

The Factors Influencing Farmers' Adoption of Agricultural Technology Innovations in Pacitan Agricultural Technology Park, East Java, Indonesia

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ABSTRACT

Agricultural Technology Park Pacitan is a venue that showcases innovations developed in Pacitan for farmers in the region. Based on data from the Agricultural Technology Park Pacitan, the interest of farmers in adopting innovations offered by the Park is very low. Moreover, it can be observed from the continued use of conventional farming patterns by some individuals. This study aims to describe the role of the Agricultural Technology Park Pacitan for farmers, and analyze the factors that influence farmer adoption of agricultural technology innovations in the Agricultural Technology Park Pacitan. The research method employed was a descriptive quantitative approach. Determination of the number of samples using the saturated sampling method was 43 respondents. The results revealed that the Agricultural Technology Park Pacitan needs to socialize innovations developed for farmers in the Pacitan Regency area, as well as those around it. Furthermore, the Agricultural Technology Park in Pacitan also serves as a forum for pilots to develop agricultural technologies that farmers can utilize. The factors that influence the level of adoption of agricultural technology innovations at the Agricultural Technology Park Pacitan are the type of innovation, methods, media, frequency of extension, perceived benefits, and suitability for needs.

Keywords: *agricultural technology park, factor influencing, farmer's adoption, technology innovations*

INTRODUCTION

Indonesia is an agrarian country, where the agricultural sector plays a vital role in supporting the country's economy (Kompas.com, 2019). A food self-sufficient society remains one of Indonesia's key agricultural goals (Sulaiman, 2018). Recently, the direction of agricultural development has begun to shift with the implementation of a program aimed at increasing food production. With adequate food production in terms of both quality and quantity, these agricultural products will not only meet domestic food needs but also enable the export of farming products abroad in sufficient quantities (Rizki, 2019).

The adoption of technological innovation in the agricultural sector is a key factor in increasing productivity and sustainability of farming businesses. However, the level of adoption of agricultural technology by farmers is often influenced by various factors, both internal and external. According to Rogers (2003), the adoption of innovation depends on the characteristics of farmers, such as education level, farming experience, and access to information. In addition, socio-economic factors, such as land area, income, and institutional support, also play an essential role in determining the success of implementing technological innovation (Feder et al., 1985). A study by Ghadim and Pannell (1999), revealed that farmers' perceptions of the risks and benefits of innovation significantly influence their decisions to adopt new technologies. In the context of the Agricultural Technology Park (TTP), the availability of infrastructure, training, and support from agricultural extension workers also influences the adoption of technology by farmers (Sulaiman et al., 2020).

In addition to individual and socio-economic factors, external aspects such as government policies, market access, and environmental conditions also play a role in encouraging or inhibiting the adoption of agricultural technology. Vanclay (2004) stated that the success of technology transfer in agriculture is highly dependent on a participatory approach that actively involves farmers in the innovation process. Another study by Knowler and Bradshaw (2007), showed that incentive and subsidy policies can increase farmers' motivation to adopt more environmentally friendly technologies. In the implementation of TTP, synergy among the government, academics, and the private sector is crucial for accelerating the adoption of agricultural innovation (Rahman & Hermanto, 2021). Therefore, understanding the various factors that influence technology adoption among farmers is crucial for designing effective strategies to increase the adoption of innovation in the agricultural sector.

Agricultural Technology Park is an extension of the Agricultural Technology Park. Agricultural Technology Park is an institution engaged in agro-tourism (KOMPASIANA, 2023). Based on data from the Pacitan Agricultural Technology Park in 2021, it is explained that the Pacitan Agricultural Technology Park is a facility equipped to disseminate existing and developed innovations to surrounding farmers, as well as those in the Pacitan Regency area. Based on the data, the Pacitan Agricultural Technology Park is located on Jl. Raya Tumpak Rinjing, Easy, Ngadirejan, Pringkuku District, Pacitan Regency. The central location of the Agricultural Technology Park area has been determined by Decree of the Pacitan Regent No. 188.45/2015 on a land area of 6.8 ha. The activities carried out at the Pacitan Agricultural Technology Park, among others, included collaboration with the local Agricultural Extension Center, as well as agricultural innovation counseling, seed distribution, and the processing of agricultural products.

With the Agricultural Technology Park located in the Pacitan Regency area, it is hoped that it will increase agricultural production by applying technological innovations developed by the Ministry of Agriculture to farmers in Pacitan. Apart from that, the existence of the Pacitan Agricultural Technology Park can serve as a pilot for developing agricultural practices that farmers can utilize. This is because the agricultural sector is the mainstay of the Pacitan people's economy.

Pringkuku has a unique topography; some areas are sea, but others are highlands. Therefore, Pringkuku has two areas with great potential, namely in the southern region, specifically the coastal residential area of Watukarung Beach, which holds significant potential in the marine sector. On the other hand, in the northern region, because of the slope of the land, which is classified as mountainous, it is very suitable for farming for its residents, especially those who cultivate fruits, vegetables, and agricultural products.

Based on the data from the Pacitan Agricultural Technology Park, the interest of farmers in Pringkuku District in adopting innovations offered by the park is very low. This can also be seen from the existence of people who still apply conventional farming patterns. Apart from that, farmers are still developing agricultural commodities from generation to generation, following in the footsteps of their ancestors, even though the Pacitan Agricultural Technology Park has conducted several counseling sessions aimed at changing agricultural patterns in the Pringkuku District area.

However, the low adoption of agricultural technology innovations by farmers in Pringkuku District indicates a gap between the provision of innovations by the Pacitan Agricultural Technology Park and their acceptance by local farmers. Despite regular outreach efforts, in-depth empirical data on the factors influencing farmers' attitudes and behaviors in adopting these agricultural innovations are still lacking. This highlights the need for research that identifies explicitly barriers to technology adoption at the local level. In this context, Rogers' (2003) theory of *Innovations diffusion* serves as an important foundation, stating that the success of innovation dissemination is strongly influenced by the characteristics of the innovation itself, communication channels, timing, and the social conditions of the recipient community. This theory emphasizes that farmers' perceptions of the relative benefits, complexity, and ease of use of an innovation also determine the level of adoption. Therefore, this research is crucial for filling this data gap and systematically examining the factors influencing the adoption of agricultural innovations in Pringkuku District. This study aims to determine the factors that influence farmers' adoption of agricultural technology innovations in the Pacitan Agricultural Technology Park.

RESEARCH METHODS

The location used in this study is Pringkuku Village, Pringkuku District, Pacitan Regency. The determination of the research location was carried out purposively or deliberately selected with the following considerations: 1) it must include agro-tourism or agricultural tourism, 2) there is an Agricultural Technology Park as a place for agricultural technology innovation, and 3) based on the results of observations, Pringkuku Village still applies conventional farming systems. The research period spanned from February to April 2023.

The research method used is a Descriptive Quantitative Approach. Descriptive Quantitative Research is a type of research method that describes an object and subject being studied without any engineering, including the relationship between activities, views, attitudes, and processes that influence a phenomenon that occurs. The population of this study consisted of all farmers involved in the Agricultural Technology Park, totaling 43 respondents. The sample was determined using a saturated sampling method, where the entire population was sampled, amounting to 43 respondents.

The data collection techniques used in this study were interviews and questionnaires. The instrument used in this study is a closed-ended questionnaire containing validated and reliable statements that address the study's objectives. In this study, the target interviewees were the Wayah Makmur farmer group in Pringkuku Village, who had previously received information and counseling regarding one of the innovations in the Pacitan Agricultural Technology Park, namely the development of citrus cultivation land. The questionnaire in this study includes aspects related to farmer adoption rates of agricultural technological innovations provided by the Pacitan Agricultural Technology Park. Questionnaires were distributed directly or in the field, face-to-face with members of the Wayah Makmur farmer group in Pringkuku Village.

Variables used in this study are Variable Factor Characteristics of Agricultural Technology Parks (X1), including types of innovation, methods, media, and frequency of extension; technological factor variable (X2), including perceived benefits and conformity with needs; farmer adoption rate of agricultural technology innovation (Y) (aware, interest, assess, try, and implement).

The data analysis used in this study is descriptive statistical analysis, which involves describing the data collected without drawing general conclusions. Data were analyzed using multiple linear regression methods through the application of the SPSS (Statistical Package for the Social Sciences) 26 program. Multiple linear regression analysis aims to determine whether the independent variable (X) has a significant influence on the dependent variable (Y). Data analysis in this study aims to determine whether the characteristic factors of the Agricultural Technology Park and technological factors influence the opportunities for farmers to adopt agricultural technology innovations at the Pacitan Agricultural Technology Park. The stages used to analyze the data that have been studied are as follows: (1) Data tabulation, (2) Estimation of Multiple Linear Regression Models, (3) Classical Assumptions Test, (4) Model Feasibility Test, and (5) Interpretation of Multiple Linear Regression Models.

RESULTS AND DISCUSSION

Community Characteristics

The potential human resources in Pringkuku Village comprise a total of 1,305 heads of families, with 1,909 males and 1,907 females. The main livelihood of the community in Pringkuku Village consists of 1112 people, with 1112 as farmers, 28 as farm laborers, and 51 as Civil Servants. The level of education consisted of 1,223 people who graduated from elementary school or its equivalent, 767 people who graduated from junior high school or its equivalent, 787 people who graduated from high school or its equivalent, and 153 people who graduated from a bachelor's degree or its equivalent. From the characteristics above, it is clear that the community surrounding the Pacitan Agricultural Technology Park, especially in Pringkuku Village, is predominantly composed of individuals with farming livelihoods and an education level of elementary school graduation/equivalent.

The role of the Pacitan Agricultural Technology Park

The Pacitan Agricultural Technology Park is a venue that facilitates the dissemination of existing innovations and the Development of New Ones to surrounding farmers in the Pacitan Regency area. With the Pacitan Agricultural Technology Park, it is hoped that agricultural production will increase by applying technological innovations developed by the Ministry of Agriculture to farmers in Pacitan Regency. Additionally, the existence of the Pacitan Agricultural Technology Park can serve as an example for developing agriculture that farmers in Pacitan Regency can utilize.

Adoption Rate

The adoption rate of agricultural technology innovations was calculated based on a questionnaire given to farmers. The level of adoption of agricultural technology innovations is categorized as very low, low, medium, high, and very high. Farmer recapitulation data on the adoption of agricultural technology innovations is presented in Table 1.

Table 1. Data of Respondents' Recapitulation of the Adoption Rate of Agricultural Technology Innovations

Category	Intervals	Amount	Percent (%)
Very low	28-50	0	0
Low	51-73	0	0
Currently	74-96	3	7
High	97-119	25	58
Very high	120-140	15	35
Amount		43	100

Source: Data processed in 2022

Table 1 shows the results of farmers' recapitulation of the level of farmer adoption of agricultural technology innovations. It is found out that three respondents, with a percentage of 7%, are classified as moderate, 25 respondents, with a percentage of 58%, are classified as high, and 15 respondents, with a percentage of 35%, are classified as very high in terms of farmer adoption of agricultural technological innovations.

The level of farmer adoption of agricultural technological innovations prior to counseling on these innovations was high, at 58%, which was included in the trial stage on a small scale but was not consistently applied. However, the application of agricultural technological innovations is also supported by the intensity of assistance provided by extension agents and managers of the Agricultural Technology Park. This is in accordance with the opinion of (Knickel et al., 2009). Another factor responsible for lagging adoption rates is the design of most extension programs, which is generally based on the perspective that the diffusion of innovations resembles a 'linear to this perspective, key agricultural innovations are created by specialists (researchers), distributed by other specialists (extension officers), and adopted by producers. Such linear diffusion processes have been challenged by recent insights emphasizing social learning in (non-linear) networks (Bandiera & Rasul, 2006; Conley & Udry, 2010) and by academic work which identifies heterogeneity among smallholder farmers so that 'overall recommendations' are unlikely to be relevant for a large proportion of the farming

population (Duflo et al., 2008; Suri, 2011). These problems, combined with those stemming from insufficient public funding and the detrimental effects of incentives, have prompted policymakers and academics to investigate alternative modalities for innovation and diffusion. For example, capacity building and farmer empowerment have become important in recent years, at the expense of a more prescriptive approach (World Bank, 2007).

Apart from being influenced by the intensity of assistance provided, the level of farmer adoption of agricultural technological innovations is also influenced by the age and education level of farmers. Farmers in the Wayah Makmur Farmer Group in Pringkuku Village are predominantly aged 51-60 years, classified as the productive age. This is in accordance with a study conducted by (Burhansyah, 2016) which states that individuals in the productive age group (15-64 years) will more easily and quickly accept innovation, while those in a non-productive age group will tend to find it difficult to accept innovation. As for the education level of members in the Wayah Makmur Farmer Group, Pringkuku Village, it is predominantly comprised of graduates from elementary schools/equivalent. The level of education is relatively low; usually, their insight into agricultural technological innovations is also relatively low. This is also in accordance with a study conducted by (Silviyani, 2019) which states that the level of education influences the way of thinking about innovative responses and recommended changes.

On the other hand, non-productive farmers do not understand the application of existing agricultural technology innovations because they consider the application of agricultural technological innovations to be complex, encompassing the entire cultivation and marketing process. Farmers at non-productive ages often prefer conventional agricultural cultivation, a practice that has been carried out for generations by their ancestors. This shows that the adoption rate is a measure of the extent to which technology or innovation introduced to farmers is in accordance with the needs and conditions of farmers in the local environment (Lensun et al., 2019)

Characteristic Factors of Pacitan Technology Park and Technology Factors

The characteristic factors of the Agricultural Technology Park consist of the type of innovation, methods, media, and frequency of counseling. At the same time, technological factors consist of perceived benefits and conformity with needs. The results of data collection related to the characteristic factors of the Agricultural Technology Park and technological factors are as follows:

Characteristic Factors of Agricultural Technology Parks

Type of Innovation. The type of innovation refers to the type of innovation that was introduced to farmers at the time the study was conducted. The types of innovation are categorized into very suitable, suitable, sufficient, not suitable, and wildly inappropriate. Data on the recapitulation of types of innovation is presented in Table 2

Table 2. Respondents' recapitulation data based on the type of innovation

Category	Intervals	Amount	Percent (%)
Very Inappropriate	3-4	1	2
Not Appropriate	5-6	0	0
Enough	7-8	7	17
Appropriate	9-10	6	14
Perfect fit	11-15	29	67
Amount		43	100

Source: Data processed in 2022

Table 2 shows the recapitulation data for types of innovation, it is known that one respondent with a percentage of 2% is classified as very inappropriate, seven respondents with a percentage of 17% are classified as sufficient, six respondents with a percentage of 14% are classified as suitable, and 29 respondents with a percentage of 67% are classified as very suitable of the types of innovation that exist. This type of innovation primarily influences farmers' adoption of a given agricultural technology innovation. The easier and more precise the selection of the type of innovation, the more excited and motivated individuals are to learn new things and adopt agricultural technology innovations more

quickly. In addition, the type of innovation provided will affect someone's acceptance of something new, even if they have little experience related to the innovation.

The results of the t-test showed that the type of innovation had a significant positive effect, indicating that the type of innovation provided affected farmer adoption. This means that if the type of innovation provided is appropriate and readily accepted, farmers will be more motivated to adopt the innovation. In the category of innovation types, it was shown that one respondent, with a percentage of 2%, felt that the type of innovation selected was very inappropriate. The selection of an inappropriate type of innovation can be a barrier to farmers adopting existing innovations. Factors that hinder the adoption of innovations include the compatibility between innovations and farmers, as well as the compatibility between communication channels and farmers' conditions. In accordance with the opinion of (Okezone, 2022) that several criteria can be used in choosing the right type of innovation, including innovation that must be felt as a farmer's need, provide concrete benefits for farmers, have compatibility/harmony, be affordable by the financial ability of farmers, simple not complicated, easy to try, and easy to observe. As many as seven respondents, representing 17% of the total, are classified as sufficient, indicating that the type of innovation provided has a significant influence, albeit not too substantial. As many as six respondents, representing 14% of the total, are classified as suitable, meaning that the type of innovation provided matches the biophysical and socio-economic conditions of the farmers.

Meanwhile, as many as 29 respondents, with a percentage of 67%, felt that they were very compatible with the innovation that had been given because it was suitable for the biophysical and socio-economic conditions of the farmers, and was also considered easy to implement. Respondents will more readily accept the process of adopting agricultural technology innovations if the type of innovation provided is considered easy and appropriate to the conditions they face. However, the factor of the type of innovation that is easy and precise does not guarantee that someone will adopt technological innovation quickly. It needs to be adapted to existing conditions because there are some farmers' lands which are not suitable for planting this type of innovation in the form of developing citrus fields, besides that it is also prone to be affected by pests and irrigation problems. This aligns with the opinion of (Fajri & Panggabean, 2013) that technological innovations must be tailored to the biophysical and socio-economic conditions of farmers/agribusiness actors.

Method. The method refers to the approach used in delivering agricultural technology innovations that were in place at the time the study was conducted. The methods are categorized into very suitable, suitable, sufficient, not suitable, and wildly inappropriate. Method recapitulation data is presented in Table 3

Table 3. Respondents' recapitulation data by method

Category	Intervals	Amount	Percent (%)
Very Inappropriate	3-4	2	5
Not Appropriate	5-6	0	0
Enough	7-8	4	9
Appropriate	9-10	7	17
Perfect fit	11-15	30	69
Amount		43	100

Source: Data processed in 2022

Table 3 shows the method recapitulation data; it is found out that two respondents with a percentage of 5% are classified as very inappropriate, four respondents with a percentage of 9% are classified as sufficient, seven respondents with a percentage of 17% are classified as suitable, and 30 respondents with a percentage of 69% are classified as very suitable for method used.

The method has a close relationship with the speed of innovation adoption. The easier and more precise the extension methods provided to farmers, the faster and easier it will be for them to implement the technological innovations offered.

The results of the t-test show that the method factor has no significant effect on farmer adoption of agricultural technology innovations. This means that the more difficult the method used, the lower the farmer's motivation to adopt the innovation. Conversely, the easier the method used, the higher the farmer's motivation to adopt. This is related to the method factor, as many as two respondents, with a

percentage of 5% are classified as very inconsistent with the method given. This means that they have difficulty adopting the method used. As many as four respondents, representing 9% of the total, are satisfied with the method used. That is, farmers are generally capable of adopting these methods. As many as seven respondents, representing 17% of the total, are classified according to the method used. That is, farmers can understand the innovations given through the lecture method. Moreover, as many as 30 respondents, representing 69% of the total, are classified as very suitable with the method given, namely the lecture method and group discussions. The results of interviews with farmers indicated that the lecture and discussion method was considered appropriate and had been carried out for a long time, so that in every extension activity, the emphasis was on using the lecture and discussion method. Another thing that affects the lecture and discussion method is more often done than the demonstration method, namely due to the lack of facilities and infrastructure as well as assistance from the Pacitan Agricultural Technology Park and the local government so that the extension workers deliver material related to the adoption of agricultural technology innovations in the form of citrus development using the lecture method and group discussions. This is in accordance with the opinion of Dinas Pertanian, Pangan, dan Perikanan Kabupaten Bangka Selatan (2021) which said that the selection of extension methods is used to help farmers form opinions and make decisions.

Media. The media used in carrying out agricultural technology innovations at the time the study was conducted are categorized into very suitable, suitable, sufficient, not suitable, and wildly inappropriate. Media recapitulation data is presented in Table 4.

Table 4. Respondents' recapitulation data based on media

Category	Intervals	Amount	Percent (%)
Very Inappropriate	3-4	2	5
Not Appropriate	5-6	0	0
Enough	7-8	8	18
Appropriate	9-10	6	14
Perfect fit	11-15	27	63
Amount		43	100

Source: Data processed in 2022

Table 4 shows media recapitulation data. It is found out that two respondents with a percentage of 5% are classified as very inappropriate, eight respondents with a percentage of 18% are classified as sufficient, six respondents with a percentage of 14% are classified as appropriate, and 27 respondents with a percentage of 63% are classified as very suitable for media use.

The results of the t-test showed that the media factor had a significant positive effect, indicating that the given media factor influenced farmers' adoption of agricultural technological innovations. This means that the use of appropriate and easy-to-understand media will increase farmer motivation to adopt the given innovation. In the media category, two respondents with a 5% share were classified as unsuitable for the media used because the farmers were illiterate and could not understand the material presented in the media. As many as eight respondents, representing 18% of the total, are classified as sufficient. This means that the media used is sufficient to motivate farmers to adopt the given innovation. As many as six respondents, representing 14% of the total, are classified according to the type of innovation they received. This means that the media used to convey innovative material is readily accepted and understood by farmers. Moreover, as many as 27 respondents, representing 63% of the total, strongly agreed with the media provided in the form of distributing leaflets. This means that the media used is not only easy to accept and understand but also increases the enthusiasm of farmers in adopting the innovations provided. Respondents will more quickly accept the process of adopting agricultural technology innovations if the extension media provided is easy to understand and interesting. The selection of extension media, in the form of leaflets, was determined by considering the favorable conditions of the facility and infrastructure availability, as well as the personal circumstances of the farmers. This approach was deemed more effective in ensuring the acceptance of leaflets, which were distributed with the assistance of extension workers. In accordance with the opinion of (Setyarini, 1990). Cao and Zhao (2019) suggest that the selection of extension media should be based on or in accordance with the targets and changes in farmer behavior that are expected to affect the ease and speed with which farmers can adopt these innovations.

Extension frequency. The frequency of counseling refers to the number of extension services related to agricultural technology innovations provided to farmers up to the time the study is conducted. The frequency of counseling was categorized as "always," "often," "sometimes," "rarely," and "never." The data for the recapitulation of counseling frequency is presented in Table 5

Table 5. Respondents' recapitulation data based on counseling frequency

Category	Intervals	Amount	Percent (%)
Never	3-4	0	0
Once	5-6	5	12
Sometimes	7-8	8	18
Often	9-10	10	23
Always	11-15	20	47
Amount		43	100

Source: Data processed in 2022

Table 5 shows the recapitulation data for counseling frequency, it is shown that five respondents with a percentage of 12% are classified as ever, eight respondents with a rate of 18% are classified as sometimes, 10 respondents with a percentage of 23% are classified as often, and 20 respondents with a percentage of 47% are classified very often on the frequency of counseling given.

The frequency of counseling is positively related to the speed of innovation adoption. The more frequently an extension is carried out, the faster farmers will adopt a given technological innovation.

The results of the t-test showed that the frequency of counseling had a significant positive effect on farmers' adoption of agricultural technological innovation in the form of developing citrus fields. That is, the more often the frequency of counseling/intensity is carried out, the faster farmers will adopt the innovations provided. In the counseling frequency category, five respondents, representing 12% of the total, were classified as having participated in the given counseling activities. As many as eight respondents, 18%, were classified as sometimes participating in extension activities but also sometimes not participating in these activities. As many as 10 respondents, representing 23% of the total, are classified as frequently participating in the provided counseling activities. And as many as 20 respondents, representing 47% of the total, feel that they always participate in counseling activities provided regarding existing technological innovations. The results of interviews with farmers indicate that counseling is conducted at least twice a month. However, in practice, counseling is not carried out routinely; only one meeting is sufficient in one month. Therefore, with conditions like these affecting the speed of innovation adoption, it proceeds slowly. This is in accordance with a study conducted by (Omara et al., 2021) which stated that the frequency of counseling showed no significant relationship. The lack of intensity in meetings between farmers and extension officers resulted in a slow adoption process. This was also exacerbated by the non-routine nature of some farmers attending meetings due to the constraints of their personal activities, so that when counseling was carried out, they were often only represented or replaced by their children or wives.

Technology Factors

Perceived Benefits. The perceived benefits include the increased profits of farmers resulting from the use of technology. Perceived benefits were categorized as very happy, happy, neutral, not happy, and very unhappy. Data on the recapitulation of the benefits felt by respondents is presented in Table 6.

Table 6. Respondents' recapitulation data based on perceived benefits

Category	Intervals	Amount	Percent (%)
Very Unhappy	5-8	0	0
Not happy	9-12	1	2
Neutral	13-16	3	7
Happy	17-20	22	54
Very happy	21-25	15	37
Amount		43	100

Source: Data processed in 2022

Table 6 shows the data from the recapitulation of respondents based on perceived benefits. It is shown that one respondent with a percentage of 2% is classified as unhappy, three respondents with a rate of 7% are classified as neutral, 22 respondents with a percentage of 54% are classified as happy, and 15 respondents with a percentage of 37% are classified as very happy with the perceived benefits related to farmer adoption of innovation. The perceived benefits are the primary reason why someone continues to adopt and use agrarian technology innovations.

The results of the t-test show that the perceived benefits factor has a significant positive effect on the adoption of agricultural technology innovations. That is, the more benefits the innovations provided to farmers, the more motivated farmers will be to adopt the innovations. In terms of perceived benefits, as many as one respondent, with a percentage of 2%, was not happy with the innovations provided because the farmers had not felt the benefits of the technological innovations. As many as three respondents, representing 7% of the total, feel neutral. That is, the three people have never experienced the benefits of the innovation provided, but they are willing to try to implement it. As many as 22 respondents, representing 54% of the total, were satisfied with the innovations provided because the farmers had benefited from them, even on a small scale. And as many as 15 respondents, with a percentage of 37% felt very happy with the innovations provided. That is, Sudanese farmers reap the benefits of implementing existing innovations. This is related to the level of farmer adoption of agricultural technological innovations, which is relatively high but has not been consistently and sustainably applied. This means that farmers want to use agricultural technological innovations, such as developing citrus fields, and those who do can feel the benefits. However, in accordance with the existing conditions, the benefits obtained are not stable, thus influencing farmers' decisions not to apply technological innovations in a consistent and sustainable manner to develop their citrus fields. Perceived benefits refer to the level of benefits that someone perceives from applying technological innovation. If the use of these agricultural technological innovations is easier and more useful, it will increase one's enjoyment of adopting and using them (Rushendi & Zachroni, 2017).

Compatibility with Needs. Conformity to requirements is the consistent level of technology that can meet the needs of adopters. Compatibility with needs is categorized into very high, high, medium, low, and very low. Data recapitulation of conformity with the needs of respondents is presented in Table 7.

Table 7. Respondents' recapitulation results based on conformity with needs

Category	Intervals	Amount	Percent (%)
Very low	4-6	0	0
Low	7-9	0	0
Currently	10-12	2	4
High	13-15	7	17
Very high	16-20	34	79
Amount		43	100

Source: Data processed in 2022

Table 7 shows the data from the recapitulation of respondents based on suitability for needs. It is shown that two respondents with a percentage of 4% are classified as moderate, seven respondents with a rate of 17% are classified as high, and 34 respondents with a percentage of 79% are classified as very high, in conformity with the needs related to farmer adoption of agricultural technological innovations.

Conformity with needs refers to the extent to which technological innovations are perceived as consistent or have existing fixed value. An idea that does not fit the needs will not be adopted as fast as the right technological innovation.

Farmers assume that the innovation offered can meet their need for knowledge regarding citrus cultivation. A total of 34 respondents, representing 79%, were classified as having a very high level. That is, farmers think that the innovations provided are very suitable for their current needs. This is related to the level of farmers' adoption of innovations in the development of citrus fields, specifically that the majority is classified as high, indicating that farmers consistently and sustainably apply technological innovations to develop their citrus fields. Based on the results of interviews with farmers, it is evident that they will plant citrus commodities because it is profitable and in accordance with environmental factors, as well as the role of related parties, such as the Agricultural Extension Center

and the Pacitan Agricultural Technology Park in the region. This is in accordance with the opinion of (Mahendra, 2015) which said that conformity with needs indicates the level of adoption of a technology will be high if someone feels the value offered by its performance.

CONCLUSION

Based on the results and discussion on the study of the factors that influence farmer adoption of this agricultural technology innovation, it can be concluded as follows: The characteristics of the farmers around the Pacitan Agricultural Technology Park, more precisely in the Wayah Makmur Farmer Group, are dominated by the age of 51-60 years and belong to the mature or productive age stage. Most of the education levels of farmers in the Wayah Makmur Farmer Group are in the category of graduating from elementary school/equivalent. This condition can be caused by various factors, such as economic conditions that make it impossible to continue at a higher level of education, a lack of interest and willingness from oneself, and a lack of awareness to pursue a higher degree. The role of the Pacitan Agricultural Technology Park is to disseminate existing and developed innovations to the surrounding farmers and those in the Pacitan Regency area. Additionally, the Pacitan Agricultural Technology Park serves as a forum for demonstrations in agricultural development that farmers can utilize. The factors that influence the level of adoption of agricultural technology innovations in the Pacitan Agricultural Technology Park are the type of innovation, methods, media, frequency of extension, perceived benefits, and conformity with needs. The results of the evaluation after counseling showed that the knowledge level was dominated by 32 farmers (74%) in the very high category regarding the use of agricultural technological innovations through the development of citrus fields. The attitude level was dominated by 22 farmers (52%) who agreed with the use of technological innovations in agriculture, particularly in the development of citrus fields. This research is novel because it examines the relationship between farmer characteristics, including age and educational level, and the adoption of technological innovations among the Wayah Makmur Farmers Group in the vicinity of the Pacitan Agricultural Technology Park. Furthermore, the study assessed factors such as innovation type, method, media, frequency of extension services, and perceived benefits in influencing technology adoption. The evaluation results indicate an increase in farmers' knowledge and positive attitudes toward technology, particularly in citrus land development, thus strengthening the role of the Agricultural Technology Park as a center for extension and a pilot project for agricultural innovation in the region.

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