

Farmer Group Management Development Model in Rice Farming



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ABSTRACT: Farmer group management is a process of planning, activating and evaluating farmer group work programs. This research aims to analyze the internal factors that can formulate a development model for farmer group management, and analyze how much influence these internal factors have on improving farmer group management. The variables of this study consist of X variables, namely: Characteristics (X1), social psychology of farmers (X2), and the role of stakeholders (X3), and Y variables, namely; farmer group management. This research is designed as explanatory research. Data were collected from a sample selected by proportional sampling from 37 members of a purposively selected farmer group in farmer groups in three districts in Gorontalo City. The data obtained in this research were analyzed using the *Structural Equation Model* (SEM). The results showed that the variable characteristics, social psychology of farmers, and the role of stakeholders influenced the management of farmer groups with the following coefficients: 0.61, 0.85, and 0.45 significant at $\alpha = 0.05$. Cumulatively (R^2) the influence of characteristics, social psychology of farmers, and the role of stakeholders on farmer group management is 87%, the remaining 13% is the influence of other variables outside of this Research.

KEYWORDS: Characteristics, farmer groups, management, role of stakeholders, social psychology

I. INTRODUCTION

The agricultural sector is the driving force for national and regional economic development, especially in the management and provision of food for the community to reduce poverty, provide employment, and are a source of income for the community's economy. However, the development of the agricultural sector has not shown significant results in accordance with the expectations of the community and the government, this is due to the lack of use of agricultural technological innovations in the farming system and the lack of management of farmer groups which are a forum for learning for farmers.

The role of farmers in farmer groups can increase the scale of farming production through the use of technological innovations delivered by agricultural extension workers. According to Soto et al (2021) farmer groups are a learning platform for farmers to change their knowledge, skills, attitudes, and independence in farming. According to Kumeh et al (2021) farmer groups are a forum for farmers to discuss finding solutions to solving farming problems. Farmer group management functions as a measuring tool for planning and increasing productivity through group farming management (Schwering et al, 2022).

Agricultural development is supported by the implementation of agricultural counseling using a group approach as an effort to encourage the growth of farmer institutions. However, the reality on the ground is that the role of farmer group management in increasing farm production has not been maximized, due to the lack of farmer participation that can drive farmer group activities in fostering cooperation in planning farmer group work programs. This is also influenced by the fact that there are still many farmers who have not joined farmer groups, the limited number of agricultural extension workers as facilitators, and the lack of financing in fostering farmer groups and farmer group associations.

Lack of knowledge and skills in group management is a measure of the failure to achieve farmer group work programs that can improve the welfare of farmers and their families. According to Das et al (2022) group management can be analyzed through several indicators including: (1) group planning, (2) group organization, (3) group activity implementation, and (4) group evaluation.

Farmer group management model is analyzed through two approaches, namely; internal factors and external factors farmer groups. Internal factors consist of characteristics and social psychology of farmers. According to Filimonau & Vladimir

Farmer Group Management Development Model in Rice Farming

(2021) external factors are the role of stakeholders in improving the management process of farmer groups which include; the role of agricultural extension workers, the role of government, the role of information media, and social norms. Individual characteristics are traits that are inherent in a person and related to aspects of life and work, namely: age, education, and work experience (Shaw & Jay, 2022). According to Kruger et al (2022), that social psychology is a form of relationship between humans and groups in their environment that is influenced by human behavior, such as; leadership, perception, motivation, participation, and communication of farmer group members. Internal factors and external factors are considered to influence the management of farmer groups.

Farmer group management in Gorontalo City has not been carried out in accordance with management principles which consist of planning, organizing, implementing, and evaluating farmer group work programs. This is influenced by the lack of psychological ability factors from administrators and members of farmer groups, as well as the lack of the role of several stakeholders who can foster farmer group activities.

Based on the explanation above, the objectives of this research are: analyzing internal factors that can formulate a development model for farmer group management in rice farming, and analyze how much influence these internal factors have on improving the management of farmer groups in rice farming.

II. RESEARCH METHODS

This research was conducted in Gorontalo City in three districts namely; Sipatana District, Kota Timur District, and Kota Tengah District in farmer groups carrying out rice farming. The selection of research sites was purposive with the consideration that farmer groups in the three districts have the highest rice productivity in Gorontalo City. The research was conducted from August to November 2024.

The research method used is explanatory method using survey techniques. Explanatory research is carried out to describe a symptom, event and event that occurs factually, systematically and accurately. The research variables include the independent variable (X) and the dependent variable (Y). The independent variable (X) consists of: characteristics of farmers, social psychology of farmers, and the role of stakeholders. The dependent variable (Y), namely; farmer group management.

To determine the effect of the independent variable on the dependent variable, the operational formula for the measurement equation model and the structural equation model are prepared according to the *Structural Equation Model (SEM)*. The measurement equation model and the research structural equation model are described as follows:

A. Measurement model equation:

1. Characteristic variable measurement:

$$X1.1 = \lambda_1 X_1 + \delta_1$$

$$X1.2 = \lambda_2 X_1 + \delta_2$$

$$X1.3 = \lambda_3 X_1 + \delta_3$$

$$X1.4 = \lambda_4 X_1 + \delta_4$$

2. Social psychology variables measurement:

$$X2.1 = \lambda_5 X_2 + \delta_5$$

$$X2.2 = \lambda_6 X_2 + \delta_6$$

$$X2.3 = \lambda_7 X_2 + \delta_7$$

$$X2.4 = \lambda_8 X_2 + \delta_8$$

$$X2.5 = \lambda_9 X_2 + \delta_9$$

3. Measurement of stakeholder role variables:

$$X3.1 = \lambda_{10} X_3 + \delta_{10}$$

$$X3.2 = \lambda_{11} X_3 + \delta_{11}$$

$$X3.3 = \lambda_{12} X_3 + \delta_{12}$$

$$X3.4 = \lambda_{13} X_3 + \delta_{13}$$

4. Measurement of farmer group management variables:

$$Y1.1 = \lambda_{14} Y_1 + \epsilon_1$$

$$Y1.2 = \lambda_{15} Y_1 + \epsilon_2$$

$$Y1.3 = \lambda_{16} Y_1 + \epsilon_3$$

$$Y1.4 = \lambda_{17} Y_1 + \epsilon_4$$

B. Equation of the structural model of farmer group management:

$$Y = \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 + \zeta_1$$

Farmer Group Management Development Model in Rice Farming

Based on the measurement equation model and the structural equation model, the variables in this research are described in Table 1.

Table 1. Variables and sub-variables of the measurement equation model and the structural equation model

Variable	Subvariable	Notation
Exogenous latency		
Characteristics	Age	X1.1
	formal education	X1.2
	Farming experience	X1.3
	Paddy field area	X1.4
Social psychology	Leadership	X2.1
	Perception of farmer group members	X2.2
	Farmer group member motivation	X2.3
	Participation of farmer group members	X2.4
	farmer group member communication	X2.5
The role of stakeholders	Government	X3.1
	Agricultural extension	X3.2
	Information media	X3.3
	Social norms	X3.4
Endogenous Latent		
Farmer group management	Planning	Y1.1
	Organizing	Y1.2
	Implementation	Y1.3
	Evaluation	Y1.4

The population in this research were members of farmer groups in three selected districts with a total of 5 (five) farmer groups with 145 members.

Sampling was carried out by proportional sampling of 25% of the total number of members of the farmer group, so that the total sample of farmers who became respondents was 37 people. Arikunto (2002) explains that for respondents less than 100, the sample is taken from all members of the farmer group, if the number of respondents is more than 100 then the sampling is 10% - 15% or 20% - 25% or more. The number of farmer groups in the three research sub-districts is described in Table 2.

Table 2. Number of Farmer Groups in the Three Research Districts

No	Farmer Group Name	Member (Person)	Sample (25%)
1	Pertasil	35	9
2	Snapping	27	7
3	Sustainable Roofing	40	10
4	Molta Jaya	23	6
5	Rice Flower	20	5
Amount		280	37

Source: Primary Data After Processing, 2024.

The data in this research comes from primary data and secondary data. Primary data is data obtained from interviews with farmers who are respondents through questionnaires. Secondary data is data in a systematic form obtained from related agencies, namely from the Department of Agriculture, and Agricultural Extension Center.

The analytical method to determine the effect of internal factors and external factors on the management of farmer groups is *Structural Equation Modeling* (SEM) analysis with the LISREL (*Linear Structural Relationships*) program which can describe variables according to their indicators (measurement model) and explain the causal relationship between variables (measurement model structural).

Model suitability testing was carried out using several *Goodness-of-Fit-Test* (GFT) model suitability measures. A structural model is indicated as suitable or *fit* if it satisfies three types of GFT, namely: (1) chi-square test $p\text{-count} \geq 0.05$, (2) *Root Means*

Farmer Group Management Development Model in Rice Farming

Square Error of Approximation (RMSEA) ≤ 0.08 and (3) Comparative Fit Index (CFI) ≥ 0.90 .

III. RESULTS AND DISCUSSION

Farmer Group Management Model

Farmer group management was analyzed with structural equation model parameters, as described in Figure 1.

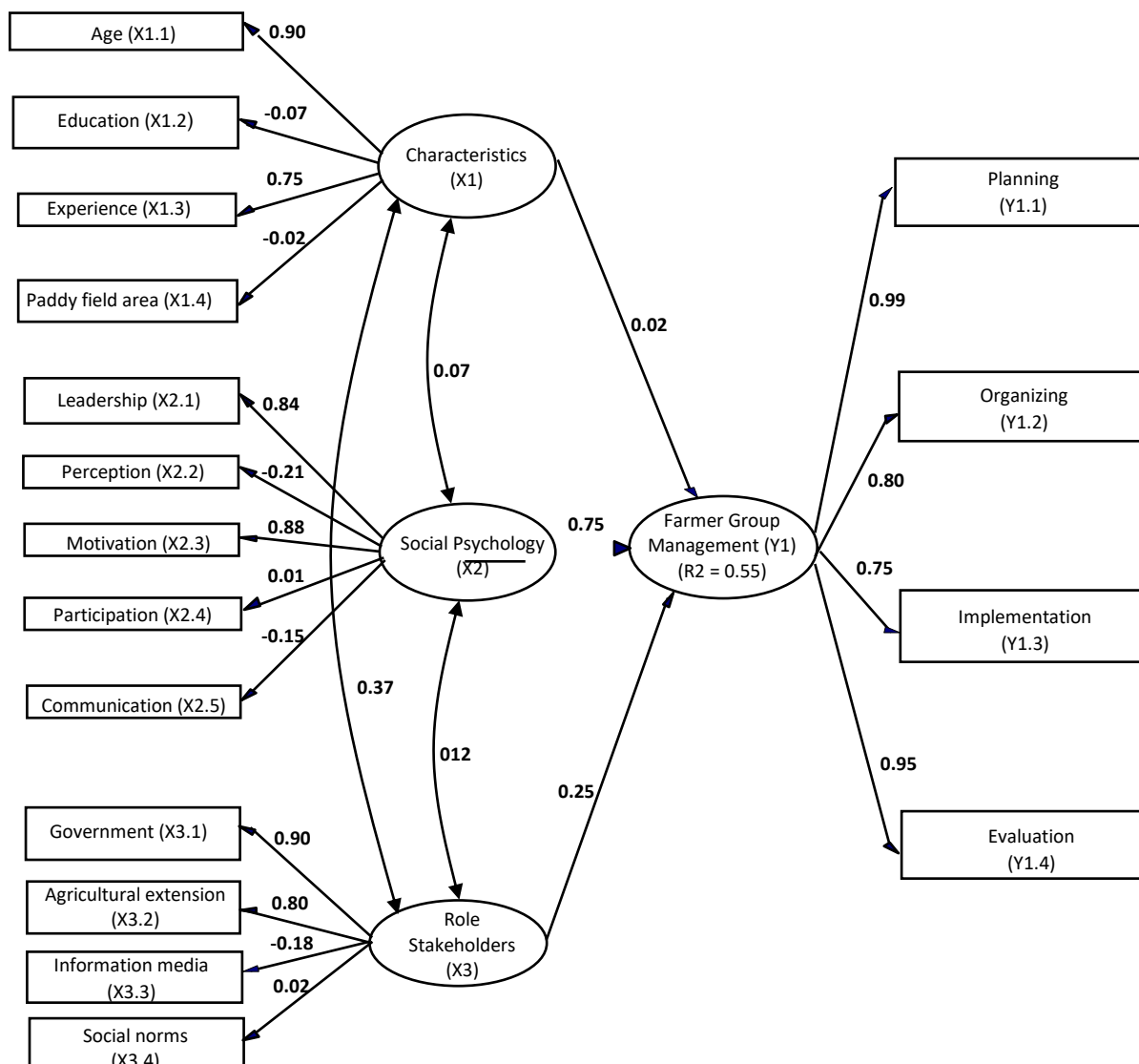
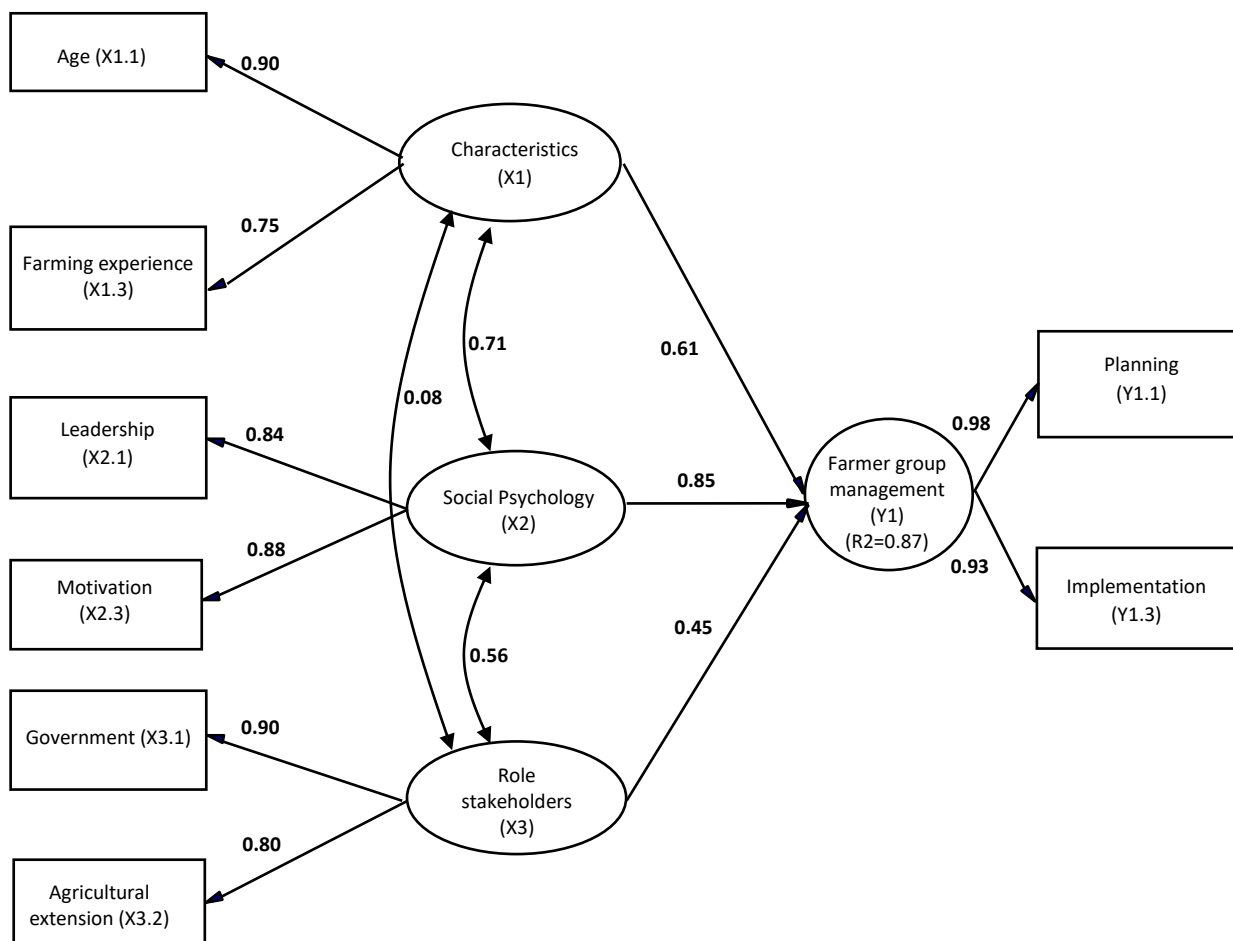


Fig 1. Estimation of all parameters of the structural model of farmer group management

Farmer group management was analyzed with structural equation model parameters, as shown in Figure 1 which shows the p -value = 0.00000 < 0.05 , where the *Root Mean Square Error of Approximation* (RMSEA) = 0.143 > 0.08 , and the *Comparative Fit Index value* (CFI) = 0.62 < 0.91 , meaning that the model being tested was unable to estimate the covariance matrix of the study population. Thus the results of testing the suitability of the farmer group management model in Figure 1 show that the measurement model does not fit the data, so the model needs to be improved.

Kusnendi (2008) states that, if an indicator is found in the model that is invalid, then the indicator is removed from the measurement model. That is, the measurement model is corrected and the factor weight coefficient is re-estimated. An indicator is said to be valid and reliable in measuring its latent variable if: (1) statistically the coefficient of the weighted factor is real at an error rate of $\alpha = 0.05$, and (2) the magnitude of the estimated coefficient of the weighted factor of each standardized indicator is not less than 0.40 or .50. Thus the improvement of the model that is not fit refers to both of these things. After repairing the model, a fit model was found based on the estimation of the parameters of the structural model of farmer group management and statistical *t-count* of the parameters of the farmer group management model as shown in Figure 2.

Farmer Group Management Development Model in Rice Farming



Chi-Square = 71.12, df = 55, p-count = 0.073, RMSEA = 0.050, CFI = 0.95

Fig 2. Parameter estimation of the structural model of farmer group management that fits the data

Figure 2 shows the existence of a structural model of farmer group management which is a fit model with variable data that influences the structural model of farmer group management through the path of influence between variables whose structural model equation formula is as follows:

$$Y = 0.61X1 + 0.85X2 + 0.45X3$$

Overall the results of the analysis of the structural model of farmer group management show the relationship and influence between variables/sub-variables which are summarized in Table 3.

Table 3. Decomposition of the influence between variables/sub-variables of the farmer group management model

Relationship between variables/sub variables		Influence			t count
		Live	Indirect	Total	
Characteristics farmers	of → Farmer Group Management	0.61	-	0.61	2.75
Characteristics farmers	of → Planning		0.21	0.21	3,21
Characteristics farmers	of → Implementation		0.18	0.18	2.85
Psychology Social	→ Farmer Group Management	0.85	-	0.85	3.45
Peasant psychology	social → Planning	-	0.71	0.71	5,36
Peasant psychology	social → Implementation	-	0.53	0.53	4.54

Farmer Group Management Development Model in Rice Farming

Role	→	Farmer Group Management	0.45	-	0.45	2.63
Stakeholders	→	Farmer Group Management				
Stakeholder Role	→	Planning	-	0.34	0.34	2.59
Stakeholder Role	→	Implementation	-	0.22	0.22	2.37

Description: t 0.05 table = 1.96

The equation of the measurement model and the structural equation model of farmer group management as shown in Figure 2 in this study are explained as follows:

A. Measurement model equation

1. Loading on farmer characteristic variables (X1):

$$X1.1 = 0.90 X1$$

$$X1.3 = 0.75 X1$$

2. Loading on social psychology variables of farmers (X2):

$$X2.1 = 0.84 X2$$

$$X2.3 = 0.88 X2$$

3. Loading on the stakeholder role variable (X3):

$$X3.1 = 0.90 X3$$

$$X3.2 = 0.80 X3$$

4. Loading on farmer group management variables (Y):

$$Y1.1 = 0.98 Y$$

$$Y1.3 = 0.93 Y$$

B. Equation of the structural model of farmer group management:

$$Y = 0.61X1 + 0.85X2 + 0.45X3$$

Effect of Farmer Characteristics on Farmer Group Management

The results of the research in Figure 2 show that the variable characteristics of farmers directly have a significant effect on the management of farmer groups. This means that the characteristics can determine the good or bad management of farmer groups with an effect coefficient of 0.61 which is significant at $\alpha = 0.05$. The influence of characteristics on the management of farmer groups can be seen in the good or bad management planning and management of the implementation of farmer groups. This indicates, if there is an increase in one characteristic unit, it will increase the management of farmer group planning by 0.21 units and at the same time increase the management of farmer group implementation by 0.18 units.

The results of the research in Table 3 explain that the influence of the characteristics of farmer group members on improving the management of farmer group planning, because characteristics can determine individual abilities in planning farmer group work programs. The results of this study are in line with the results of research from Kamariotou and Fotis (2022) which explain that planning is the main work in the management process which is determined by individual perceptions and abilities to understand organizational goals. Furthermore, the results of research from Martins et al (2022) concluded that planning in management is a mindset that forms the basis for intruding on certain problems.

The results of the research in Table 3 explain that the influence of the characteristics of farmer group members on improving the management of farmer group implementation, because individual characteristics contribute to the actualization of farmer group work programs that have been planned at the managerial level in order to achieve organizational goals. The results of this study are in line with the results of research from Jewell et al (2022) which concluded that implementation management is the movement or motivation of group members so that they can optimally actualize work plans.

The Influence of Farmer Social Psychology on Farmer Group Management

The results of the research in Figure 2 show that the social psychology variables of farmers directly have a significant effect on the management of farmer groups. This means that social psychology can determine the pros and cons of farmer group management with an influence coefficient of 0.85 which is significant at $\alpha = 0.05$. The influence of social psychology on the management of farmer groups can be seen in the good or bad planning and implementation of farmer group management. This indicates, if there is an increase in one unit of social psychology, it will increase planning management by 0.71 units and at the same time increase the management of farmer group implementation by 0.53 units.

The results of the research in Table 3 explain that the influence of social psychology on improving planning management, because social psychology determines the behavior and personality of managers/members in the process of planning management of farmer group work programs. The results of this study are in line with the results of research from Bourceret et

Farmer Group Management Development Model in Rice Farming

al (2022) which explain that social psychology is the experience of individual behavior that plays a role in planning management according to organizational environmental conditions.

The results of the research in Table 3 explain that the influence of social psychology on improving implementation management, because the implementation of work programs in management is determined by the psychological processes of members and managers who work together to achieve the goals of farmer groups. The results of this study are in line with the results of research from Maheshwari (2022) which concluded that implementation management is determined by the social psychological structure of individuals related to affiliation motivation and self-actualization.

The Effect of Stakeholder Roles on Farmer Group Management

The results of the research in Figure 2 show that the stakeholder role variable directly has a significant effect on the management of farmer groups. This explains that the role of stakeholders can determine the pros and cons of farmer group management with an effect coefficient of 0.45 which is significant at $\alpha = 0.05$. The influence of the role of stakeholders on the management of farmer groups can be seen in the good or bad planning management and implementation management. This indicates, if there is an increase in one stakeholder role unit, it will increase the management of farmer group planning by 0.34 units and at the same time increase implementation management by 0.22 units.

The results of the research in Table 3 explain that the influence of the role of stakeholders on improving the management of farmer group planning, because the role of stakeholders in planning is to make policies in certain areas related to organizational management for the benefit of society. The results of this study are in line with the results of research from Andersen et al (2021) which explain that the role of stakeholders in planning is to hold discussions and deliberations with strategic management designers to realize work programs according to organizational management.

The results of the research in Table 3 explain that the influence of the role of stakeholders on improving the management of the implementation of farmer groups. because the role of stakeholders can contribute to the budget, information on technological innovation, and oversight of the management of the implementation of farmer group work programs. The results of this study are in accordance with the results of research from Zikargae et al (2022) which concluded that the implementation of an organizational management is a shared responsibility of stakeholders in realizing work programs that have been planned together through budget intervention and supervision to achieve organizational goals.

Influence of Characteristics, Social Psychology, and the Role of Stakeholders in the Management of Farmer Groups

The results of the research in Figure 2 show that the variable characteristics, social psychology, and stakeholder roles have a significant effect on farmer group management with a coefficient of determination (R^2) of 0.87% which is significant at $\alpha=0.05$. This means that the three independent variables (X) simultaneously have a significant effect on farmer group management (Y) by 87% and the remaining 13% is the influence of other variables not included in this study.

The influence of characteristics on farmer group management is determined by two dimensions, namely; farmer's age and farming experience. This means that increasing the age of farmers and farming experience will improve the management of farmer groups. While the other two dimensions of farmer characteristics, namely: formal education and paddy field area in this study have an estimated factor weight coefficient of less than 0.40 which is not significant at $\alpha = 0.05$. This means that the two dimensions are not valid in measuring farmer group management in rice farming.

The influence of social psychology on farmer group management is determined by two dimensions, namely; leadership and motivation of farmer group members. This means that increased leadership and motivation will improve farmer group management, while the other three dimensions of social psychology, namely: perception, participation, and communication of farmer group members in this study have an estimated factor weight of less than 0.40 which is not significant at $\alpha = 0,05$. This means that the three dimensions of farmer social psychology are not valid in measuring farmer group management in rice farming.

The influence of the role of stakeholders on the management of farmer groups is determined by two dimensions, namely; role of government and agricultural extension. This means that the increasing role of the government and agricultural extension workers will improve the management of farmer groups, while the other two dimensions of stakeholder roles, namely: the role of information media and social norms in this study have an estimated factor weight of less than 0.40 which is not significant at $\alpha = 0,05$. This means that the two dimensions of the stakeholder role are not valid in measuring farmer group management in rice farming.

The results of this study are in line with the results of research from Lyngdoh et al (2018) which explain that organizational management is the result of the development of social psychology from individual behavior in determining the direction of planning and implementing organizational work programs. Furthermore, the results of research from Domingues et al (2023) concluded that individual characteristics can influence the role of stakeholders in organizational management which can create development policies and community welfare.

Farmer Group Management Development Model in Rice Farming

IV. CONCLUSION

Based on the results of the research and discussion, it can be concluded that the development model of farmer group management in rice farming is influenced by internal factors, namely; farmer's age, farming experience, leadership, motivation, role of government, and role of agricultural extension which are manifestations of exogenous latent variables, namely; characteristics of farmers, social psychology of farmers, and the role of stakeholders. Cumulatively (R^2) the influence of farmer characteristics, social psychology of farmers, and the role of stakeholders on farmer group management is 87%, the remaining 13% is another influence outside of this study.

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Farmer Group Management Development Model in Rice Farming

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