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FACTORS INFLUENCING FARMER PARTICIPATION IN EXTENSIONS: CASE STUDY FROM MERANGIN DISTRICTS

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Abstract

Farmer participation is essential for the success of agricultural extension and agribusiness sustainability. However, Access to agricultural extension is still hampered by several factors. This research analyses farmer participation in agricultural extension and its determinant factors. The research was conducted in Merangin Regency, Jambi Province, Indonesia, from October to December 2022. The research sample was farmers who planted potatoes in the rainy and dry seasons, with 102 respondents using purposive sampling techniques. Data were analyzed using descriptive statistics and binary logistic regression analysis. The research findings indicate that farmer engagement in agricultural extension activities is influenced by two factors: membership in farmer groups and the distance between their homes and the farming region. Therefore, the needs of improvement on two factors must be consiered by policymakers through the create of cooperation and the enhancement of infrastructure quality in this region.

Keywords: Agricultural Extensions; Farmers, Logistic Regression, Socio-Demographic.

1. INTRODUCTION

The involvement of farmers is seen indispensable for the efficacy of agricultural extension and is a pivotal element in the long-term viability of agribusiness. As reform agents at the forefront of accelerating agribusiness development in Indonesia, agricultural extension workers are expected to have high competence and credibility (Wardani dan Kusnadi 2007; Dayat dan Anwarudin 2020). To support agricultural businesses, farmers need innovative information, which can be obtained from Field Agricultural Extension Officers through agricultural extension activities. The government has issued a policy to revitalize extension, and one of the strategies in this program is to empower farmers. Through Gapoktan, all the strengths farmers possess in their groups are combined to mobilize the group. Apart from that, there is another distinctive about this program, namely that the government intends to increase the status of farmers via their freedom and inventiveness since Gapoktan would have a defined legal position. As a result, it possesses greater leverage and is formally acknowledged as a corporate consortium (Ratna et al., 2012).

Empowering extension has been proven to be able to reduce poverty in rural areas, as has been implemented by several countries (Jennings et al. 2015). This empowerment places significant emphasis on the proactive involvement of farmers in all activities and programs (Liani et al., 2018; Warya and Anwarudin, 2018; Anwarudin and Dayat, 2019; Nazaruddin and Anwarudin, 2019; Putri et al., 2019). Deriving knowledge from this encounter promotes a paradigm of agricultural and rural development, placing more focus on the active involvement of farmers

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in the execution of agricultural extension. Farmer participation is the key to the success of the extension program. Hence, it is very important to control and maintain the program. It is hoped that the success of farmer participation in empowerment will remain motivated, consistent and maintained. (Dayat and Anwarudin 2020). Anwarudin and Dayat (2019) stated that farmer participation must at least fulfill the planning, implementation and evaluation stages. Farmer participation is the participation of individuals or groups of farmers with full awareness and responsibility in agricultural businesses (Koampa et al. 2015). This research aims to descriptively analyze farmers' participation in agricultural extension and the factors that influence this participation.

There are numerous previous studies about the factors influencing farmer participation in agricultural extensions. Elias et al. (2015) found that perceived economic return, regular extension contact, family size and off-farm income were driving factors for farmers' satisfaction. Dissatisfied farmers on agricultural extensions, on the other hand, cited restricted technological options, high input prices, an inconvenient loan system, and an ambiguous line between extension services and local politics as explanations. Muatha et al. (2017) revealed the determinant factor of farmer awareness on agricultural extensions are attendance to farmer field days, land tenure security, income and education. Gebremriam et al. (2021) found that Determinant factors of Farmers' Level of Interaction with Agricultural Extension Agencies in Northwest Ethiopia are importance of the personal and household attributes, farm/plot characteristics and socio-economic and institutional factors. Goshu et al. (2019) revealed the determinants of smallholder participation in agricultural extension are sex of household, education level of household, family size, age of household, experience in extension, farming experience, farmers' access to social network and DAs' frequency of visit. Based on these studies, there are potential to exploring the factors influencing on farmer participation in agricultural extension by using Indonesian farmers as a case study

2. METHOD

The choice of research location was deliberate, and it was precisely in the Merangin Regency. The research location was chosen based on the prospects for potato cultivation in Jambi Province. The investigation was carried out from October to December 2022. Samples were collected using a purposive non-probability sampling strategy because the availability of data regarding demographic characteristics was very minimal. This technique deliberately selected individuals as samples with the criteria of monoculture potato farming, which produced production in the last year during the research, both in the rainy season and the dry season. The number of respondents involved in this research was 102 people. The logit model is used to analyze the factors that influence the level of adoption/diffusion (Pindict and Rubenfield, 1997). The data collected includes variables that are thought to influence farmer participation in extension, namely farmer's age (years), formal education level (represented in years of schooling, for example, primary school completion = 6 years, junior high school = 9 years, high school = 12 years), distance from the respondent's house to the farming location (km), Dummy membership of farmer groups, Dummy income outside farming. The analysis method used is Logistic Regression Analysis. The logistic regression model is used to explain the

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relationship between response variables in the form of dichotomous/binary data and independent variables in the form of interval scales or categorical data, namely variables that only have two categories, namely the category that states an event was successful. (Y=1) and a category indicating failure events (Y=0). (Hosmer and Lemeshow, 1989). A goodness-of-fit test is needed to determine whether the statistical model is feasible, namely by using the Hosmer and Lemeshow tests. The Logistic Regression Model was used to test the effect of farmer participation in extension with explanatory variables by including the variable farmer participation in extension as a response variable, with 5 explanatory elements as independent variables. The response variable data (farmer participation in extension) is categorical, where Y = 1 for respondents who participate and Y = 0 for respondents who do not participate. The independent variable data in the model is in the form of nominal and ratio data, as follows: (1) AGE = farmer's age (years), (2) EDU = formal education (years), (3) DIST = measure of distance from home to farming location (km), (4) MEMB = dummy member of the farmer group. (D=1, yes and others D=0), (5) INC = non-agricultural income dummy (D=1, yes and others D=0). There is a regression logistic in this study as a follows:

$$Ln\frac{\pi_i}{(1-\pi_i)} = \alpha + \sum_{j=1}^{n}\beta_i X_{ji} + \sum_{k=1}^{m}\gamma_k D_{ki} + e$$

$$Ln\frac{\pi_i}{(1-\pi_i)} = \alpha + \beta_1 AGE + \beta_2 EDU + \beta_3 DIST + \gamma_4 MEMB + \gamma_5 INC$$

The Logistic Regression estimation in this discussion was completed using the Maximum Likelihood estimation method, using the Eviews Version 12 program. One of the most important requirements for high-quality results in Logistic Regression estimate is a representative and enough sample size of respondents. Prior to analysis, data validation is an essential step in obtaining the necessary validity and diversity (Hendayana, 2013)

3. RESULTS AND DISCUSSION

The decision to participate in the extension or not to participate in the extension shows various variations. This diversity is related to the characteristics of the respondent farmers, who are also diverse. The diversity of these characteristics can be measured through the diversity coefficient, which is obtained from the Standard Deviation value divided by the average of each element of the respondent's characteristics. The study of respondent characteristics (Table 1) reveals that the coefficient of diversity of explanatory factors in the model varies between 26.92% and 96.15%. The mean age of farmers in Merangin Regency is 39.37 years, suggesting that they are in their productive years. The productive age of individuals is regarded as a valuable asset for agricultural endeavors, since it directly impacts productivity and the capacity to adopt and utilize new technologies. Typically, farmers are in their prime working years, making them dependable in assimilating and applying information provided by extension workers. The mean duration of schooling for farmers is 12.29 years at the secondary school level. This circumstance will impact the acceptance of agricultural advances disseminated by extension agents through print and electronic media. The mean distance from residence to

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agricultural site is 11.60 kilometers, with approximately 78% of individuals being affiliated with farming organizations.

Table 1: Individual Variability and the Farming Environment of Farmers

Variable	N	Mean	Coef Var	Minimum	Median	Maximum
AGE	102	39.37	26.92	20	37	66
EDU	102	12.29	32.92	2	12	18
DIST	102	11.60	77.41	0.6	8.2	50
MEMB	102	0.78	52.56	0.00	1	1
INC	102	0.52	96.15	0.00	1	1

Source: Field Survey (2022)

The multicollinearity test utilizes whether the regression model finds a correlation between independent variables. A good regression model should not correlate with independent variables. If independent variables are correlated, then these variables are not orthogonal. Orthogonal variables are independent variables whose correlation value between independent variables equals zero (Ghozali, 2011). Based on calculating the matrix correlation test values for each predictor variable, there is no correlation above 0.7. It means that each predictor variable does not have multicollinearity between the predictor variables or is not correlated with each other. The model must meet Goodness of Fit (GoF), which shows the suitability between the data entered in the model and the observed data. The feasibility of the model can be tested using the Hosmer-Lemeshow method. From the analysis results, the Hosmer-Lemeshow (H-L) probability value is 8.4708, higher than 0.05. Therefore, the model can predict observation values well and is acceptable because it matches the observation data.

The coefficient of determination in the logistic regression model, expressed as McFadden R-Squared, shows the extent to which variations in the dependent variable (profit smoothing) can be explained by independent variables (age, education level, distance from home to farming location, group membership, and planting outside the farm). The McFadden R-squared test results in Table 2 show a value of 0.15. It indicates that 15% of the variability in income smoothing can be explained by the variables in the model (age, education level, distance, group membership, and non-business investment). Meanwhile, around 85% of the remainder is explained by other factors outside the research model. For logistic regression models, no single equivalent summary measure of pedictive power seem to have achieved the same level of acceptance (Zheng & Agresti, 2000).

Table 2: Outcomes of Logistic Regression's Variable Estimation

Prediktor	Coefficient	Std. Error	z-Statistic	Prob
Constant	-3.084	1.73	-0.786	0.074
AGE	0.022	0.028	0.798	0.424
EDU	0.051	0.072	1.128	0.259
DIST	0.063	0.035	1.770	0.077
MEMB	1.893	0.589	3.214	0.001
INC	-0.190	0.502	-0.379	0.704
McFadden R-Squared	0.15			

Source: Field Survey (2022)

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Based on the analysis results in Table 2, the factors that influence farmer participation in extension activities are farmer group membership (MEMB) and distance from home to farming location (DIST). Several factors do not influence participation, namely age (AGE), education level (EDU), and non-farming income (INC). Thus, the equation can be stated as follows:

$$Y = -3.084 + 0.022X_1 + 0.081X_2 + 0.063X_3 + 1.89X_4 - 0.19X_5$$

This research shows that the distance from home to the farming location significantly influences participation in extension activities at the 10% level. The distance coefficient value of 1.893 means that the farther the distance from home to the business location, the higher the farmer's participation in extension. Farmers' active participation in extension can increase efficiency and cost utilization. After all, the extension focuses more on farmers' needs and pays attention to local diversity and their resources. It shows that farmers who are far away depend more on extension assistance to support their farming. The research results are in line with (Koampa et al., 2015); (Muniarty et al., 2021); (Wardani & Kusnadi, 2007);(Pratiwi & Suzuki, 2020); (Suvedi et al., 2017)

Farmer group membership (MEMB) has a positive effect at a significance level of 5% on farmer participation in extension activities. Farmers who are members of farmer groups will increase their participation in extension activities. Farmer group membership influences farmers' social involvement, increasing participation in social activities and exchange of information related to farming. This membership can also increase the accessibility of information related to extension programs, helping farmers obtain relevant and valuable information about the latest agricultural practices and increasing participation in extension programs. Farmer group membership also influences farmer collaboration and extension activities because group members are more involved through collaboration and support from fellow members. This research is in line with (Yuniarsih et al., 2021); (Putri et al., 2019); (Danso-Abbeam et al., 2018); (Ma et al., 2023);(Amrullah et al., 2023)

From partial statistical tests, two explanatory variables are significant for farmer participation in extension. These variables are (1) Farmer group membership (MEMB) and (2) distance from home to farming location (DIST). Meanwhile, other explanatory variables, such as age (AGE), education level (EDU), and non-farming income (INC), do not have a significant influence on farmers' decisions to participate in potato farming extension. The variable farmer group membership (MEMB) has a very significant effect at the 95% confidence level. The Z coefficient shows 3.21 with a p-value of 0.001. It means that farmer group membership really influences farmer participation in extension. With a positive sign, it means that farmers who are members of farmer groups will participate more in extension than farmers who are not members of farmer groups.

The relationship between farmer participation in extension and the distance from home to the farming location (DIST) is with a coefficient Z = 1.77 and a p-value of 0.077. The closer the distance from the house to the farming location, the better the farmer's participation in extension. Increasing efficiency and cost utilization and paying attention to local diversity and existing resources. The research results are in line with (Biswas et al., 2021); (Daniso, 2022).

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The relationship between farmer participation in extension and farmer group membership is with a coefficient Z = 3.214 and a p-value of 0.001. Farmers who are members of farmer groups will participate more in extension. By increasing participation in extension, social activities and exchange of information related to farming, increasing the accessibility of information related to extension programs helps farmers obtain relevant and helpful information about the latest agricultural practices, increasing participation in extension programs. This research is in line with (Etwire et al., 2013); (Somanje et al., 2021)

CONCLUSION

This study aims to look at the determinants of agricultural extension. This research shows that the factors influencing farmer participation in extension are the distance from home to the farming location and farmer group membership. The implications of extension policy require optimizing farmer group membership and extension locations to be more easily accessible to farmers. Policy adjustments are needed to be responsive to the needs and potential of young people in developing the agricultural sector, including support for incentives and facilities for internship and field practice programs and the development of special motivation programs for young people. By considering managerial implications, it is crucial for agricultural extension policies to proactively improve and adapt strategies to be more responsive to the needs and potential of young people in developing the agricultural sector. Young people have a strategic role in bringing change and innovation, especially with the development of technology and new challenges facing the agricultural sector. Integrating ideas and creative energy in agricultural development.

References

1) Amrullah, E. R., Takeshita, H., & Tokuda, H. (2023). Impact of access to agricultural extension on the adoption of technology and farm income of smallholder farmers in Banten, Indonesia. *Journal of Agribusiness in Developing and Emerging Economies*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/JADEE-06-2023-0143

2) Anwarudin O, Dayat D. 2019. The effect of farmer participation in agricultural extension on agribusiness sustainability in Bogor, Indonesia. Int. J. Multicult. Multireligious Underst. 6(3):1061.doi:10.18415/ijmmu.v6i3.1028.

3) Biswas, B., Mallick, B., Roy, A., & Sultana, Z. (2021). Impact of agriculture extension services on technical efficiency of rural paddy farmers in southwest Bangladesh. *Environmental Challenges*, *5*(April), 100261. https://doi.org/10.1016/j.envc.2021.100261

4) Daniso, B. (2022). Factors affecting farmers' decision to participate in various agricultural related information sources in Ethiopia. *Cogent Food and Agriculture*, *8*(1). https://doi.org/10.1080/23311932.2022.2133347

5) Danso-Abbeam, G., Ehiakpor, D. S., & Aidoo, R. (2018). Agricultural extension and its effects on farm productivity and income: Insight from Northern Ghana. *Agriculture and Food Security*, *7*(1), 1–10. https://doi.org/10.1186/s40066-018-0225-x

6) Dayat D, Anwarudin O. 2020. Faktor-faktor penentu partisipasi petani dalam penyuluhan pertanian era otonomi daerah di Kabupaten Bogor. J. Agribisnis Terpadu. 13(2):167–186.doi:10.33512/jat.v13i2.9865.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.11547188

7) Elias, A., Nohmi, M., Yasunobu, K., & Ishida, A. (2016). Farmers' satisfaction with agricultural extension service and its influencing factors: a case study in North West Ethiopia. *Journal of Agricultural Science and Technology*, *18*(1), 39-53.

8) Etwire, P. M., Dogbe, W., Wiredu, A. N., Martey, E., Etwire, E., Owusu, R. K., & Wahaga1, E. (2013). Factors influencing farmer's participation in agricultural Pprojects: The case of the agricultural value chain mentorship project in the Northern Region of Ghana. *Journal of Economics and Sustainable Development*, *4*(10), 36–43.

9) Gebremariam, Y. A., Dessein, J., Wondimagegnhu, B. A., Breusers, M., Lenaerts, L., Adgo, E., ... & Nyssen, J. (2021). Determinants of farmers' level of interaction with agricultural extension agencies in northwest Ethiopia. *Sustainability*, *13*(6), 3447.

10) Goshu, F. B. (2019). Evaluation of the determinants of smallholder famers' participation in agricultural extension in Western Ethiopia. *International Journal of Agricultural Economics, 42*(2)L 48-54.

11) Hendayana R. 2013. Penerapan metode regresi logistik dalam menganalisis adopsi teknologi pertanian. Inform. Pertan. 22(1):1–9

12) Jennings KS, Cheung JH, Britt TW, Goguen KN, Jeffirs SM, Peasley AL, Lee AC. 2015. How are perceived stigma, self-stigma, and self-reliance related to treatment-seeking? A Three-Path Model. Psychiatr. Rehabil. J. 38(2):109–116.doi:10.1037/prj0000138.

13) Koampa MV, L.S BO, Marha M Sendow VRBM. 2015. Partisipasi kelompok tani dalam kegiatan penyuluhan pertanian di Desa Kanonang Lima, Kecamatan Kawangkoan Barat. ASE. 11(November):19–32.

14) Liani F, Sulistyowati D, Anwarudin O. 2018. Perspektif gender dalam partisipasi petani pada program kawasan rumah pangan Llestari (KRPL) tanaman sayuran di Kecamatan Kersamanah Kabupaten Garut Provinsi Jawa Barat. J. Penyul. Pertan. 13(1):21–32.

15) Ma, W., Abdul-Rahaman, A., & Issahaku, G. (2023). Welfare implications of participating in agri-value chains among vegetable farmers in Northern Ghana. *Agribusiness*, *39*(3), 793–811. https://doi.org/10.1002/agr.21792

16) Muatha, I. T., Otieno, D. J., & Nyikal, R. A. (2017). Determinants of smallholder farmers awareness of agricultural extension devolution in Kenya. *African Journal of Agricultural Research*, *12*(51), 3549-3555.

17) Muniarty P, Wulandari W, Pratiwi A, Kusumayadi F, Haryanti I. 2021. Penguatan partisipasi petani melalui penyuluhan pertanian di Kecamatan Rasanae Timur Kota Bima. Glob. ABDIMAS J. Pengabdi. Masy. 1(1):24–29.doi:10.51577/globalabdimas.v1i1.77.

18) Nazaruddin N, Anwarudin O. 2019. Pengaruh penguatan kelompok tani terhadap partisipasi dan motivasi pemuda tani pada usaha pertanian di Leuwiliang, Bogor. J. Agribisnis Terpadu. 12(1):1.doi:10.33512/jat.v12i1.5530.

19) Pratiwi, A., & Suzuki, A. (2020). Does training location matter? Evidence from a randomized field experiment in Rural Indonesia. *Agricultural and Food Economics*, *8*(1). https://doi.org/10.1186/s40100-019-0146-4

20) Putri CA, Anwarudin O, Sulistyowati D. 2019. Partisipasi petani dalam kegiatan penyuluhan dan adopsi pemupukan padi sawah di Kecamatan Kersamanah Kabupaten Garut. J. Agribisnis Terpadu. 12(1):103.doi:10.33512/jat.v12i1.5538.

21) Pyndick, R.S. and D.D. Rubinfield. 1981. Econometric Model and Econometric Forecast. International Student Editions.Tokyo: Mc Graw Hill

22) Ratna DP, Wuradji, ER ND. 2012. Pemberdayaan petani melalui gabungan kelompok tani (GAPOKTAN. Diklus. 9(2):144–152.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.11547188

23) Somanje, A. N., Mohan, G., & Saito, O. (2021). Evaluating farmers' perception toward the effectiveness of agricultural extension services in Ghana and Zambia. *Agriculture and Food Security*, *10*(1), 1–16. https://doi.org/10.1186/s40066-021-00325-6

24) Suvedi, M., Ghimire, R., & Kaplowitz, M. (2017). Farmers' participation in extension programs and technology adoption in rural Nepal: a logistic regression analysis. *Journal of Agricultural Education and Extension*, *23*(4), 351–371. https://doi.org/10.1080/1389224X.2017.1323653

25) Wardani, Kusnadi. 2007. Kajian partisipasi petani dalam penyelenggaraan penyuluhan pertanian (Studi kasus di Desa Tegarwaru, Kecamatan Ciampea, Kabupaten Bogor, Jawa Barat). J. Penyul. Pertan. 2(2):158–166.

26) Warya A, Anwarudin O. 2018. Factors affecting farmer participation in paddy-special efforts program at Karawang, Indonesia. 3(08):3857–3867.

27) Yuniarsih ET, Andriyani I, Rahmatiah, Halil W, Rahmi, Anas S, Sunanto. 2021. Relationship analysis of farmers participation in agricultural extension with corn production levels in South Sulawesi. IOP Conf. Ser. Earth Environ. Sci. 911(1).doi:10.1088/1755-1315/911/1/012070.

28) Zheng, B., & Agresti, A. (2000). Summarizing the predictive power of a generalized linear model. *Statistics in Medicine*, *19*(13), 1771–1781. https://doi.org/10.1002/1097-0258(20000715)19:13<1771::aid-sim485>3.3.co;2-g