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THE ROLE OF AGRICULTURAL EXTENSIONERS AND AGRICULTURAL FARMER CHARACTERISTICS ON THE BEHAVIOR OF RICE SEED FARMERS IN BUNGA RAYA DISTRICT, SIAK REGENCY

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ABSTRACT

Cultivation techniques carried out by paddy farmers in Siak regency are generally still traditional and dominantly use local varieties. one of the efforts to increase production, government through related agencies produce superior rice seeds. This superior rice seed will be effective and have a broad impact if it is adopted by farmers through dissemination and extension methods. This study aims to determine the role of agricultural extension and the characteristics of farmers who carry out superior rice seed farming in Bunga Raya District, Siak Regency. This type of research is survey. the data used in this study are primary data and secondary data. Primary data was taken using a questionnaire. secondary data was taken from related agencies. The data obtained was analyzed using Structural Equation Modeling (SEM) and then processed using the SmartPLS 3.0 data processing application. Determination of the sample was carried out by purposive random sampling, amounting to 100 people with the criteria of rice farmers who also work as rice seed breeders. Research results showed that farmers' skills are influenced by education, monitoring and evaluation. The attitude of farmers is influenced by education, consultation. Farmer's knowledge is influenced by farmer characteristics, facilitation, monitoring and evaluation. Education, consultation, facilitation, monitoring and evaluation which are dimensions of the role of extension agents significantly influence the behavior of rice seed breeders consisting of knowledge, attitudes and skills.

Keywords: *extensionist, farmers, seed, structural equation model*

BACKGROUND

The agricultural sector plays an important role in the economic development and income of the majority of the Indonesian population (Istriningsih et al., 2022). The contribution of the agricultural sector to Gross Domestic Product is 13.28%, which is the second largest contribution after the industrial sector (Badan Pusat Statistik, 2021). In the agricultural sector rice has an important position, because rice is the dominant staple food for people in Indonesia. The population growth rate is still relatively high, encouraging the State to continue to develop technology to increase food productivity, especially rice, corn and soybeans. Population growth in Riau Province over the last ten years has also shown an increasing impact on increasing demand for food, especially rice, while Riau Province has only been able to produce rice for 24% of its needs, shortages of rice are still imported from outside of Riau Province. To increase rice production, the Provincial Government of Riau is working on Riau Moving Rice Planting (Farming) 2020-2024 with a target of increasing production

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Vol 7 (3): 643-659, November 2023

by at least 50% in 2024 with an average productivity increase from 3.7 tons/Ha to 4.4 tons/Ha (Tobari, 2021). In general, rice cultivation techniques carried out by farmers in Riau Province, including the Siak district, are still traditional and dominated by local varieties and incomplete fertilization (Balai Pengkajian Teknologi Pertanian Riau, 2021). Efforts to increase these include the use of superior seeds by measuring seeds and developing new superior varieties (Winarso, 2014).

Seed breeding activities are important to meet the needs of farmers seed needs. The formal seed system is guided by plant breeding and multiplication methodologies mainly used by the public or private sector and formal regulation, certification, and laws. Key formal seed system challenges include poorly developed seed value chains for example inadequate breeding, production or delivery (Nabuuma et al., 2022). The production and distribution of rice seeds to meet the needs of farmers is not only carried out by the government, state-owned enterprises, private companies, but also involves farmer groups guided by relevant agencies such as the Riau Province Food, Food Crops and Horticulture Service and the Food Crops Assessment Center which also cooperates with Field Agricultural Extension to obtain quality seeds in order to increase production. The use of superior varieties of rice seeds provides benefits including increasing production per unit area of land, increasing yield quality and will have an impact on increasing farmer income and to ensure sustainable rice production and farmers' profit maximiza- tion, environmentally friendly agricultural technology and production systems are needed (Sarma, 2022). To produce superior varieties of rice seeds, special treatment is needed, such as good land preparation, use of superior seeds, proper and controlled maintenance of rice plants, proper harvesting time, neat packing using standard seed wrappers, as well as proper storage and distribution to carry out this activity human resources are needed who are able to handle seeding (Nugraha et al., 2010).

For farmer groups who carry out superior rice seed breeding, guidance from extension workers is needed. The role of extension workers as facilitators in increasing the capacity of high-yielding rice seed breeders is highly expected (Amiruddin et al., 2016). So, that farmers who carry out this superior variety rice seed breeding business can develop and more and more farmers are willing to do superior rice seed breeding to meet the need for rice seeds, so as to increase production and income of farmers. Meanwhile for farmers the decision to carry out a seed breeding business is generally based on the socio-economic characteristics of the farmers (Sitanggang et al., 2014).

The government is always trying to increase the productivity and production of food crops, especially rice, including by using certified superior variety seeds. The use of superior seeds must be accompanied by the application of appropriate plant cultivation technology. A good seed production management system is needed so that it is able to provide seeds at the field level according to the needs of farmers. For the need for certified superior seeds, the government also fosters farmers through related institutions to carry out seed-breeding businesses locally. In Bunga Raya District, Siak Regency, seed breeding activities are carried out by the Food, Crops and Horticulture Service of Riau Province and the Food Crops Assessment Center which also works with Field Agricultural Extensionists, as well as self-help farmers, it's just that not many independent farmers have do this business. This training is related to the requirements for cultivation and post-harvest seed breeding business, which must pay close attention starting from the selection of seeds to production and packaging and storage, besides that farmers want to do this farming if it is profitable.

Seed producers or seed breeders are people who are very trusted because they cultivate very good seeds, where the processing is carried out by themselves and then the results of the prospective seeds are sold to seed breeders who process them further until they become seeds ready for planting

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

(Khoirudin, 2012). The role of farmers in cultivating superior varieties of rice seeds is needed to produce superior rice seeds in accordance with the requirements of superior rice seeds. The development of farmers and the characteristics of these farmers will influence the behavior of farmers in carrying out rice seed breeding farming. How the guidance carried out by agricultural extension workers and the characteristics of farmers in this superior rice seed breeding business will affect the behavior of farmers in conducting superior variety rice seed breeding business, so that this rice seed breeding business can develop and meet the needs of farmers' seeds locally which is a problem that will be analyzed in this study. The data analysis method used is descriptive analysis to describe the research variables and Structural Equation Modeling (SEM) analysis.

RESEARCH METHODS

The research location was carried out in Siak Regency, precisely in Bunga Raya District. The location selection was carried out by purposive sampling with the consideration that the research location had a group of farmers who carried out rice seed farming and were active in extension activities. The time of the research was carried out in March 2022 to September 2022. The type of data used is quantitative and qualitative data. Quantitative data from respondents consisted of age, farming experience, land area, family dependent and training frequency. Qualitative data, namely data regarding the role of agricultural extension workers and the character of farmers are categorical using a Likert scale. Sources of data in this study were primary data obtained directly from the respondent farmers using a questionnaire, and secondary data obtained from other parties related to the purpose of this study. The population in this study are farmers who carry out rice seed-breeding farming. samples were taken by using slovin formula with a margin of error of 5%, as many as 100 people. This study uses a Likert scale. In the Likert scale the variables measured are translated into variable indicators. This indicator is used as a starting point for compiling instrument items in the form of questions or statements. The Likert scale is used with a range of 1-3, for the role of extension workers and farmer behavior. According to Sugiyono (2014), the likert scale is used to measure attitudes, opinions and perceptions of a person or group about events or social phenomena. The answers that will be answered by respondents are made in 3 score categories, score 3 is in the form of a positive statement (expected answer) and score 1 is in the form of a negative statement (unexpected answer).

Table 1. Respondence Score Answer (Positive Question)

No	Counselling Role	Farmers Behavior	Score Value
1.	Helpful	Excellent	3
2.	Helpful Enough	Good	2
3.	Not Helpful Enough	Bad	1

Source: Sugiyono, 2014

The total scale score of the role of extension workers, farmer characteristics and farmer behavior is grouped into 3 categories which are calculated using the following formula (Sumantri et al, 2015):

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

$$\text{Variable Score} = \frac{\text{Total Questions} \times \text{Score Value}}{\text{Total Questions}}$$

$$\text{Category Range} = \frac{\text{Maximum Score - Minimum Score - 0,01}}{\text{Total Amount of Category}}$$

The number of questions to find out the role of extension, farmer empowerment and achievement of extension objectives as a whole is (50) questions, the highest score is (3), and the lowest score is (1), so the calculation results can be seen in Table 2. The results of the data obtained through the questionnaire will be processed using the SmartPLS 3.0 data processing application.

Table 2. Recapitulation of Extensionist Role and Farmer Behavior Scores

No	Counselling Role	Farmers Behavior	Score Value
1.	Helpful	Excellent	2.33-3.00
2.	Helpful Enough	Good	1.67-2.32
3.	Not Helpful Enough	Bad	1.00-1.66

Source: Processed Data, 2022

RESULT AND DISCUSSION

Characteristics of Respondents

Respondents in this study were seed breeders and had participated in extension activities conducted by extension workers. The characteristics discussed in this study are based on age, education level, farming experience, land area, number of family dependents, and number of trainings attended by the breeder farmers. The answer scores that will be given by respondents can be seen in table 3.

Table 3. Recapitulation of Respondent Characteristics of Seed Growing Farmers in Bunga Raya District, Siak Regency.

No	Age (Years)	Total
1.	< 26	0
2.	26 – 45	67
3.	> 45	33
No	**Education Level**	**Total**
1.	Uneducated/ Elementary School/ Middle School	49
2.	High School/Vocational Education	44
3.	Bachelor/University Graduate	7
No	**Farming Experience (Years)**	**Total**
1.	< 5	0
2.	5 – 10	65
3.	> 10	35

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

No	Land Area (Ha)	Total
1.	0,5 – 1,67	72
2.	1.68 – 2.83	23
3.	2.84 – 4	5
No	**Family Dependents (Person)**	**Total**
1.	1 – 2	13
2.	3 – 4	61
3.	> 4	26
No	**Training Frequency (Times)**	**Total**
1.	1 – 5	0
2.	6 – 15	56
3.	> 15	44

Source: Processed Data, 2022

Younger people in farming could have a positive impact on the degree of attitude toward working in agriculture. It also calls for awareness programs and incentives to enable these young farmers as well as older people who are expected to be more inclined and oriented toward agriculture (Shayaa Al-Shayaa et al., 2021). The characteristics of respondents based on the level of education of rice seed breeders in Bunga Raya District were dominated by farmers with uneducated, elementary and middle school education, namely 49 people. The rest have high school and vocational education levels, namely as many as 44 people, D3 and S1 education levels as many as 7 people. It can be interpreted that almost half of the total respondents have a high school and vocational education level, namely 44% and a Bachelors or University graduate education level of 7%, which means that the level of formal education taken by farmers is adequate. Education is one of the factors supporting the success of farmers in carrying out their farming. Because, the higher the level of education a person takes greatly affects his ability to act and make decisions (Harahap et al., 2018). Farming is still a primary occupation for many households in the region. However, more and more people would like to do off-farm work to obtain a stable profit. The age and education of farmers are important factors driving farmers' perceptions in the following analysis (Li et al., 2017).

Respondent characteristics based on farming experience owned by rice seed breeders in Bunga Raya District were dominated by long experience in rice farming in the range of 5-10 years, namely as many as 65 people. The rest, the experience of farmers with a range of > 10 years in rice farming, namely as many as 35 people. It can be interpreted that all rice seed breeders have a total experience of more than 5 years. This means that all seed breeders in Bunga Raya District already have high skills. With a high amount of experience, farmers have measurable tendencies in farming skills, measurable in terms of considering decisions to be made in increasing rice production. Farming experience has a positive effect on the application of agricultural technology and depends on their education, availability of credit (Paustian et al, 2016). Biswas et al. (2021) said that the farmers hold would be the lead farmer or not in their community significantly depends on their education, availability of credit, and risk-taking attitude

Respondent characteristics based on the area of land cultivated by rice farmers in Bunga Raya District are dominated by a land area of 0.5 - 1.67 Ha, namely 72 people. The rest, in the land area range of 1.68 - 2.83 Ha, are as many as 23 people, in the land area range of 2.84 - 4 Ha, there are 5

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http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

people. It can be interpreted that, almost all rice seed cultivators in Bunga Raya District have a land area of 0.5 – 1.67 Ha, which is as much as 72%. Gradually, the area of land owned by farmers increases every year because Bunga Raya District is a rice production center in Siak Regency. Perz (2003) research shows the households with more labor and capital are more likely to adopt technologie, so too if secure land tenure increases the adoption of better technology.

Respondent characteristics based on the number of family dependents owned by rice farmers in Bunga Raya District are dominated by the number of family dependents of 3-4 people, namely 61 farmers. The rest, the number of family dependents is 1-2 people, namely 13 farmers and the number of dependents > 4 people, namely 26 farmers. It can be interpreted that farmers have quite a lot of dependents to meet their needs. The size of the number of family members will affect household spending and consumption. The more family members, the more expenditure and food needs, and that adoption decisions are more correlated within family and friends (Arida et al., 2015; Bandiera et al. 2006)

Respondent characteristics based on the large number of counseling attended by rice farmers in Bunga Raya District were dominated by 6-15 counseling sessions, namely as many as 56 people. The rest, the number of counseling that has been attended by farmers is > 15 times of counseling, namely 44 people. It can be interpreted that rice farmers in Bunga Raya District have often attended counseling held by BPP Bunga Raya District, at least they have attended counseling 6 times and a maximum of more than 15 times. For farmer-oriented policies of agricultural extension to be succesfully implemented, it is imperative for executive practitioners to know the local culture, needs education, skills and economic status (Mohammadzadeh et al., 2017).

Outer Model

The outer model is a model that can provide specifications between latent variables and their indicators. The outer model is evaluated using the average variance extracted (AVE), convergent validity and discriminant validity of the latent construct (Ghozali & Latan, 2012).

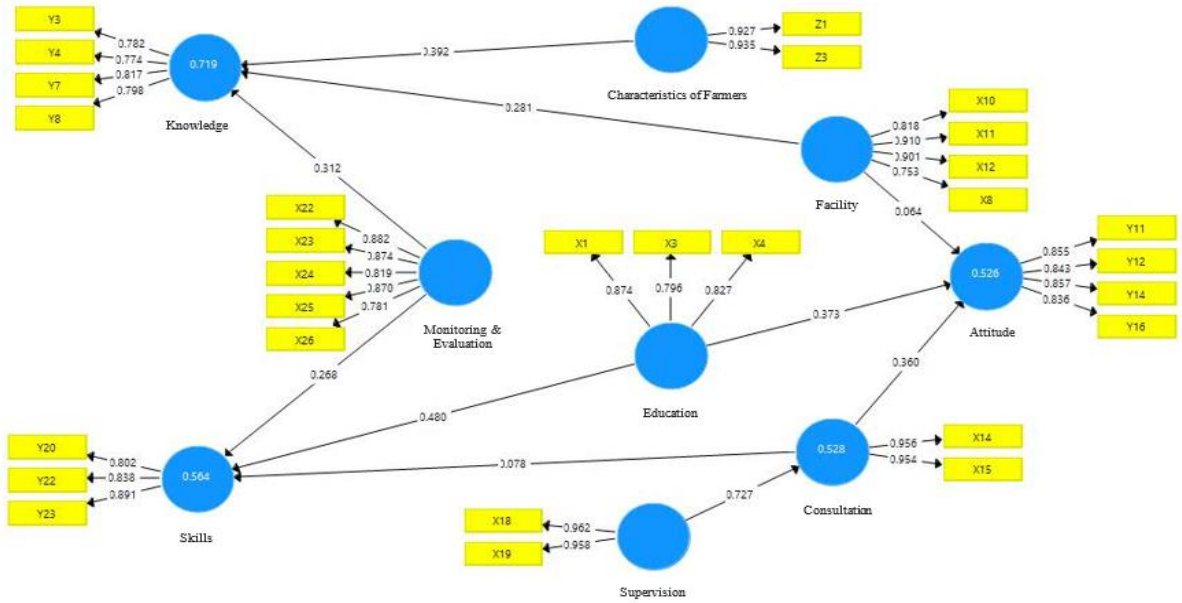

Figure 1. Measurement Model
Source: Processed Data, 2022

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

Figure 1 indicates that all indicators of organizational learning, job satisfaction, organizational commitment, and employee performance meet the criteria above 0.7. Therefore, all variable indicators are acceptable. After testing the validity through factor loading, the next step is to test convergent validity and discriminant validity.

Validity test

In the convergent validity test in this preliminary study, the value of the loading factor must exceed 0.7 and the value of the average variance extracted (AVE) must exceed 0.5. If the resulting value does not meet these two criteria, then the value is considered invalid.

Table 4. Average Variance Extracted (AVE) Preliminary Study

No	Dimension	AVE	Validity
1.	Education	0.694	Valid
2.	Facilitation	0.719	Valid
3.	Consultation	0.912	Valid
4.	Supervision	0.921	Valid
5.	Monitoring & Evaluation	0.716	Valid
6.	Knowledge	0.629	Valid
7.	Behavior	0.719	Valid
8.	Skills	0.713	Valid
9.	Characteristics of Farmers	0.867	Valid

Source: Processed Data, 2022

The table above shows that all variables have fulfilled the specified conditions, namely the AVE value must exceed a threshold value of 0.5. The measurement of convergent validity in this preliminary study has also been tested using a loading factor. The value of each indicator must exceed 0.7 in order to be declared a valid indicator. The recommended loading factor value is > 0.7 for explanatory research. The table below is the result of calculating the loading factor using the SmartPLS program.

Table 5. Loading Factor Preliminary Study

No	Variable	Indicator	Loading Factor Value	Validity
1.	Education	X1	0.874	Valid
		X3	0.796	Valid
		X4	0.827	Valid
		X8	0.753	Valid
2.	Facilitation	X10	0.818	Valid
		X11	0.910	Valid
		X12	0.901	Valid
3.	Consultation	X14	0.956	Valid
		X15	0.954	Valid
4.	Supervision	X18	0.962	Valid
		X19	0.958	Valid
		X22	0.882	Valid
5.	Monitoring & Evaluation	X23	0.874	Valid
		X24	0.819	Valid
		X25	0.870	Valid

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

		X26	0.781	Valid
6.	Knowledge	Y3	0.782	Valid
		Y4	0.774	Valid
		Y7	0.817	Valid
		Y8	0.798	Valid
7.	Behavior	Y11	0.855	Valid
		Y12	0.843	Valid
		Y14	0.857	Valid
		Y16	0.836	Valid
8.	Skills	Y20	0.802	Valid
		Y22	0.838	Valid
		Y23	0.891	Valid
9.	Characteristics of Farmers	Z1	0.927	Valid
		Z3	0.935	Valid

Source: Processed Data, 2022

There are 29 indicators that measure 9 variables based on table 19 above. The values listed in the table are loading factors that have been selected with the criterion that the value of the loading factor must exceed 0.7. Then, in identifying discriminant validity it can be shown from the value of the Heterotrait-Monotrait Ratio of Correlations (HTMT). Figure 2 below will show the results of the discriminant validity of the preliminary study.

	Education	**Facilitation**	**Characteristics of Farmers**	**Skills**	**Consultation**	**Monitoring & Evaluation**	**Knowledge**	**Attitude**	**Supervision**
Education									
Facilitation	0.890								
Characteristics of Farmers	0.631	0.643							
Skills	0.897	0.643	0.630						
Consultation	0.801	0.870	0.530	0.672					
Monitoring & Evaluation	0.813	0.739	0.720	0.766	0.683				
Knowledge	0.884	0.838	0.899	0.779	0.737	0.866			
Attitude	0.783	0.680	0.582	0.818	0.729	0.802	0.868		
Supervision	0.756	0.869	0.664	0.589	0.799	0.637	0.749	0.550	

Figure 2. Discriminant Validity of Preliminary Studies (HTMT)
Source: Processed Data, 2022

Heterotrait-Monotrait Ratio of Correlations (HTMT) is an alternative method that is recommended to assess discriminant validity. This method uses a multitrait-multimethod matrix as the basis for measurement. The HTMT value must be less than 0.9 to ensure discriminant validity between the two reflective constructs (Henseler et al., 2015). The table above shows that all variables have fulfilled the specified conditions, namely the HTMT value must be no more than a threshold value of 0.9. So, it can be concluded that the discriminant validity requirements have been met by all variables.

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

Reliability Test

The reliability test in a preliminary study is based on the calculation of Cronbach's coefficient alpha. Data can be considered as reliable data if the data has a minimum value of Cronbach's coefficient alpha of 0.7 and if the value is closer to 1.00, the value will become more consistent (Sekaran & Bougie, 2019). From the results of data processing that has been processed with SmartPLS, results have been found as listed in table 6.

Table 6. Disciminant Validity of Preliminary Studies (Heterotrait-Monotrait Ratio of Correlations)

No	Variabel	Cronbach's Alpha	Information
1.	Education	0.781	Reliable
2.	Facilitation	0.868	Reliable
3.	Characteristics of Farmers	0.846	Reliable
4.	Skills	0.798	Reliable
5.	Consultation	0.903	Reliable
6.	Monitoring & Evaluation	0.900	Reliable
7.	Knowledge	0.803	Reliable
8.	Behavior	0.871	Reliable
9.	Supervision	0.915	Reliable

Source: Processed Data, 2022

Based on table 6 above, all variables meet the criteria where all variables have values above 0.7.

Inner Model

The first stage in testing the structural model begins with multicollinearity testing, namely calculating the Variance Inflation Factor (VIF). If multicollinearity occurs, then the predictive power of an independent variable will decrease. A variable experiences multicollinearity if the resulting VIF value is greater than five (Ghozali & Latan, 2012).

Table 7. VIF (Variance Inflation Factor) Inner Model

No.	Variable	Indicator	VIF	Information
1.	Education	X1	1.942	Valid
		X3	1.717	Valid
		X4	1.462	Valid
2.	Facilitation	X8	1.670	Valid
		X10	1.995	Valid
		X11	3.116	Valid
		X12	3.044	Valid
3.	Consultation	X14	3.106	Valid
		X15	3.106	Valid
4.	Supervision	X18	3.454	Valid
		X19	3.454	Valid
5.	Monitoring & Evaluation	X22	2.988	Valid
		X23	2.986	Valid
		X24	2.212	Valid
		X25	2.756	Valid

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

		X26	1.989	Valid
6.	Knowledge	Y3	2.169	Valid
		Y4	2.133	Valid
		Y7	2.346	Valid
		Y8	2.255	Valid
7.	Behavior	Y11	2.553	Valid
		Y12	2.454	Valid
		Y14	2.025	Valid
		Y16	2.054	Valid
8.	Skills	Y20	1.535	Valid
		Y22	1.809	Valid
		Y23	2.156	Valid
9.	Characteristics of Farmers	Z1	2.164	Valid
		Z3	2.164	Valid

Source: Processed Data, 2022

The table above is the result of the VIF calculation. Based on the table above, it can be seen that all indicators have met the requirements, namely VIF <5. All items or indicators have met the validity and reliability requirements and there is no multicollinearity between indicators.

R-Square (R^2)

Evaluation of the structural model can be carried out using the SmartPLS program by taking into account the value of R^2 in each endogenous latent variable as the predictive power of the structural model (Ghozali & Latan, 2012). The results of R^2 indicate the number of variants of the construct described by the model.

Table 8. R-Square Research

No	Variabel	R-Square	R-Square Adjusted
1.	Skills	0.564	0.550
2.	Knowledge	0.719	0.710
3.	Behavior	0.526	0.512

Source: Processed Data, 2022

Table 8 shows that the effect simultaneously or simultaneously of exogenous constructs (monitoring & evaluation, education, consultation) on skills with an R-square value of 0.564 and an adjusted R-square of 0.550. So, it can be explained that all exogenous constructs (monitoring & evaluation, education, consultation) jointly affect skills by 55% which are included in the moderate category.

The simultaneous or simultaneous influence of exogenous constructs (monitoring & evaluation, facilitation, farmer characteristics) on knowledge with an R-square value of 0.719 and an adjusted R-square of 0.710. So, it can be explained that all exogenous constructs (monitoring & evaluation, facilitation, farmer characteristics) together affect knowledge by 71% which is included in the moderate category.

The simultaneous or simultaneous influence of exogenous constructs (facilitation, education, consultation) on attitudes with an R-square value of 0.526 and an adjusted R-square of 0.512. So, it

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http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

can be explained that all exogenous constructs (facilitation, education, consultation) jointly affect attitudes by 51.2% which are included in the moderate category.

Hypothesis Test

After calculating the R-Square, model evaluation is carried out by looking at the significance value to determine the effect between variables using the bootstrapping method. The reason why this research uses the bootstrap method is because the SmartPLS program only provides a bootstrap resampling method. The iteration that will be used to correct the standard error estimate for PLS according to the recommendations is 500. The results of the calculations can be seen in the following table. Table 10 is the result of bootstrapping with 500 iterations using the SmartPLS program. According to Ghozali & Latan (2012), whether a hypothesis is supported or not can be known from the t-value. The T-value is tested with a one-tailed test or a one-way test with a significance level of 5%. The terms of a hypothesis can be declared significant if the t-value exceeds 1.96.

Table 9. Hypothesis Test Results

No	Hypothesis	Sample (O)	t-statistic (| O/STDEV |)	P Values
1.	Education -> Skills	0.480	3.722	0.000
2.	Education -> Behavior	0.373	2.440	0.015
3.	Facilitation -> Knowledge	0.281	3.032	0.003
4.	Facilitation -> Behavior	0.064	0.367	0.713
5.	Char. Of Farmers -> Knowledge	0.392	5.134	0.000
5.	Consultation -> Skills	0.078	0.640	0.522
6.	Consultation -> Behavior	0.360	2.327	0.020
7.	Monitoring & Evaluation -> Skills	0.268	2.668	0.008
8.	Monitoring & Evaluation -> Knowledge	0.312	3.666	0.000
9.	Supervision -> Consultation	0.727	11.652	0.000

Source: Processed Data, 2022

Education on skills has a positive direct effect of 0.480. An increase in education by one unit will increase skills by 48%. With a p-value of 0.000 < 0.05, Ha is accepted, which means that the direct effect of education on skills is statistically significant. The role of extension workers in educating farmers has a positive and significant impact in shaping farmer skills. The suitability of the material with the problems faced by farmers in each growing season increases the ability of farmers to find solutions that change the attitude of farmers for the better, better in the sense of being wise when making decisions and calm in facing critical situations, attitudes like this will make a Farmers are more rational in making decisions. Coordination between agricultural extension workers, farmers, farmer groups and village officials also helped make farmers feel calmer. Following the stages of cultivation according to recommendations such as, willingness to cultivate land has become a routine for farmers when starting a new planting season up to the harvest stage, selection of seeds according to recommendations that make the survival of seedlings higher, higher production yields as well as plant resistance to pests and illness. Davidsen et al. (2015) said that efforts to more support for the development of farmer businesses is prioritizing agricultural policy and designing informative advisory and extension services for policy makers and other advisory services. Many studies have

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

shown farmers as rational agents in determining their crop choices by optimizing objective functions according to physical and economic constraints (Aljanabi et al., 2018).

Education on attitudes has a positive direct effect of 0.373. An increase in education by one unit will increase attitudes by 37.3%. With a p value of 0.015 < 0.05, Ha is accepted, which means that the direct effect of education on attitudes is statistically significant. The role of extension workers in educating farmers has a positive and significant impact on shaping farmers' attitudes. Interactions between farmers and extension workers can usually be determined at any time (Kilelu, Klerkx, and Leeuwis 2014). One of the materials given to farmers in each extension program is to recommend the use of superior seeds, one of which aims to break the chain of pests which is the main problem in Bunga Raya District. Rice seed breeders are a new program launched by the government in the framework of efficiency in farming cultivation at the end of 2021 by ATAC (Agricultural Technology Assessment Center) so that there is no need to bring in seeds from outside the province. Other material given to farmers is the use of sorting and treating seeds when they are about to be sown. This treatment helps farmers to anticipate seeds that are not of good quality. The instructor's material on planting system innovation for farmers, which was initially 10:1, namely 10 lines and then filled with 1 blank line, slowly began to move to the jajar legowo 4:1 cropping system. Materials about the advantages of harvesting using combine harvest machines which provide advantages in terms of time, effort and cost are also slowly being followed by farmers

Facilitation of knowledge has a positive direct effect of 0.281. An increase in facilitation by one unit will increase knowledge by 28.1%. With a p-value of 0.003 < 0.05, Ha is accepted, which means that the direct effect of facilitation on knowledge is statistically significant. The role of extension workers in facilitating farmers has a positive and significant impact on shaping farmer knowledge. One of the facilities provided by extension workers in submitting their complaints is to submit these complaints through the WhatsApp application, which creates special groups for extension workers and farmers for each work area, so that farmers who have the same complaints can find a solution at once. The high frequency of farmer participation in counseling provided by PPL in Bunga Raya Subdistrict is because farmers are increasingly motivated to add new knowledge that will make it easier for the farmer to cultivate paddy rice. As in the jajar legowo 4:1 planting system, the use of harvesting machines (combine harvest) and assisting farmers to financial institutions. Girma & Kuma (2022) showed that agricultural extension services should also be market oriented to improve the welfare and food security status of farmers.

Facilitation of attitudes has a positive direct effect of 0.064. An increase in facilitation by one unit will increase attitude by 6.4%. With a p value of 0.713 > 0.05, Ho is accepted, which means that the direct effect of facilitation on attitudes is not statistically significant. The role of extension workers as farmer facilitators in the form of information has a positive impact but not too significant in shaping farmer attitudes. Even though it can be seen that the frequency of farmers participating is very high in the counseling provided by PPL of Bunga Raya District. Making whatsapp groups specifically for extension workers and farmers for each work area, involving extension workers as a bridge between farmers and the bank in matters of business financing are some of the facilities provided by extension workers, because the underlying mechanisms that drive farmers' behavioral change are quite complex and may vary from region to region, from farmer to farmer, and from year to year (Andriyas and McKee, 2014). The role of extension agents as communicators in conveying new information or materials so that farmers can cultivate rice even better, is the key to the success of extension agents in their role as communicators. Information such as the superiority of recommended seeds, one of

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

which aims to break the pest chain, the use of sorting and treating seeds at the time of sowing which aims to select seeds before sowing, the planting system which was originally 10:1 to 4:1 and harvesting using combine harvest machine. extension agents must establish cooperation with the leaders of farmer groups, because they support and assist in organizing community meetings and agricultural demonstrations, is an important bridge between farmers and government, awareness and adoption of agricultural management practices, consistent with the awareness and application of most of the agricultural practices that promoted (Ragasa, 2020).

Knowledge is critical for innovative development (Ali and Avdic, 2015). It is also shown from this research that the characteristics of farmers on knowledge have a positive direct effect of 0.392. An increase in farmer characteristics by one unit will increase knowledge by 39.2%. With a p value of 0.000 < 0.05, Ha is accepted, which means that the direct effect of farmer characteristics on knowledge is statistically significant. Farmers in Bunga Raya District are still dominated by productive age farmers, productive in terms of energy and mind as well as experience levels ranging from 5-10 years. Adult age is a time when mental abilities reach their peak to learn and adapt to new situations such as remembering things that have been learned, analogical reasoning and creative thinking. For example, when sowing rice seeds, making special beds in rice fields as a growing medium for rice seeds to be planted, the planting system uses a 4:1 row legowo (4 rows inserted with 1 empty row), buying superior seeds labeled every growing season. new, preparation for harvest using combine harvest. High experience tends to increase the skills and knowledge of a farmer. When the skills and knowledge of a farmer increase, the obstacles encountered by farmers in their farming activities can be resolved in the right, effective and timely manner. Sumo et al. (2022) shows that the income from farming, selling crops and telephone ownership has a significant effect on farmers' demand for extension services, and to implement government programs, agricultural extension workers must adapt to the socio-economic characteristics of farmers.

Consultation on skills has a positive direct effect of 0.078. An increase in consulting by one unit will increase skills by 7.8%. With a p value of 0.522 > 0.05, Ho is accepted, which means that the direct effect of consultation on skills is not statistically significant. The newest technologies available in Bunga Raya District in rice cultivation such as the introduction of new superior seeds with higher productivity, the use of alsintan (planter machines, combine harvest machines) are always echoed by extension workers in order to achieve efficiency of rice farming in one planting season. The convenience provided by technology makes farmers even more enthusiastic because of notification of the latest technologies by extension workers. Extension agents are very willing to be met during work/office hours if farmers want to consult either directly or indirectly/via telephone. Consultation regarding the problems faced by farmers regarding farming & the introduction of the latest technology. Usually, things like this happen only to farmers who still don't understand or don't understand enough when the counseling was held the previous day. Activities like this that make farmers willing to cultivate the land when they are about to start a new planting season, select seeds according to recommendations, harvest stages according to recommendations have also been followed by farmers, one of which is by using a combine harvest machine (Antwi-Agyei & Stringer, 2021). This study shows to increase service effectiveness, it is necessary (i) to utilize information sources such as radio and television, (ii) to increase the capacity of extension services by increasing the technical skills of extension workers, increasing communication skills, increasing knowledge and use of information communication technology (ICT), field demonstration skills and project monitoring and evaluation. Answering question (iii), the main obstacles faced by agricultural

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

extension workers in delivering extension services are lack of transportation facilities for extension agents, lack of proper extension materials, high ratio of agricultural extension workers to farmers, and inadequate funds to implement adaptation practice.

Consultation on attitudes has a positive direct effect of 0.360. An increase in consultation by one unit will increase attitudes by 36%. With a p value of 0.020 < 0.05, Ha is accepted, which means that the direct effect of consultation on attitudes is statistically significant. The latest technology, such as the use of new superior seeds with higher productivity, has made farmers understand the advantages of using recommended seeds, one of which is to break the chain of pests which is the main problem in Bunga Raya District. In addition, sorting and treating the seeds when they are about to be sown helps farmers to increase the viability of the seeds when they are sown. The use of alsintan (planter machines, combine harvest machines) has been carried out by farmers who have always been echoed by extension workers in order to achieve efficiency in paddy rice farming in one planting season. Extension agents are very willing to be met during work/office hours if farmers wish to conduct consultations either directly or indirectly/via telephone, consultations regarding problems faced by farmers regarding farming & the introduction of the latest technology. The convenience provided by technology makes farmers even more enthusiastic because of notification of the latest technologies by extension worker. these results are supported by research by Garcia-Alvarez-Coque et al. (2020) show that Knowledge management platforms for extension services should include both technical and facilitation (non-technical) platforms

Monitoring & evaluation of skills has a positive direct effect of 0.268. An increase in monitoring & evaluation by one unit will increase skills by 26.8%. With a p-value of 0.008 < 0.05, Ha is accepted, which means that the direct effect of monitoring & evaluation on skills is statistically significant. Coordination between extension workers and farmers in anticipating the spread of pests and diseases is solid so that whenever there is an indication of a pest or disease attack, extension agents and farmers can anticipate the time, method and use. In evaluating the stages of rice farming production, farmers already understand and understand the training taught by extension agents such as cultivating land in the early stages of planting, selecting seeds according to recommendations that aim to make the seeds' vitality higher at the time of sowing, carrying out the stages of harvesting according to recommendations by using a combine harvester. However, farmers prefer to exchange ideas with fellow rice farmers directly. The closeness between farmers makes farmers more open to exchanging ideas. Monitoring carried out by farmers in marketing their agricultural products is to remind farmers not to be in debt to collectors. When farmers are in debt, the rice yields are immediately sold to traders in the form of harvested wet grain which makes farmers have no bargaining position. A good extension approach is a participatory approach compared to the top-down approach. In carrying out extension activities, institutional constraints often occur related to the limited number of extension workers and the lack of technical knowledge of extension workers (Baloch & Thapa, 2018).

Monitoring & evaluation of knowledge has a positive direct effect of 0.312. An increase in monitoring & evaluation by one unit will increase knowledge by 31.2%. With a p-value of 0.000 <0.05, Ha is accepted, which means that the direct effect of monitoring & evaluation on knowledge is statistically significant. Monitoring carried out by extension workers to farmers in anticipating the spread of pests and diseases, one of which is when they are about to sow rice seeds, farmer extension workers will inspect special beds in the rice fields that have been prepared by farmers as a growing medium for rice seeds to be planted. The evaluation will be carried out by extension workers when

ISSN 2580-0566; E-ISSN 2621-9778
http://ejournal2.undip.ac.id/index.php/agrisocionomics
Vol 7 (3): 643-659, November 2023

the rice seedlings have grown and pests have started to appear, such as golden snails. Monitoring carried out by extension workers to farmers in marketing their agricultural products is to remind farmers not to be in debt to collectors. Likewise with the evaluated cropping system which initially used 10:1 to 4:1 which is a 4-row cropping system interspersed with 1 empty row with twice the width of the spacing. Evaluation of the cropping system increases productivity in agricultural products. Extension officers also monitor the use of seeds, namely the logawa variety is the seed that is always and dominantly used by farmers in Bunga Raya District. Because these seeds are the most resistant among other varieties. But the problem is when the seeds used are taken from repeated harvests. But there are also many farmers who always buy labeled superior seeds every time they start a new planting season. The use of harvesting machines (combine harvest) is more efficient and effective in terms of time, effort and costs incurred by farmers. According to Salehi et al. (2021), farmers' perspectives and satisfaction with an agricultural program are not the same between experts and farmers, to achieve an agricultural program, farmers must be given confidence in program planning and implementation models of agricultural extension

CONCLUSION AND SUGGESTION

Farmers' skills are influenced by education, monitoring and evaluation. The attitude of farmers is influenced by education, consultation. Farmer's knowledge is influenced by farmer characteristics, facilitation, monitoring and evaluation. Education, consultation, facilitation, monitoring and evaluation which are dimensions of the role of extension agents significantly influence the behavior of rice seed breeders consisting of knowledge, attitudes and skills.

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