Factors Influencing Jajar Legowo Innovation Decisions
(Case Study Of Budi Sepakat Farmer Group, Koto Tangah District, Padang City)

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Abstract – **This study aims to describe the diffusion of legowo jar innovation in the Budi Sepakat farmer group and find out the factors that influence the decision of legowo jajar innovation in the Budi Agree farmer group, Koto Tangah District, Padang City. This research method uses qualitative and descriptive quantitative with a case study approach in Budi Sepakat's farmer group. The analysis of the first objective data was carried out by interactive analysis of Miles and Huberman in [1] The data used in this study are primary data and secondary data. The results showed that the innovation of legowo rows is an innovation regarding rice planting spacing with alternating planting patterns between two or more rice planting rows and one empty row. The legowo jajar innovation was first introduced by the Department of Agriculture through the 2017 Penas event in Aceh. Communication runs smoothly with the communication channel used, namely interpersonal communication channels. This innovation was communicated in 2017 and implemented in 2021. This innovation does not oppose customs and culture and is fully supported by the community. The factors that influence farmers' decisions on legowo line innovation are the nature of successive innovations, namely: Compatibility, complexity, relative advantage, trialability, and observability. And factors that do not influence farmers' decisions on legowo line innovation are age, land area, and education.**

Keywords – **Legowo Line; Innovation Characteristics; Decision Making.**

I. INTRODUCTION

Indonesia's agricultural development is directed toward *sustainable agricultural* development. The National Medium-Term Development Plan (RPJMN) for 2015-2019, the agricultural sector is an important sector and plays a role in national economic development. Agricultural development requires dynamic agriculture, namely agriculture characterized by, among others, the continuous use of new technology, and the role of farmers and their families in carrying out their agricultural activities.

Food crops are one of the very important and strategic subsectors of agriculture and the economy. The challenge of food security today is the growing population that requires large and diverse food provision. Food self-sufficiency efforts intensified by the government, one of which is rice food commodities. Domestic rice production has not been able to meet needs, so the government still has to import rice from abroad[2].

The need for rice as the basic need of the Indonesian people in meeting food needs encourages farmers to perform well and provide optimal results. The achievement of *performance farming* will be determined by farmers and other factors that influence it, both internal and external factors [3].

The rice harvest area in West Sumatra province in 2021 only reached around 272,392 hectares, a decrease of 7.87% from 2020. 2021 rice production of 1,317,209 tons decreased by 70,060 tons or 5.5% from 2020. If converted into rice for food consumption by the population, rice production in 2021 amounted to 762,694 tons, a decrease of 40,566 tons compared to 2020. Therefore, innovation is needed to increase rice production in the form of rice improvement programs with the legowo row system. (Central Bureau of Statistics of West Sumatra province).

The main purpose of rice plants with the legowo row system is to increase plant populations by adjusting plant spacing and manipulating the location of plants as if rice plants are on the edge will result in higher rice production and better quality of grain [4]. In disseminating information (Diffusion of Innovation) and motivating farmers, extension workers need help to do their job so that farmers are able and willing to adopt an innovation. According to Law number. 16 of 2006, agricultural extension workers are a learning process for main actors and business actors so that they are willing and able to help and organize themselves in accessing market information, technology, capital, and other resources, which aims to be able to change their knowledge, skills, and attitudes so that farmers can accept new ideas. For the dissemination of this information, communication is needed. Innovation communication is a process by which innovation is communicated through various channels within a certain period of time in a social system [5].

To facilitate the course of counseling, of course, it must also be supported by the presence of farmer groups. Budi Sepakat farmer group is the group that most participate in cultivating rice plants with the legowo row system in Koto Tangah District, Padang City. However, farmers still need to get comprehensive counseling in order to optimally implement the legowo row planting system.

Based on the background and formulation of the problem above, it can be seen that the objectives of this study are:

(1) Describing the diffusion of legowo jajar innovation in the Budi Sepakat farmer group (2) Knowing the factors that influence the decision of legowo jajar innovation in the Budi Agree farmer group, Koto Tangah District, Padang City.

II. LITERATURE REVIEW

The Jajar Legowo planting system is an attempt to manipulate the location of the plantation, so that the plant will have a larger number of peripheral plants with empty rows. As is known that rice plants that are on the edge have better growth and development than rice plants in the middle row so as to provide higher production results and grain quality. This is because plants that are on the edge will get more sunlight intensity [6]. The legowo planting system is a way of planting rice fields with a pattern of several rows of plants interspersed with one empty row. Plants that should have been planted in empty rows are moved as insert plants in rows. Then interspersed by 1 empty row where the planting distance on the edge row is 1/2 times the distance of plants in the middle row. How to plant legowo rows for rice fields, in general, can be done with various types, namely: legowo (2: 1), (3: 1), (4: 1), (5: 1), (6: 1) or other types.

All ideas, ways, and objects operated by a person as something new, are innovations. According to [5], innovation is novelty in assumption, or novelty in subjective things that are interpreted for someone, which determines his reaction to the innovation. From a macroeconomic perspective, innovation is also related to economic growth, improving the standard of living, and international competitiveness of a country. The need for innovation is aided by information technology in a variety of ways. In this contemporary era, it is difficult to separate innovation and technology due to its outstanding offerings in all types of industries and sectors [7].

Soekartawi, 2005 in [8] stated that several things that are important in influencing innovation decisions include; age, education, courage to take risks, relationship patterns, attitudes towards change, motivation to work, aspirations, fatalism, certain belief systems, and psychological characteristics. The results of Hidayat's research, (2020) said that the factors that influence the adoption of innovation are: the characteristics of farmers, characteristics of innovation, the intensity of extension services, and the availability of innovation-supporting facilities. The variables that allegedly influence farmers' innovation decisions in this study are the characteristics of farmers, as well as the speed of innovation decisions; namely relative advantage, compatibility, complexity, triability, and observability [5].

III. RESEARCH METHODS

This research was carried out in Aia Pacah Village, Koto Tangah District, Padang City, West Sumatra, the object of

this research was the Budi Sepakat farmer group, which used legowo line innovation. This research will be conducted from April 2023 to May 2023. The research method uses qualitative and quantitative approaches with case study methods in Budi Sepakat's farmer group. The data used are primary data and secondary data.

Respondents in the study for the first purpose were the tools of the Budi Agree farmer group, including the chairman, secretary, and treasurer. While the respondents for the second destination were all members of the Budi Sepakat farmer group totaling 39 people. Data analysis used for the first purpose of describing the diffusion of legowo line innovations used interactive analysis of Miles and Huberman in [1]. For the second purpose, knowing the factors that influence the decision to apply legowo rows is used in multiple linear regression analysis.

IV. RESULTS AND DISCUSSION

Farmer Group Budi Sepakat

The farmer group Budi Sepakat is a farmer group that has been established since 1994, this group is a farmer group whose members all members of the group cultivate rice plants. This group was originally chaired by Mr. Munir Hb, but in 1998 this group was no longer active and even the members of the group no longer existed. Seeing that the Budi Sepakat group experienced this problem, the father of Adang Muslim who is a community within the Budi Sepakat group empathized to build a Budi Sepakat farmer group to develop again. In addition, KUT (provision of agricultural credit) assistance is one of the government policies aimed at helping farmers' capital in applying recommended technology so that farmer productivity and farmer income can be increased. KUT assistance can be obtained if you join a farmer group. To rebuild the Budi Sepakat farmer group, Mr. Muslim Adang met Mr. Munir to discuss the Budi Sepakat farmer group and ran to become the chairman of the Budi Sepakat farmer group. Until now the chairman of the Budi Sepakat farmer group is Pak Muslim Adang. This farming group started to be active again in 2000.

The Budi Sepakat farmer group is now chaired by Mr. Muslim Adang, secretary Mr. Ilman, and treasurer Mrs. Siska Fatmiya. The vision of the Budi Sepakat farmer group is the realization of a prosperous rice farming community through competitive, fair, and sustainable use of resources. And the mission of the Budi Sepakat farmer group is (a) Building solidarity, cooperation, and always the interaction between groups and surrounding communities, (b) Making farmer groups a force that advances welfare, and (c) Managing and developing human resources for food security and income in a sustainable manner.

Description of Legowo Jar Innovation Diffusion

Innovation

All ideas, ways, and objects operated by a person as something new, are innovations. New here is not merely a measure of time since it was encountered or the first time the innovation was used. According to respondents' responses, jajar legowo innovation is an innovation regarding rice planting spacing, which is basically done by adjusting the spacing of rice seedlings with alternating planting patterns between two or more rice planting rows and one empty row. Which has the advantage of increasing rice crop production, reducing pest attacks, and facilitating the maintenance of rice plants.

Communication Channel

Communication is the process by which the actors involved create and convey messages to one or many people with the aim of achieving a common understanding. While communication channels are means or intermediaries used to convey messages from communicators to communicants. The innovation of jajar legowo was introduced by the Padang city agriculture office in 2017 through the PENAS (National Farmers Week) program, then further introduced by BPP Sukarami in 2021 in the rice dissemination program until now continued by agricultural extension under the auspices of BPP Koto Tangah. Communication runs smoothly with the communication channel used, namely interpersonal communication channels, namely directly meeting with members of the Budi Agreed farmer group, communication about this legowo jajar innovation is still continuing today.

Period

According to Rogers (1996) in [9] which states that the period of time is the process of making innovation decisions by

adopters starting from someone knowing the existence of innovation to adopting or rejecting the innovation. The Jajar Legowo innovation was introduced in 2017, after being introduced, namely from 2017-2020 members of the Budi Sepakat farmer group only tried to apply it on a small part of their land with the aim of seeing results. In 2021, members of the Budi Sepakat farmer group have been able to make decisions from 39 members, 24 of whom adopted the legowo jar innovation, 15 of whom rejected the legowo line innovation.

Social System

A social system is defined as a set of interconnected units related to each other in an attempt to solve problems to achieve a common goal. Members of a social system are individuals, informal groups, organizations and sub-systems. The innovation of the legowo jar does not affect the relationship between members of the Budi Sepakat group with other farmers, but if around the land that uses the legowo line innovation, there are those who farm conventionally, it is feared that there will be many rat pests on conventional land. The surrounding community, extension workers, government and agriculture office support this innovation well.

Characteristics of Respondents

Age

Age is one of the factors that greatly influences the level of productivity of farmers in carrying out their farming activities. The age is calculated from the group farmers in the Budi Sepaat farmer group to be born until the time the research is conducted. Farmers in the Budi Sepakat farmer group aged 30-40 years amounted to 5 people or 12.8%, those aged 41-50 years amounted to 7 people or 18%, and those aged >51 years amounted to 39 people or 69.2%. It was concluded that the data showed that members of the Budi Sepakat farmer group were generally still at a productive age.

In this vulnerable age, people who are in productive age tend to have physical abilities that allow them to cultivate land in an effective and efficient way and are able to accept innovations in improving their business so that they can get greater profits, this is also in line with [10] opinion (2021) which states that the age of farmers affects their physical abilities and responsiveness to new things when running agriculture. The younger the farmer, the more excited he is curious about what is not yet known. Therefore, young farmers will try to adopt innovations faster, even if they have no experience.

Land

The area of agricultural land is the area of land cultivated by farmers either owned, fishing, or renting. Rice farming activities carried out in the Budi Sepakat farmer group have a land area that varies from 1300 M² to 15000 M². Based on the study, it is known that 28 people or 71.85 respondents have a production area of 1300 – 4100 M², 10 people, or 25.7% of respondents have a land area of 4200 – 7000 M² and 1 person, or 2.5 respondents have a land area of 7100 – 10,000 M². The agricultural land area of the Budi Sepakat farmer group does not reach 1 ha on average. Agricultural land is the most important thing in farming, where the wider the land, the greater the amount of production that farmers can produce [11]. However, a land area that is not so large but follows the right innovation and technology will produce high production also compared to conventional farming.

Education

Education is formal learning that has been passed by farmers based on the last diploma they have. Education is one of the indicators of the socioeconomic state of a society. Highly educated farmers implement innovations relatively quickly. Conversely, it is more difficult for poorly educated farmers to implement innovations quickly [10]. Based on the research, it can be concluded that from 39 respondents, there were 24 people, or 61.5% who received education up to the level of elementary school education (SD), 14 people, or 36% who completed education until junior high and high school and only 1 person or 2.5% who reached the level of Academic / D3 / S1 education.

Brganda Linear Regression Test

Multiple linear regression analysis aims to see if there is a relationship between the independent variable and the dependent variable. The independent variables in this study are age, educational land area, relative advantage, compatibility, complexity, trialability, and observability. While the dependent variable in this study is the decision of farmers.

Table 1. Multiple Linear Regression Test

Type		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.467	2.022		1.220	.232
	Age	-.086	.428	-.033	-.202	.841
	Land	1.075	.563	.299	1.909	.064
	Education	1.029	.534	.302	1.927	.062
	Relative advantages	.854	.196	.583	4.364	<,001
	Compatibility	1.237	.175	.757	7.052	<,001
	Complexity	1.055	.232	.598	4.537	<,001
	Triability	1.045	.365	.426	2.861	.007
	Observability	.906	.362	.381	2.504	.017

a. Dependent Variable: Farmer Decision

Source : SPSS 2023 data processing

Based on table 9 above, a regression equation model is obtained, namely:

$Y = 2.467 + (-0.086)X_1 + 1.075X_2 + 1.0292X_3 + 0.854X_4 + 1.237X_5 + 1.055X_6 + 1.045X_7 + 0.906X_8 + e$

Test the hypothesis

Simultaneous Testing (F-Test)

Simultaneous testing (F-Test) aims to determine whether together (simultaneously) has an influence between the independent variable and the dependent variable. Test F can be seen at a significance value of < 0.05, if the significance value < 0.05 then it can be said that the independent variables have a simultaneous effect on the dependent variable. Analysis of the F Test can also be seen in the f value of the table where if the f value is calculated > f table then it can be said that the independent variables have a simultaneous effect on the dependent variable. For F the table obtained is: 2.32.

Table 2. Test F

Model		Sum of Squares	df	Mean Square	F	Itself.
1	Regression	90.169	8	11.271	7.937	<.001b
	Residual	42.600	30	1.420		
	Total	132.769	38			

1.   Dependent Variable: Y

2.   Predictors: (Constant), X8, X3, X2, X7, X5, X1, X6, X4

Source : SPSS 2023 data processing

The hypothesis is accepted if Fcalculate > Ftable and the sig value < α 0.05. The value of Ftable is 2.32. The Fcalculate value is 7.937. Thus Fcalculate > Ftable which is 7.937 > 2.32. This shows that regression capital can be used to simultaneously examine the effect of independent variables on dependent variables, namely age, educational land area, relative advantage, compatibility, complexity, triability and observability.

Partial Test (T-Test)

Partial testing (T-Test) aims to show the influence between the independent variable and the dependent variable. The analysis in the T Test is that if the significance value > 0.05 then it can be said that there is no influence between the independent variable and the dependent variable, then the hypothesis is rejected. Conversely, if the significance value < 0.05 then it can be said that there is an influence between the independent variable and the dependent variable, then the hypothesis can be accepted. The hypothesis is accepted if t counts > t table, t table is: 2.042.

Table 3. T Test

Coefficientsa

Model		T	Itself.
1	(Constant)	1.220	.232
	Age	-.202	.841
	Land	1.909	.064
	Education	1.927	.062
	Relative advantages	4.364	<.001
	Compatibility	7.052	<.001
	Complexity	4.537	<.001
	Triabilitas	2.861	.007
	Observabilitas	2.504	.017

a. Dependent Variable: Innovation Decisions

Source : SPSS 2023 data processing

Based on the table above, it can be said that:

1. Age is the life span of farmers from birth until this research is conducted (2023). Age will also affect physical abilities and responses to new things in farming. There is a tendency that young farmers adopt an innovation faster because young farmers have the spirit to know and find out what they don't know yet. Age is one of the factors related to the ability to work to carry out an activity, both agricultural and non-agricultural activities [12]. Based on the results of multiple regression analysis, it shows that the age variable has a calculated t-value > t-table, which is -0.202 < 2.042 and a significance value of > 0.05, which is 0.841. So it can be concluded that the age variable does not have a positive and significant effect on farmers' decisions. Based on the results of the distribution of questionnaires to rice farmers in the Budi Sepakat farmer group, the average farmer in the Budi Sepakat farmer group has an age of over 51 years, but age does not affect farmers' decisions, this is evident from many farmers who are old in the Budi Sepakat farmer group but can still apply legowo line innovations.

2. Land area is the entire area used as a place for crop cultivation by farmers. Agricultural land is the main thing in farming, where the larger the land, the greater the amount of production that farmers can produce (Ambarita &; Kartika, 2015: 778), large production will provide high income as well. Based on the results of multiple regression analysis, it shows that the land area variable has a calculated t-value < t-table, which is 1,909 < 2.042 and a significance value of > 0.05, which is 0.064. So it can be concluded that the variable land area does not have a positive and significant effect on farmers' decisions. Based on the results of the distribution of questionnaires to rice farmers in the Budi Sepakat farmer group, the average farmer in the Budi Sepakat farmer group has a narrow land area of 1300 – 4100 M². However, the narrow land area does not affect the enthusiasm and decision of farmers in adopting the legowo line innovation.

3. Education is the formal learning that farmers take during their lives. A low level of education will result in someone having a lack of knowledge and utilization of resources available around us. Conversely, a higher level of education will make someone able to receive the information and innovations conveyed [2]. Based on the results of multiple regression analysis, it shows that the educational variable has a calculated t value < t table, which is 1,927< 2.042 and a significance value of > 0.05, which is 0.062. So it can be concluded that the variable land area does not have a positive and significant effect on farmers' decisions. Based on the results of the distribution of questionnaires to rice farmers in the Budi Sepakat

farmer group, the average farmer in the Budi Sepakat farmer group only received elementary school (SD) education, if farmers are given a real understanding of an innovation, farmers will adopt the innovation.

The most influencing factors of the characteristic aspects of innovation are as follows: compatibility (7,052), complexity (4,537), relative advantage (4,364), triability (2,861) and observability (2,504).

1. Compatibility is the extent to which the innovation of legowo jars is in accordance with the experience and needs of farmers. According to [13], compatibility is the level of compliance of innovation with one's value and experience. Based on the results of multiple regression analysis, shows that the compatibility variable has a calculated t-> t-table value of 7,052> 2.042 and a significance value of < 0.05, which is 0.001. The innovation of jajar legowo is in accordance with the needs of farmers in the Budi Sepakat farmer group and this innovation does not violate existing norms in the community.

2. Complexity is the degree to which innovation is considered more difficult to understand or use. According to [13], complexity is the level of difficulty for innovation to understand or use. The easier an innovation is understood and understood by adopters, the faster it will be adopted. Based on the results of multiple regression analysis, it shows that the complex variable has a calculated t-value > t-table, which is 4,537> 2.042, and a significance value of < 0.05, which is 0.001. So it can be concluded that the variable complexity has a positive and significant effect on farmers' decisions. The innovation of legowo rows makes it easier to maintain (fertilize, weed), make it easier to harvest because it uses a *Combine Harvester machine.*

3. Relative Advantage is the degree to which the planting system using legowo rows is more profitable than using a conventional planting system. According to[13], relative profit is the level to which an innovation looks better and better than the old product. Based on the results of multiple regression analysis, it shows that the relative profit variable has a calculated t value > t table, which is 4,364 > 2.042, and a significance value of < 0.05, which is 0.001. So it can be said that the variable of relative profit has a positive and significant effect on farmers' decisions. The innovation of jajar legowo makes crop yields increase, namely the rice yield of jajar legowo farmers in the Budi Sepakat farmer group is 8 tons / Ha. And farmer income is higher by using the legowo line innovation, which is IDR 35,200,000 in 2022. The innovation of legowo jars also reduces rat pests.

4. Triability is a level where legowo line innovations can be tried on farmers' land. According to[5], innovations that can be tried will be adopted and implemented more often and faster than innovations that are less implementable. Based on the results of multiple regression analysis, it shows that the trialability variable has a calculated t value > t table of 2,861> 2.042 and a significance value of < 0.05, which is 0.007. So it can be said that the trialability variable has a positive and significant effect on farmers' decisions. Jajar Legowo innovation can be done in various areas of rice fields.

5. Observability is the level at which the results of legowo line innovation can be seen by farmers. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it [5]. Based on the results of multiple regression analysis, it shows that the observability variable has a calculated t value > t table, which is 2,504> 2.042, and a significance value of < 0.05, which is 0.017. So it can be said that the observability variable has a positive and significant effect on farmers' decisions. The innovation of Jajar Legowo reduces pest attacks and its productivity is increased more than conventional planting systems.

Coefficient of Determination (R²)

Coefficient of determination (R^2) testing aims to measure how far the independent variable is capable of the dependent variable.

Table 4. Coefficient of Determination (R^2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.824a	.679	.594	1.19164

a. Predictors: (Constant), X8, X3, X2, X7, X5, X1, X6, X4

Source : SPSS 2023 data processing

Based on Table 21 it can be seen that the R Square value has a value of 0.679 or 67.9%, this shows that the variables age, land area, education, relative advantage, compatibility, complexity, trialability, and observability cumulatively (together) to farmers' decisions are 67.9% with the remaining 32.1% influenced by other variables contained in this study.

V. CONCLUSION

Based on the results and discussions described above, it can be concluded that:

1. The diffusion of legowo line innovation in Budi Sepakat's farmer group can be explained from aspects: of the innovation picture, communication channels, time period, and social system. Jajar legowo is a new innovation in the intermittent rice planting system in the Budi Agree farmer group. The communication channels used are interpersonal, from the agriculture office to extension workers and farmer groups face-to-face. The duration of application of innovation in farmer groups is 4 years, for 60% of group members. Jajar legowo can be applied by group members because it is in accordance with applicable norms.

2. The factors that influence the decision of legowo-lined innovation are reflected in age, land area, education, and innovation characteristics (relative advantage, compatibility, complexity, trialability, and observability). Based on the results of statistical tests, age, land area, and education, do not significantly affect decision-making on the application of legowo jars. The factors that significantly influenced the characteristics of innovation were as follows: compatibility (7,052), complexity (4,537), relative advantage (4,364), trialability (2,861), and observability (2,504). From the compatibility aspect, it is known that legowo rows are in accordance with the needs of farmers. From the aspect of complexity, it can be concluded that legowo rows can facilitate farmers in maintaining and harvesting. From the aspect of relative profit, it is known that farmers get relatively increased profits from yields using legowo rows. From the trialability aspect, it is concluded that legowo jajar is easy for farmers to practice in various types of land. The rate at which the results of legowo row innovation can be seen by farmers (observability) is concluded that productivity is more increased than conventional cropping systems due to reduced pest attacks.

VI. SUGGESTION

Based on the discussion and conclusions of this study, researchers provide the following suggestions:

1. It is recommended for extension workers to further motivate members who have not implemented the legowo jajar to get used to the new rice planting system.

2. It is recommended that farmer group members interact with each other and share experiences of the legowo row planting system.

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