Performance of Agricultural Extension Workers and Their Impact on Maize Farmer Behavior on Peatlands

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Abstract. The good performance of agricultural extension officers impacts maize farmer behavior and increases maize farm productivity, improving farmers' income and welfare. The success of agricultural extension workers in improving farmer competence and participation is closely related to internal factors, namely competence and motivation. This study aims to 1) Analyze the effect of motivation on the performance of agricultural extension workers and 2) Analyze the effect of agricultural extension performance on farmer behavior in maize farming on peatlands in Rasau Jaya Sub-district. The research was conducted in Bintang Mas Village, Rasau Jaya 2 Village, and Rasau Jaya 3 Village. Respondents consisted of 4 agricultural extension officers and 90 sweet corn farmers. The research variables consisted of manifest variables, exogenous latent variables (motivation and performance of agricultural extension officers), and endogenous latent variables (behavior of maize farmers). The model used was the Structural Equation Model. Data analysis was completed using SEM-PLS. The results of the analysis show that motivation affects the performance of agricultural extension workers. The need for achievement and power motivates extension workers to carry out their duties. Implementation of the Field School is a determining factor for extension worker performance. Extension performance affects the behavior of maize farmers. Farmer behavior most influenced by extension worker performance is using maize seeds. Based on the study results, recommendations are to provide competencies and skills to extension workers to implement Field School to assist maize farmers.

Keywords: Role of Extension Officers, Extension Performance, Farmer Behavior.

1   Introduction

Agricultural extension is the primary mechanism that increases agricultural production and productivity [1,2]. The agricultural extension aims to increase production, develop producer groups in rural areas [3], and create linkages of farmers to markets and other business actors in the value chain [4], helping target farmers make the right decisions [5-8], and build quality and reliable agricultural and human resources (Minister of Agriculture Number: 91/Permentan/OT.140/9/2013) so that they can play a better role in

society, and be able to improve food security for the family, community, nation, and state [9,10].

The local government system is decentralized and directed to be independent, including generating revenue [11]. In line with this condition, agricultural development must be able to become a supporting sector [12]. For this reason, agricultural development requires competent field agricultural extension workers [13-15]. Agricultural extension workers who are competent will perform well to meet the community's needs [16]. Assessment of the performance of agricultural extension workers is also helpful in improving their performance in the future.

Rasau Jaya sub-district is one of the sub-districts in Kubu Raya Regency, located not far from the capital of West Kalimantan province, with an area of 111.07 km2. The Rasau Jaya sub-district is divided into six villages: Rasau Jaya General Village, Bintang Mas Village, Rasau Jaya III Village, Rasau Jaya I Village, Rasau Jaya II Village, and Pematang Tujuh Village. Rasau Jaya Sub-district is a developing area and has potential because it is traversed by transportation routes from various sub-districts to the provincial capital of West Kalimantan, Pontianak City [17]. (Urban Area Development Center, 2017) mentioned that the Rasau Jaya Sub-district is included in the Rasau Jaya Sub-district National Priority Rural Area (KPPN) program. Furthermore [17] also stated that agriculture is the priority sector in Rasau Jaya Sub-district. Kubu Raya Regency is the district with the third largest swamp/peat forest in West Kalimantan, with an area of 282,671.35 ha (22.64%) [18].

Muliady [19] and Jamil et al [20] state that the performance of agricultural extension workers can improve farmer behavior through competence and participation. The effectiveness of this performance can be measured through changes in the behavior (farmers) of beneficiaries [21-23] suggest that agricultural extension workers who have technical competence, communication, planning, program implementation will have better performance in increasing the capacity of farmers. Research conducted by [24] showed that services from extension workers to farmers positively impact technology adoption. Research conducted by Jami et al suggests that extension workers have a role in the dynamics of farmer groups; the better the role of agricultural extension workers, the more dynamic the farmer groups Vintamo et al., [1], Tamsan et al [26], Hary [27] suggests that agricultural extension contributes to increasing production and commercialization of farms, educating farmers, conserving natural resources, promoting new technologies, promoting sustainable agriculture, and disseminating information in various settings. The success of agricultural extension workers in improving farmers' competence and participation is closely related to internal factors of extension workers, such as individual characteristics, competence, motivation, and independence of extension workers. These factors have a direct and indirect relationship to the performance of agricultural extension workers and changes in farmer behavior.

Research related to the motivation and performance of agricultural extension workers and farmer behavior has been done quite a lot, but the research results are still diverse. Research by Arifianto et al [28] suggests that the characteristics of extension workers, working conditions, and motivation have a positive effect on the performance of agricultural extension workers, and the performance of agricultural extension work-

ers affects the behavior of farmers in Rembang Regency. Research by Bahua [29] suggests that the motivation of extension workers indirectly affects changes in farmer behavior. The relationship between motivation and self-efficacy of extension workers needs to be stronger. Another finding is that extension causes changes in farmer behavior through changes in farmer competence. Research by Hernalius et al [30], Hadi et al., [31], Wulandany et al [32], Efri [33], Sundari et al [34], They suggested that agricultural extension has a natural and positive influence on increasing farm productivity. Kansrini [35] suggest that extension affects the level of farmer adoption, socioeconomic behavior of farmers [36,37], and farmer technology Yakub et al [38]. Meanwhile, Nona and Sagajoka [39] argued that agricultural extension shapes farmer behavior consisting of knowledge, attitudes, and skills.

Agricultural development aims to empower and increase farmer participation, so this research needs to be conducted. The results of this study can contribute to the continuous improvement of agricultural extension workers' performance, which will impact changes in the behavior of maize farmers on peatlands and increase the productivity of maize farming. This study aims to (1) analyze the effect of motivation on the performance of agricultural extension workers and (2) analyze the effect of the performance of agricultural extension workers on the behavior of maize farmers on peatlands in Rasau Jaya District.Subsequent paragraphs, however, are indented.

2   Research Methods

The research location was determined in Rasau Jaya Sub-district, Kubu Raya Regency, West Kalimantan's vegetable production center, The research time was eight (8) months, namely April - November 2022. This study's primary and secondary data are primary and secondary. The population was sweet corn farmers in Rasau Jaya 2 Village, Rasau Jaya 3 Village, and Bintang Mas Village. Respondents were determined using a random sampling technique of as many as 100 farmers. Five agricultural extension workers were the respondents.

The research variables are grouped into exogenous latent variables, namely extension worker motivation and extension worker performance, and the endogenous latent variable is the behavior of sweet corn farmers. The exogenous latent variable of motivation is measured through manifest variables (indicators), namely income, need for achievement, need for affiliation, and need for power. Manifest variables of extension worker activities measure the exogenous latent variable of extension worker performance at the stages of preparation, implementation, evaluation, and reporting of extension activities. The endogenous latent variable of farmer behavior is measured through indicator manifest variables: farmer competence in maize cultivation and farmer participation in farmer groups. The analysis method used in this research is descriptive analysis. Measurement of research scores using the Likert Scale. The quantitative analysis conducted in this study is Partial Least Square (P.L.S.), considering the advantages of P.L.S. analysis [40]. Data is processed using SmartPLS software.
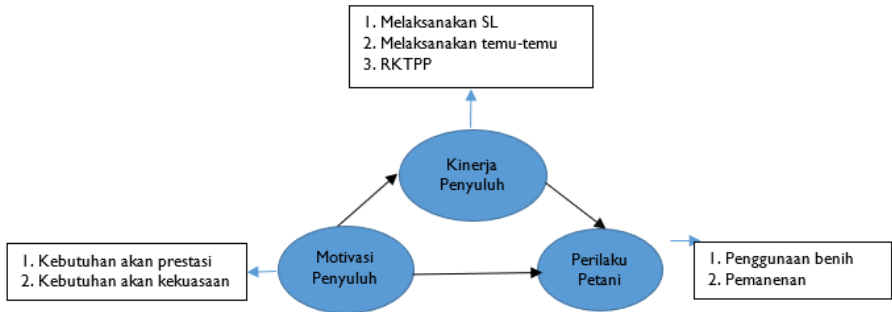
Fig. 1. Conceptual framework.

In S.E.M., there are three stages simultaneously, namely checking the validity and re-liability of the instrument (confirmatory factor analysis), testing the relationship model between variables (path analysis), and obtaining a model that is suitable for prediction (structural model and regression analysis) [41]. Test the validity and reliability of indicators using Cronbach Alpha (said to be reliable if Cronbach's α (C.A.)> 0.7), rho A, composite reliability (said to be reliable if Composite Reliability (C.R.)> 0.7), and Average Variance Extracted value (said to be reliable if factor loadings> 0.7, AVE> 0.5. The structural model analysis uses the Variance Inflation Factor (V.I.F.) < 5. VIF formula = 1 / Tolerance. Tolerance level > 0.2. Tolerance value = 1-R2 for each variable. Hypothesis testing is done by looking at the Standardized Path Coefficient (β) of the structural model tested with t-statistics (> 1.96) and the level of significance at p < 0.05 for the structural model.

3   Research and Discussion

3.1   Overview of the Research Area

Rasau Jaya District is located in Kubu Raya Regency, Kalimantan Province, with an area of 111.03 km2. The Rasau Jaya sub-district has six villages: Rasau Jaya General Village, Rasau Jaya One Village, Rasau Jaya Two Village, Rasa Jaya Three Village, Bintang Mas Village, and Pematang Tujuh Village: the Sungai Raya sub-district and the Sungai Kakap sub-district border Rasau Jaya sub-district in the north. The south is bordered by Kubu and Teluk Pakedai sub-districts. In the west, it is bordered by the Sungai Kakap Sub-district, and in the east, it is bordered by the Sungai Raya Sub-district [42].
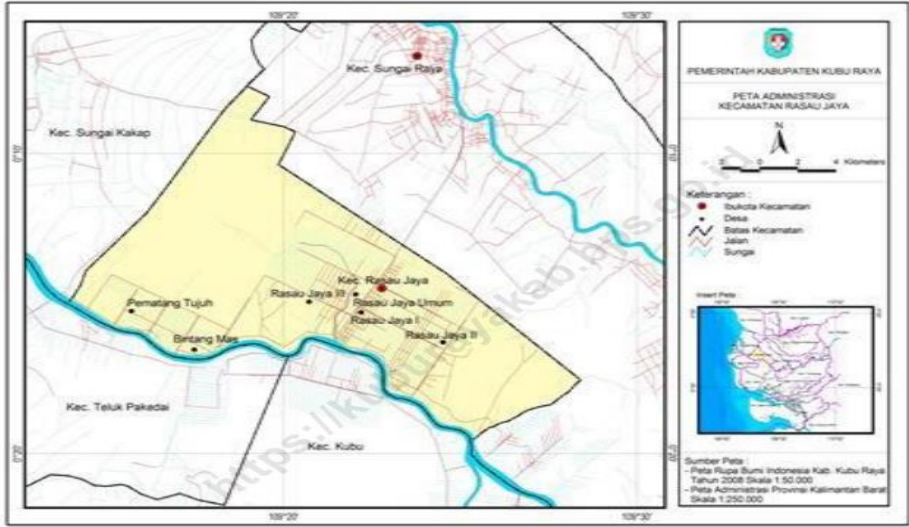
Fig. 2. Map of Rasau Jaya Sub-district.

3.2   SEM PLS Analysis

The stages are the research instrument test stage (Outer model), model fit test (inner model), and hypothesis testing. The outer model shows how indicators present latent variables to be measured while looking at the validity and reliability of the data.
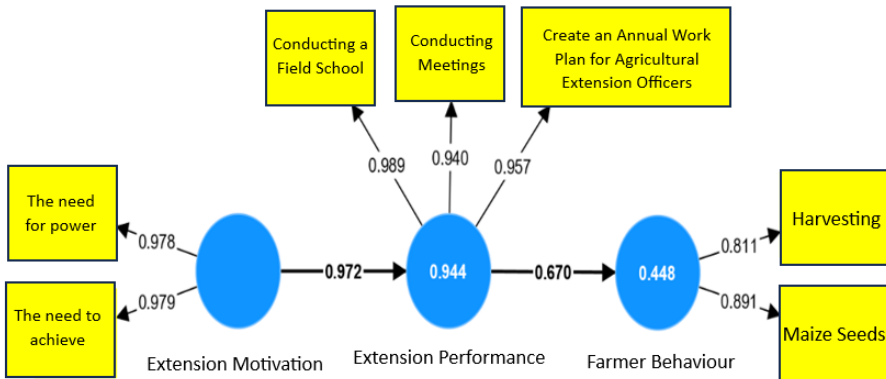

Fig. 3. Outer model.

Validity measurement is carried out in two ways, namely convergent validity and discriminant validity tests. The convergent validity test is seen from the loading factor value (> 0.7) and the average variance extracted (AVE> 0.5) value. [43] For validity testing with discriminant validity, two tests are carried out, namely looking at the Fornell-Larcker Criteria value and the cross-loading value.

Table 1. Results of Loading Factor and Cross-Loading Analysis.

Latent Variable/Manifest Variable	Loading Factor			Cross Loading		
	Extension Motivation	Extension Performance	Farmer Behavior	Extension Motivation	Extension Performance	Farmer Behavior
Motivation						
The need to achieve	0,979			0,979	0,962	0,678
The need for power	0,978			0,978	0,940	0,682
Performance						
Create an Annual Work Plan for Agricultural Extension Officers		0,956		0,863	0,957	0,588
Conducting a Field School		0,989		0,954	0,989	0,656
Conducting Meetings		0,940		0,978	0,940	0,682
Behavior						
Maize Seeds			1,00	0,658	0,635	0,891
Harvesting			0,811	0,511	0,493	0,811

Source: Data Processing, 2022

Table 2. Fornell-Larcker Criteria and AVE Analysis Results.

Latent Variable	Extension Performance	Extension Motivation	Farmer Behavior	AVE
Extension Performance	0.962	0	0	0,926
Extension Motivation	0.972	0.979	0	0,958
Farmer Behavior	0.670	0.694	0.852	0,725

Source: Data analysis, 2022

Table 3. Composite Reliability and Cronbac'h Alpha Analysis Results.

Variables	*Composite Reliability*	*Cronbac'h Alpha*
Extension Performance	0.974	0.960
Extension Motivation	0.979	0.956
Farmer Behavior	0.840	0.626

Source: Data analysis, 2022

Based on the criteria for composite reliability and Cronbac'h alpha, the data has met the criteria. So that all scales used are reliable and can be continued in the inner model analysis.

The inner or structural model predicts the causality relationship between endogenous latent variables and exogenous latent variables. The tests for the structural model are: (1) R Square on endogenous constructs [44,45] with Chin [46] criteria, the R square value is 0.67 (strong), 0.33 (moderate) and 0.19 (weak); (2) Estimate for Path Coefficients, is the value of the path coefficient or the magnitude of the relationship of the latent construct. The outer loading value between the latent variable and the indicator variable can be seen in the SEM-PLS model image. In contrast, the path coefficient value can be seen in the arrow between the exogenous and endogenous latent variables.

Based on all criteria, convergent validity has met the criteria. So that all scales used are valid and can be continued in the subsequent analysis. The data reliability test is carried out by looking at the composite reliability value (> 0.7) [47] and Cronbac'h alpha (> 0.6) [48].

Table 4. R-Square Value.

Endogenous Variable	R-Square
Extension Performance	0.944
Farmer Behavior	0.448

Source: Data analysis, 2022

The extension performance variable has a value of R2 of 0.944. The variation in the performance of extension workers can be explained by the variation in the motivation of extension workers by 94.40%. The model includes a robust model. The R2 value of farmer behavior is 0.448. Variation in farmer behavior can be explained by the variation in the performance of extension workers by 48.80%, indicating a moderate model.
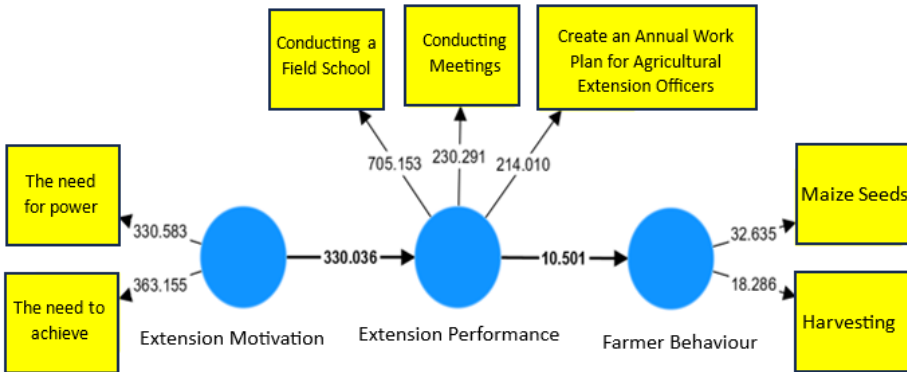
Fig. 4. Inner model.

Based on Figure 4, the outer loading value on the extension agent motivation variable that plays the most role is the need for an achievement indicator. The need for achievement indicator has a value of 0.979, which is the highest of the other indicators (need for power). The outer loading value of most instructor performance variables indicates

implementing field schools with a value of 0.989. This value is higher than the indicators of other extension performance variables (implementing meetings and R.K.T.T.P.). Then, for the variable behavior of farmers, the indicator of the use of corn seeds is the indicator with the highest value among other indicators, with a value of 0.891. The indicator of the use of maize seeds is the most instrumental in seeing the behavior of farmers in the Rasau Jaya sub-district.

Table 5. Direct Effect Test Results (Path Coefficient).

	Original Sample (O)	T statistic (O/STDEV)	P Values
Extension Performance -> Farmer Behavior	0.670	10.501	0.000
Extension Motivation -> Extension Performance	0.972	330.036	0.000

Source: Data analysis, 2022

The influence of the motivation variable on the performance of extension workers, as well as the influence of the performance of extension workers on farmer behavior, is seen based on the value of the path coefficient (Table 5). The effect of extension workers' motivation on farmers' performance is positive, with a value of 0.972. Then, the effect of extension performance on farmer behavior is positive, with a value of 0.670.

Extension motivation has a significant effect on the extension worker performance variable. The direction of the relationship between the two variables is positive, meaning that the higher the motivation of extension workers, the performance of extension workers will increase by 97.20%. This increase can occur in need for achievement, and the need for power is fulfilled. In line with research conducted by Wulandany et al [32], Kuswati [49], Kusmiati et al [50], Nor et al [52], motivation has a positive effect on the performance of agricultural extension workers [52]. The better the extension agent's drive for power and achievement needs, the more the performance of agricultural extension workers in Rasau Jaya District will improve. The excellent performance of agricultural extension workers will significantly contribute to agriculture in Rasau Jaya District. Mangkuprawira [53] explains that motivation is the drive that makes employees do something in a way and achieve specific goals. Motivation is important because it causes, channels, and supports human behavior, so they want to work hard and enthusiastically to achieve optimal results.

The performance of agricultural extension workers has a significant effect on farmer behavior variables. The direction of the relationship between these two variables is positive, meaning that the better the performance of farmers will cause an increase in farmer behavior by 67%. This increase can be supported by the efforts of extension workers to carry out field schools and conduct meetings and annual work plans for agricultural extension workers (R.K.T.P.P.). This research is in line with research . Sugiarta et al [54], Rokhani et al [55], Biswas [56] which state that the performance of extension workers has a positive effect on farmer behavior. Imaran et al [57] also suggested that extension methods that help farmers learn and discuss the results of learning will increase the likelihood of farmers adopting technology and ultimately increase

farmer productivity [58,59]. Thus, good agricultural extension performance has an impact on improving farmer behavior. Ajayi and Okunlola [60] showed that extension services to farmers using demonstration plots and field schools positively influence the adoption level of introduced technologies.

4   Conclusions and Suggestions

Motivation has a positive effect on the performance of agricultural extension workers. The factor that motivates extension workers is the need for achievement. Extension performance has a positive effect on maize farmer behavior. In the performance of extension workers, the indicator that plays the most role is the implementation of field schools. Farmer behavior most influenced by extension workers is farmer competence (use of maize seed) but has not influenced farmer participation in farmer groups. It is recommended that extension workers improve their ability to use the Field School method.

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