practices among smallholder farmers in Nigeria. *International Soil and Water Conservation Research*, *9*(2), 241–248.

https://doi.org/10.1016/j.iswcr.2020.10.007

Paltasingh, K. R., & Goyari, P. (2018). Impact of farmer education on farm productivity under varying technologies: case of paddy growers in India. *Agricultural and Food Economics*, *6*(1). https://doi.org/10.1186/s40100-018-0101-9

Rusastra, I. W., & Suryadi, M. (2004). *[Ekonomi tenaga kerja pertanian dan implikasinya dalam peningkatan produksi dan kesejahteraan buruh tani]. Jurnal Litbang Pertanian, 23(3), 91–99.*

Sekaran, U. (2006). *[Metodologi Penelitian Untuk Bisnis]. Penerbit Salemba Empat.*

Singarimbun, M. (2011). *[Metode Penelitian Survei]. LP3ES.*

Solano, C., León, H., Pérez, E., Tole, L., Fawcett, R. H., & Herrero, M. (2006). Using farmer decision-making profiles and managerial capacity as predictors of farm management and performance in Costa Rican dairy farms. *Agricultural Systems*, *88*(2–3), 395–428. https://doi.org/10.1016/j.agsy.2005.07.003

Suandi, Damayanti, Y., & Yulismi. (2012). *[Model Pengembangan Usaha Agribisnis Perdesaan Pada Usahatani Padi Sawah di Kecamatan Sekernan Kabupaten Muaro Jambi Provinsi Jambi]. Jurnal Penelitian Universitas Jambi, 14(2), 25–34.*

*Sugiyono. (2012). Metode Penelitian Kuantitatif Kualitatif dan R&D. Penerbit Alfabeta.*

Susilo. (2011). *[Faktor-Faktor Yang Berpengaruh Terhadap Produktivitas Pekerja Sektor Pertanian dan Industri Pengolahan]. Jurnal Kependudukan Indonesia, VI(2), 33–49.*

Syafruddin, Utama, I. M. S., Yasa, I. G. W. M., & Marhaeni, A. A. I. N. (2018). Effect of Socio-Economic and Demographic Factors against Social Capital, Farming Performance and Farmers Welfare in Sumbawa, Indonesia. *IOSR Journal of Economics and Finance*, *9*(1), 1–8. https://doi.org/10.9790/5933-0901040108

Tambo, J. A., & Wünscher, T. (2017). Farmer-led innovations and rural household welfare: Evidence from Ghana. *Journal of Rural Studies*, *55*, 263–274. https://doi.org/10.1016/j.jrurstud.2017.08.018

Thomas, G. (2018). *Risk Management in Agriculture* (Issue July 2018). The Scottish Parliament.

Tijani, M. N., Obayelu, A. E., Sobowale, A., & Olatunji, A. S. (2014). Welfare analysis of smallholder farmers by irrigation systems and factors affecting their production outputs in Nigeria. *Sustainability of Water Quality and Ecology*, *3–4*(2014), 90–100. https://doi.org/10.1016/j.swaqe.2014.12.002

Utami, Y. E., Maarif, M. S., Fahmi, I., & Suroso, A. I. (2018). Factors Affecting Productivity and Welfare among Indonesian Cacao Farmers. *Journal of Agriculture and Veterinary Science*, *11*(9), 62–70. https://doi.org/10.9790/2380-1109026270

Utaranakorn, P., & Yasunobu, K. (2016). The mutual influence of managerial ability and social networks of farmers on participation in an organic vegetable group in Khon Kaen province, Thailand. *Kasetsart Journal of Social Sciences*, *37*(3), 127–131. https://doi.org/10.1016/j.kjss.2016.08.001

Vinzi, V. E., Chin, W. W., Hanseler, J., & Wang, H. (2010). *Handbook of Partial Least Squares: Concepts, Methods and Applications.* Springer.

Yang, D., Zhang, H. wei, Liu, Z. min, & Zeng, Q. (2021). Do cooperatives participation and technology adoption improve farmers' welfare in China? A joint analysis accounting for selection bias. *Journal of Integrative Agriculture*, *20*(6), 1716–1726. https://doi.org/10.1016/S2095-3119(20)63325-1