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ADOPTION AND DIFFUSION OF AGRICULTURAL TECHNOLOGICAL INNOVATIONS GOVERNMENT PROGRAM FIELD SCHOOL INTEGRATED PARTICIPATORY DEVELOPMENT MANAGEMENT OF IRRIGATION PROGRAM (IPDMIP)

Tri Yuni Artanti
General Soedirman University
tri.artanti@mhs.unsoed.ac.id

Keywords
Agricultural Technology Adoption; IPDMIP Field School; Innovation Diffusion

Abstract
This research details efforts to analyze the adoption and diffusion of agricultural technology innovations through the Integrated Participatory Development Management of Irrigation Program (IPDMIP) Field School Program in Kedungreja District, Cilacap Regency. In the background, the urgency of agriculture as the primary sector in development is illustrated, with technology adoption being the key to increasing productivity and farmer welfare. The IPDMIP program emphasizes the involvement of farmers in irrigation management and implementing modern technology to optimize agricultural yields. However, there has not been much in-depth research on the factors that influence the successful adoption and diffusion of technological innovations in the context of this program. This research aims to identify the factors that influence the adoption and diffusion of agricultural technology innovations in the IPDMIP Field School while measuring the adoption and diffusion of these innovations in the Kedungreja District. The quantitative research method uses a survey approach and statistical data analysis. The research instrument includes variables such as cultivated area, farmer age, education level, innovation characteristics, characteristics of potential users, decision-making, communication channels, and instructor qualifications. Data was collected from 100 respondents who were members of farmer groups receiving IPDMIP Field School activities through questionnaires. Data analysis shows that the IPDMIP Field School Program effectively increases the adoption and diffusion of agricultural technology innovations in the Kedungreja District. Factors such as farmer age, characteristics of the innovation, characteristics of potential users, and communication channels play a significant role in the successful adoption and diffusion of the innovation. The research results provide an in-depth picture of the effectiveness of this program in bringing positive change among farmers. This conclusion can be a basis for formulating further policies to support sustainable agricultural development and improve farmer welfare.

Corresponding Author: Tri Yuni Artanti
E-mail: tri.artanti@mhs.unsoed.ac.id

INTRODUCTION

Agricultural development strengthens a country (Sayifullah & Emmalian, 2018). Agricultural growth is critical to national development efforts (Mahadiansar et al., 2020). Rice is the primary food source for the Indonesian population. The government always pays special attention to the availability of rice because its need is critical (Utama et al., nd). In the last three years, namely in 2020-2022, Indonesia's average rice production reached 54,649-55,670 million tons of milled dry grain (GKG). However, Indonesia's population is projected to reach 275 million people in 2022, with rice consumption of around 33 million tons annually. Apart from that, the land area in Indonesia is also shrinking every year. Therefore,

it is necessary to increase lowland rice productivity to overcome this (BPS, 2022) (Marwanti et al., 2023).

The government plays an active role in designing and implementing various innovative activities to advance the country and society. One example is the Integrated Participatory Development and Management of Irrigation Project (IPDMIP) field school implemented by the Ministry of Agriculture in collaboration with the Agricultural Extension and Human Resources Development Agency (BPPSDMP) and supported by IFAD (International Fund for Agricultural Development). The government designs the IPDMIP field school program in the irrigation sector involving the participation of farmers and farmer groups. This program aims to change farmers' behaviour, attitudes, and skills to sustainably increase production, productivity, and farmer income (Fadhilah et al., 2018). This program also aims to motivate and increase farmers' human resource capacity (Meliyanawati & Tutik, 2018).

The IPDMIP field school program is implemented in 74 districts across 16 provinces (BPPSDMP, nd). Central Java Province has had outstanding achievements regarding the export value of its agricultural commodities, which resulted in the Abdi Bakti Tani award in 2019-2020. One of the largest districts in Central Java province is Cilacap Regency (https://jatengprov.go.id/publik/tertinggi-besar-ekspor-pertanian-jateng-raih-penghargaan-abdi-bakti-tani/2021). Cilacap Regency was the first-ranked district in 2019-2020; there was a significant increase in rice production at the national level, with productivity reaching 3.94 tons per hectare (ha) and total production of 93,942 tons (https://lingkar.co/cilacap-brebes-dan-provinsi-jateng-cepat-penghargaan-feld-pertanian-2021/).

Two thousand twenty-two field schools will be implemented in 7 sub-districts and involve 52 farmer groups. Kedungreja District was one of those who received the IPDMIP field school program. Among the seven sub-districts, Kedungreja District is the dominant sub-district or the largest sub-district, covering an area of 4,829 hectares. The number of farmer groups that received the program was 11, involving 275 people. Farmer groups were chosen as field school participants because they have relatively low levels of education (Nikmatullah, 2016).

The benefits of this research can provide theoretical benefits by providing additional information for the academic world and references for subsequent research regarding the adoption and diffusion of agricultural technology innovations in IPDMIP field schools. Practically, this research is expected to provide insight into technology that can improve rice farming and farmers' living standards (Skd, 2017). It is also hoped that the government, primarily regional governments, will consider the research results in formulating policies for efficient farming development to achieve maximum profits (Siahaan, 2017).

Objectives of the research: To increase the effectiveness of the IPDMIP field school program in Kedungreja District, Cilacap Regency, it is necessary to identify success indicators and measure the level of success in the adoption and diffusion of technological innovation. In addition, analysis of the factors that influence the successful adoption and diffusion of technological innovation in the program is also essential to ensure program sustainability and improvement.

RESEARCH METHODS

This research design uses a quantitative approach by testing hypotheses using quantitative methodology. Identification of variables involves dependent aspects, namely the success rate of IPDMIP field schools, and independent variables such as cultivated area, farmer age, education level, innovation characteristics, characteristics of potential users, decision-making, communication channels, and instructor qualifications. The research was conducted in Kedungreja District, Cilacap Regency, from May to June 2023, with a sample of 100 people from 11 farmer groups. Data analysis methods include validity tests, reliability tests, descriptive analysis, correlation tests, multiple regression analysis, model fit tests (R2), and influence tests using the F and t-tests. The research results are hoped to provide theoretical and practical contributions to understanding the adoption and diffusion of agricultural technology innovations in IPDMIP field schools.

RESULTS AND DISCUSSION

General Description of Research Locations

A. Rice Fields

Kedungreja District, with an area of 7,143.9 hectares, consists of approximately 64.9% rice fields covering an area of 4,829 hectares, 19.83% Tegal or Gardens, 8.26% Yards or Buildings, and 6.99% others. Irrigated rice fields are related to IPDMIP field school activities.

B. Population Data

1. By Gender
   Kedungreja District has 11 villages with a population of 84,557 people, with a balanced density distribution between one village and another. The male population is 42,919, and the female is 41,638.
2. Based on Education Level
   The population of Kedungreja District according to education level without school is 12,172 people; 8,813 people have not finished elementary school; 4,155 people did not finish elementary school; SD as many as 36,953 people; junior high school as many as 16,008 people; high school as many as 10,093 people; universities as many as 1,492 people. According to these data, the highest level of education is elementary school, so the level of education is relatively low, caused by low economic conditions and a lack of awareness to continue to a higher level of education. This data becomes a benchmark for holding IPDMIP field school activities to increase farmers' knowledge and mindset to achieve the objectives well.
3. Based on Age Group
   Age is one factor in farming. The farmer's age dramatically influences the physical ability to manage agriculture. According to data from the Indonesian Ministry of Health in 2017, people's age groups can be classified into 3, namely the young age group (<15 years) with 21,048 people (25%), the productive age group with an age range (15-64 years) with 56,032 (66%), and people of non-productive age (>65 years) were 7,477 people (9%).

Characteristics of SL IPDMIP Farmers

The following are the characteristics of farmers in the research:

a. Gender

From the research results, the number of IPDMIP field school participants comprised 72% men while 28% were women. This is because the main job in Kedungreja District is as a farmer and as head of the family. The head of the family is more dominant in decision-making. Apart from boys, girls also take part in the field school program. The potential of women in agricultural activities also has a significant influence, such as planting power, harvesting power, and, in financial terms, finding out the size of the capital expenditure for agricultural production facilities and the income earned (Fadhla, 2018).

b. Land Area (X1)

land area is the land planted or cultivated by farmers in hectares (ha) (Wahyudi, 2016). Based on research data, the land area categories were divided into four, including: 0.14 – 0.46 hectares, the number of field school participants was 43 people (43%); 0.47 – 0.79 hectares, the number of field school participants was 35 people (35%); land area 0.80 – 1.12 hectares, number of field school participants was 12 people (12%); land area 1.13-1.45 hectares for 10 people (10%). The average land area of all participants is 0.625 hectares. Land areas can influence farmers to adopt wetland rice planting innovations (Burano & Fadillah, 2020).

c. Farmer Age (X2)

According to BPS data (2022), the age structure of the population is divided into three, namely (a) young age, under 15 years; (b) productive age, 15-64 years; (c) old age, over 65 years. Farmers' age influences their physical abilities and response to something new (Firdaus & Mellita, 2021). Older farmers will have more experience in farming. However, on the other hand, they still directly manage their farming business, which

will be influenced by limited energy or physical abilities. In comparison, young farmers will be younger in accepting innovations even though they are not yet supported by business experience. Adequate farming (Fidyansari & Rafli, 2015). Age in this study was measured at the time the research was conducted. The research results showed that the number of respondents in the 30-41 year age category was 11 respondents (11 %). Ages 42 - 53 were 33 respondents (33%), 54-65 years were 35 respondents (35%), and ages 66-77 were 21 respondents (21%). This shows that farmers in Kedungreja District are participating in the IPDMIP field school activity program. Most are aged 54-65 because those participating in the program are farmer group administrators, religious leaders, and community leaders in the immediate environment. There are no IPDMIP field school participants under 30 years of age due to the lack of interest of the younger generation in the agricultural sector. They are more attracted to the city to earn income than those in the village who work only as farmers.

d. Education Level (X3)

The research results showed 9 participants at the elementary school level, a junior high school level of 30 people, 49 at the high school level, and 9 at the university level. The highest level of education was high school education, with 49 respondents (49%). According to calculations, the average education level of IPDMIP field school participants is 8 years of school age (SLTP). This is related to the aim of the IPDMIP field school program, namely the application and dissemination of information that will later be absorbed and applied by other farming communities. Most field school participants are junior and senior high school graduates. In this program, participants are expected to be able to record the material presented by the instructor when providing the extension material so that each participant can apply it. Each farmer group has a book of minutes of the results of the IPDMIP field school program activities (Bahua, 2016).

Validity and Reliability Test

a. Validity test

The validity test compares the calculated r and r table with *degree of freedom* (df) = n-2 and number of respondents (n) = 100. Then, the df value can be calculated, df = 100-2 = 98, and the alpha value = 0.05, obtained in Table 0.1966. The validity test was processed using SPSS 26.0 for Windows software. As for the rule that applies, the calculated r-value> r table (0.1966), then the questions in the questionnaire are said to be valid. Validity test results from the research: All questions from the questionnaire distributed to respondents were classified as valid.

b. Reliability Test

Reliability test for respondents at a significance level of 0.05. From the calculation results, *Cronbach's Alpha* is 0.736.

Indicators of the success of SL IPDMIP Innovation Adoption and Diffusion

IPDMIP field school success indicators refer to the General Guidelines for Determining Main Performance Indicators within Government Agencies. Indicators of the success of the IPDMIP field school in this research can be described in Table 1.

Table 1 Indicators of Success of the IPDMIP Field School Program

	N	Minimum	Maximum	Mean
Input Indicator (Technology)	100	1.00	4.00	3.72
Process Indicators (Meeting Frequency)	100	1.00	4.00	3.93
Output Indicator (Productivity)	100	1.00	4.00	3.36
Output Indicator (Income)	100	1.00	4.00	3.43
Output Indicators (Level of Participation)	100	1.00	4.00	3.16
Outcome Indicators (Behavior)	100	1.00	4.00	3.13
Outcome Indicators (Attitude)	100	1.00	4.00	3.65

	N	Minimum	Maximum	Mean
Outcome Indicators (Skills)	100	1.00	4.00	3.75
Valid N (listwise)	100			
Total Score				28.13
Average score				3.5

Source: Data processed in 2023

From the research data analyzed, the success indicators of the IPDMIP field school program consist of the following:

a. Input indicator

The input indicator consists of the technology used by farmers, and the average technology value is 3.72. The technology used in the IPDMIP field school includes technology that the government is currently promoting, such as land processing, use of superior and certified varieties, use of organic materials, row legowo planting, use of fertilizer as recommended, intermittent irrigation, environmentally friendly pest and disease control, harvesting technology and post-harvest, marketing, financial literacy (Bobba et al., 2023).

b. Process indicators

The process indicators consist of the frequency of IPDMIP field school meetings with an average value of 3.93. The frequency of meetings in the IPDMIP field school is 12 meetings, with participants coming according to the specified schedule. However, some participants attended several meeting sessions. Before the learning process in the field school begins, several things are discussed, including the technology commonly used by farmers, the results of applying this technology, the introduction of new technology, practices in the field school, discussions in the form of questions and answers, both between the extension officer and the farmer and the farmer's experience with farmers. The hope is that there will be interaction and participation from one farmer member to another farmer so that the atmosphere in the field school can look lively and enthusiastic. (Single, 2022) .

c. Output indicator

Output indicators consist of productivity after the IPDMIP field school program, income obtained after the IPDMIP field school program, and farmer participation level. Productivity with an average value of 3.36. This is because the land cultivated by farmers, on average, can be irrigated with irrigation water so that productivity increases. With the field school program, farmers' awareness of the function of irrigation canals increases, along with the functioning of water-using farmer institutions (P3A). Income with an average value of 3.43. This is because productivity increases with the high selling value of rice, so income from rice cultivation also increases. The level of farmer participation with an average value of 3.16. The level of farmer participation in the IPDMIP field school is classified as moderate because some participants are elderly and some are young, so participation in the practices is classified as moderate. (Devi, 2022) .

d. Outcome indicators

Behavior, attitudes, and skills changed after the IPDMIP field school program (Single, 2022). Behavior change with a value of 3.13. This is because changing farmers' behaviour cannot be done quickly but needs to be done sustainably so that farmers have the awareness to change their attitudes. In changing individual behaviour, according to Thoha (2012), behaviour is a function of a person's interaction with their environment.

Changes in attitude with an average value of 3.65. Wuri (2011) explains that 6 factors form attitudes, namely the level of farming experience, the level of influence of other people, the level of formal education, the level of non-formal education, the level of use of mass media, and the level of influence of trust.

Changes in skills have an average value of 3.75. Changes in skills in the IPDMIP field school program have sufficient ability and skills to manage their farming activities. However, they are still very minimal at specific stages, such as conducting business

analysis and controlling pests and diseases. This is also due to the low education of farmers. Hence, they still need to be given knowledge and direction to new technology.

Level of Success in Adoption and Diffusion of IPDMIP Field School Technology Innovation in Kedungreja District

To determine the level of success in the adoption and diffusion of IPDMIP field school innovation in Kedungreja District, it can be calculated using the interval formula as follows: Highest score x number of items = 4 x 8= 32; Lowest score x number of items = 1 x 8 = 8

$$Intervals = \frac{Total\ skor\ tertinggi - Total\ Skor\ terendah}{Jumlah\ Kategori} = \frac{32-8}{4} = 6$$

The number of statements to determine the adoption and diffusion of innovation level is 8, with the highest score being 4 and the lowest being 1.

Table 2 Category of the success rate of adoption and diffusion of IPDMIP field school technological innovation in Kedungreja District

Intervals	Category	Scale	Number of Respondents	Total score	Average score
8 - 14	Very low	1	0		
15 - 20	Low	2	0		
2 1 - 26	Currently	3	13		
27 - 32	Tall	4	87	28.13	3.5
	Amount		100		

Source: Data processed in 2023

The results of the analysis of the level of success in the adoption and diffusion of IPDMIP field school technology innovations show that the total score of success indicators in Table 2 is 28.13, with an average score of 3.5. This can be seen from the analysis results between 27 and 32, so the level of adoption and diffusion of IPDMIP field school technology innovation in Kedungreja District is in the high category. The technology delivered by extension workers through the IPDMIP field school program in Kedungreja District is easy to adopt and spread. Adoption of the technology presented can change attitudes, skills, and behaviour so that it can be applied by farmers, especially IPDMIP field school beneficiaries, and can increase productivity as expected.

Analysis of factors influencing the adoption and diffusion of IPDMIP field school technology innovation

The results of the analysis of factors influencing the adoption and diffusion of IPDMIP field school technological innovation in Kedungreja District can be seen in Table 3

Table 3 Results of analysis of factors influencing the adoption and diffusion of IPDMIP field school technological innovation

Variable	Indicator	Average Score	Scale
Area of cultivated rice fields	Cultivation area	1.97	1 - 4
Farmer Age	Farmer Age	2.34	1 - 4
Level of education	Level of education	2.64	1 - 4
Characteristics of Innovation	Relative advantage	3, 13	1 - 4
	Suitability	3, 67	1 - 4
	Experimentation	3, 58	1 - 4
	Visibility	3, 67	1 - 4
Characteristics of Potential	Capital	3, 63	1 - 4

Variable	Indicator	Average Score	Scale
Users			
	Skills	3, 14	1 - 4
Decision-making	Optional Decision	3.00 _	1 - 4
	Collective decision	3, 69	1 - 4
	Authority decision	3, 21	1 - 4
Communication Channels	Mass communication	3, 77	1 - 4
	Individual Communication	3, 70	1 - 4
Extension Officer Qualifications	Extension Officer Qualifications	3, 75	1 - 4

Source: Data processed in 2023

Factors influencing the adoption and diffusion of IPDMIP field school technological innovation include:

a. Area of cultivated rice fields (X1)

The area of rice fields cultivated by farmers in the field school program ranges from 0.14 - 1.45 hectares. The variable area of cultivated rice fields has an average score of 1.97, and the average area of rice fields cultivated by IPDMIP field school participants is 0.625 hectares. According to 2013 agricultural census data, the area of rice fields in Cilacap Regency reached 64,744 hectares, with the number of farmers amounting to 213,708 people. On average, each farmer has a land area of 0.30 hectares. This shows that IPDMIP field school participants have a wider area of cultivated rice fields than the average area in Cilacap Regency. Because Kedungreja District has extensive rice fields, Kedungreja District has become a food barn to meet the food needs of the wider community. According to Maharani (2016), the cultivated area is the leading resource in efforts to increase production. The area also affects rice production. The wider the farmer's cultivation area, the greater the production produced. Conversely, the smaller the cultivation area, the smaller the production produced. So, the area of land cultivated by farmers is related to factors that influence the adoption and diffusion of IPDMIP field school innovations.

b. Farmer's age (X2)

According to Rahmasari (2020), farmers of productive age are physically active in farming activities compared to farmers of unproductive age. Farmers of productive age have high curiosity and want to try innovations with new technology. Based on research that shows the farmer age variable with an average score of 2.34, the field school participants are, on average, 55 years old. Because the younger generation's interest in agriculture is decreasing. Young people think that farming has low value and is dirty and that it takes a long time to wait until the harvest arrives to get money. Innovations are needed to attract millennial youth to enter the agricultural sector so that young people can focus more on developing their villages and have high competitiveness.

c. Education Level (X3)

Education level is the final level of farmers based on their diploma. Education influences a person's mindset. Higher education will be able to receive information quickly and have broad insight. Based on the analysis results, the education level variable with a score of 2.64 is at the junior high to high school level. These can be categorized as field school participants aged 55 years and junior high school graduates who can apply the knowledge instructors convey through the IPDMIP field school program. This is because farmers of that age, on average, only have junior or senior high school graduates.

d. Innovation Characteristics (X4)

characteristics consisting of:

1. relative advantage,

   The relative advantage is 3.13, meaning that farmers assess that it has a positive value regarding technical, economic, and social benefits because it can increase yields and change farmers' behaviour to become more confident in their opinions. After all, in field schools, farmers must participate to express opinions and share their experiences. Have you ever done farming?
2. Conformity

   Conformity in research has a score of 3.67. This suitability takes the form of suitability of the materials needed by farmers. Before the IPDMIP field school begins, it must schedule the implementation and prepare the material to be presented. The material disseminated by extension workers is according to specific locations or needs, especially in technical cultivation up to the marketing level.
3. Experimentation

   Experimentation in research has a score of 3.58. Innovation will be accepted and implemented if it can be tried in a small size. Farmers can carry out this experiment because the technology is known to be easy to apply. Farmers disseminate technology in their rice fields in small sizes.
4. Visibility

   Visibility in research has a score of 3.67. In this research, the visibility variable has a high score because the technological innovation presented is easy to see, the practice method is easy, and the practice materials are easy to obtain. Hence, it is easy for farmers to accept innovations. According to Ratnaningsih (2022), the more someone sees the results of innovation, the greater their adoption of a technology. Other farmers easily observe the innovations being tried to compare the application of the technology presented with previous traditional technology.

e. Characteristics of Potential Users (X5)

Characteristics of Prospective Users consisting of capital have a score of 3.63. The capital used by farmers is measured capital in this research. The capital spent by farmers is considered adequate and affordable for farmers, resulting in relatively increased profits. The skill has a score of 3.14. Skills are measured by the level of skills that farmers have after the field school program. Changes in farmers' skills are increasing, and farmer groups can adopt and diffuse technology to other farmers in their neighbourhoods. There are even farmer groups that commercialize the products they practice so they can increase their family income.

f. Decision Making (X6)

Decision-making in the research consisted of optional or individual decisions of 3.00 as measured by the closeness of the instructor; collective decisions are 3.69; decisions are measured by decisions agreed upon collectively or as a group, and authority decisions are decisions that are forced, such as from the government or specific programs, which is 3.61. In this research, the most significant decision is the collective decision, namely the decision taken based on the agreement of the farmer group. Because the institution of farmer groups is considered to be of a higher level than individuals. Without farmer group institutions, participation and awareness of farmer group members are not formed voluntarily, so the IPDMIP field school program indirectly builds awareness of groups and increases human resources regarding farmer residents' participation level.

g. Communication Channel (X7)

Communication channels in the research consisted of mass communication, with a score of 3.77, measured by how information is delivered using mass communication, and individual communication, with a score of 3.70, measured by looking at individual communications. Mass communication is higher than individual communication. In farmer group institutions, farmers receive information more quickly from extension

workers and exchange experiences with fellow farmers. From this communication period, the interaction atmosphere between farmers was established well.

h. Extension Officer Qualifications (X8)

The instructor's qualifications in the study were 3.75, measured by the level of empathy between the instructor and farmers. Instructors need to be able to empathize in conveying information because instructors can feel the situation being experienced or the feelings of farmers and communicate with farmers so that farmers can adopt innovations. In research, the instructor's qualification score is relatively high. The instructor can communicate and feel what farmers need, such as the materials needed by farmers, so that problems at the farmer level can be resolved.

Correlation Analysis

The results of the correlation analysis calculations can be described in Table 4

Table 4 Results of correlation analysis

		Y	X1	X2	X3	X4	X5	X6	X7	X8
Y	Pearson Correlation	1	,121	**-,584** **	-,036	**,667** **	**,678** **	**,313** **	**,325** **	**,285** **
	Sig. (2-tailed)		,232	,000	,720	,000	,000	,001	,001	,004
	N	100	100	100	100	100	100	100	100	100
X1	Pearson Correlation	,121	1	,017	,144	-,141	,016	-,113	-,218 *	-,109
	Sig. (2-tailed)	,232		,868	,154	,162	,877	,263	,030	,279
	N	100	100	100	100	100	100	100	100	100
X2	Pearson Correlation	**-,584** **	,017	1	,088	-.527 **	,151	-,195	-,064	,053
	Sig. (2-tailed)	,000	,868		,384	,000	,133	,052	,525	,603
	N	100	100	100	100	100	100	100	100	100
X3	Pearson Correlation	-,036	,144	,088	1	-,072	,016	-,054	-,082	,009
	Sig. (2-tailed)	,720	,154	,384		,475	,874	,590	,420	,928
	N	100	100	100	100	100	100	100	100	100
X4	Pearson Correlation	**,667** **	-,141	-.527 **	-,072	1	,246 *	,465 **	,278 **	,297 **
	Sig. (2-tailed)	,000	,162	,000	,475		,014	,000	,005	,003
	N	100	100	100	100	100	100	100	100	100
X5	Pearson Correlation	**,678** **	,016	,151	,016	,246 *	1	,167	,225 *	,265 **
	Sig. (2-tailed)	,000	,877	,133	,874	,014		,097	,024	,008
	N	100	100	100	100	100	100	100	100	100
X 6	Pearson Correlation	**,313** **	-,113	- $1,195	-,054	,465 **	,167	1	.43 4 **	,154
	Sig. (2-tailed)	,001	,263	,052	,590	,000	,097		,000	,126
	N	100	100	100	100	100	100	100	100	100
X7	Pearson Correlation	**,325** **	-,218 *	-,064	-,082	,278 **	,225 *	,434 **	1	,242 *
	Sig. (2-tailed)	,001	,030	,525	,420	,005	,024	,000		,015
	N	100	100	100	100	100	100	100	100	100
X8	Pearson Correlation	**,285** **	-,109	,053	,009	,297 **	,265 **	,154	,242 *	1
	Sig. (2-tailed)	,004	,279	,603	,928	,003	,008	,126	,015	
	N	100	100	100	100	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS output

From the calculation of the results above that:

1. The variable area cultivated (X1) with the level of success in adoption and diffusion of innovation (Y) is insignificant and weakly correlated with a positive correlation value of 0.121. The cultivated area variable (X1) is not significantly and weakly correlated with the level of success in the adoption and diffusion of IPDMIP field school technology innovation (Y). According to Ayesha (2021), increasing the area of rice fields without being balanced by adding other inputs and increasing human resources is the same as plunging them into more severe problems. Thus, increasing the area of rice fields within a specific limit will increase the risk of farming.

2. The variable farmer age (X2) with the level of success in adoption and diffusion of innovation (Y) is strongly and significantly correlated with a correlation value of -0.584. This shows that farmer age (X2) is strongly and significantly correlated with the level of success in adoption and diffusion of innovation (Y). The younger the farmer, the easier it is to adopt IPDMIP field school technology. In line with Rosyida (2021), a farmer's age can be used as a benchmark for assessing a person's performance, and farmers of productive age can have good performance.
3. The variable education level (X3) with the level of success in adoption and diffusion of innovation (Y) is not correlated and is not significant, with a correlation value of -0.036. This shows that the level of education (X3) is not correlated with the level of success in adoption and diffusion of innovation (Y). The lower the farmer's education level, the higher the value of the adoption and diffusion of IPDMIP field school technology innovation because farmers with low education are more accessible to educate or change their mindset so that it is easier to adopt and disseminate IPDMIP field school technology information. In line with Rosyida (2021), non-formal education, such as continuous counselling and training, will increase a person's knowledge and skills.
4. The innovation characteristic variable (X4) with the successful adoption and diffusion of innovation (Y) level is significant. It has a strong correlation with a correlation value of 0.667. This shows that innovation characteristics (X4) strongly correlate with the successful adoption and diffusion of innovation (Y). Innovation characteristics (X4) include relative advantage, suitability, trialability, and visibility, closely related to the success level in adopting technological innovation. The higher the innovation characteristic value, the faster an innovation can be adopted. The results of this study are consistent with Rahab (2009), who states that relative advantage positively influences the possibility of adopting information technology. This is because, looking at the benefits obtained both technically, economically, and socially, field school activities have a positive value in increasing farmers' knowledge and skills.
5. The variable characteristics of potential users (X5) with the level of success in adoption and diffusion of innovation (Y) are significant and strongly correlated with a correlation value of 0.678. This shows that the characteristics of potential users (X5) are strongly correlated with the level of success in adoption and diffusion of innovation (Y). The higher the characteristic value of the potential user, the higher the level of success in adopting the innovation. The results of this research align with Talahatu (2014), who states that someone with good skills will change the respondent's attitude toward integrated management in a better direction.
6. The decision-making variable (X6), with the level of success in adoption and diffusion of innovation (Y), is significant and has a sufficient correlation with a correlation value of 0.313. This shows that decision-making (X6) correlates with the success level of adoption and diffusion of innovation (Y). The higher the decision-making value, the higher the success rate of adopting technological innovation. Decision-making, in this case, includes optional, collective, and authority decisions.
7. The communication channel variable (X7), with the level of success in adoption and diffusion of innovation (Y), is significant and entirely correlated with a correlation value of 0.325. This shows that communication channels (X7) correlate with the success level in adoption and diffusion of innovation (Y). The higher the value of the communication channel, the higher the level of adoption of IPDMIP field school technology innovation. The communication channels in this research are mass communication and individual communication. The results of this research align with Rushendi (2016), who states that one of the internal factors influencing the adoption speed is the adopter's relationship model and the source of information received.
8. The instructor qualification variable (X8), with the level of success in adoption and diffusion of innovation (Y), is significant and has a weak correlation with a

correlation value of 0.285. This shows that the instructor's qualifications (X8) correlate with the level of success in the adoption and diffusion of innovation (Y). The higher the instructor's qualifications, the weaker the level of adoption of IPDMIP field school technology innovation. The instructor's qualification in this research is the instructor's empathy for farmers, where the instructor understands the conditions experienced by farmers. Extension workers must recognize and understand target farmers' conditions as educators, motivators, facilitators, communicators and innovators. This is in line with Arifin (2021), who describes the role of extension workers as motivators to encourage farmers in their farming business. Extension agents act as communicators in helping farmers in farmer groups. As a facilitator, extension workers can facilitate agricultural production facilities, find partners in farming, help farmers overcome problems and discuss things.

Multiple Linear Regression Analysis

The research was conducted to determine the influence of variable factors on the adoption and diffusion of IPDMIP field school technological innovation. The independent variables (X) are farmer age (X2), innovation characteristics (X4), characteristics of potential users (X5), decision-making (X6), communication channels (X7) and instructor qualifications (X8). Meanwhile, the independent variable (Y) is the level of success in adopting and diffusing IPDMIP field school technological innovation. Multiple linear regression was carried out to determine the effect of variable X on Y. The data obtained from the Likert scale is ordinal, so it needs to be transformed into interval data using *the Method of Successive Interval* (MSI) using *STAT97 software*. Test Classical Assumptions through:

a. Normality test
   The regression model has a normal distribution if the plotting data depicted in the regression analysis follows a diagonal line. Based on the analysis using SPSS, it can be concluded that the normality test is said to pass the normality test or has a normal distribution.
b. Multicollinearity Test
   From the results of the multicollinearity test, it can be concluded that the regression model is free from multicollinearity.
c. Heteroscedasticity Test
   The analysis using SPSS shows that the data points have no pattern, so it can be concluded that the regression model does not have heteroscedasticity.

Regression Equations

Regression equation from research results from regression analysis test results in table 4.9.

The results of the processed data can be written in a regression model:

$$Y = a + b2.\ X2 + b4.\ X4 + b5.\ X5 + b6.X6 + b7.X7 + b8.X8$$

$$Y = 11.394 - 0.934.X2 + 0.088.X4 + 0.694.\ X5 - 0.037.X6 + 0.087.\ X7 + 0.146.X8$$

Information :

Y = success rate of adoption and diffusion of IPDMIP field school innovation; X2= Farmer's Age; X4= Innovation characteristics; X5 = characteristics of potential users; X6 = decision making; X7 = communication channel; X8= Extension Qualification

Model fit test (R^2)

From the analysis results, the R-value is a constant. The R-value is a multiple correlation between the variables of innovation characteristics, characteristics of potential users, decision-making, communication channels, and instructor qualifications on the success rate of adoption and diffusion of IPDMIP field school technology innovation of 0.986. R square (R^2) shows the number 0.972. This figure shows the variable size of land area, farmer age, education level, innovation characteristics, characteristics of potential users, decision making, communication channels, and instructor qualifications on the success rate of adoption and diffusion of IPDMIP field school technology innovation at 97.2% while the remaining 12.8 % influenced by other variables not included in the model.

Influence Test

The hypothesis tests carried out in this research are the t-test and F-test. The F test is intended to determine the influence simultaneously or together, while the t-test is to determine the partial influence of each factor variable that influences the adoption and diffusion of IPDMIP field school technology innovation.

1. F test

The F Test results are shown in Table 5

Table 5 F Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	190,162	6	31,694	534,023	,000 [b]
Residual	5,519	93	0.344		
Total	195,681	99			

Source: Primary data processed, 2023

Table 5 shows the calculated F value of 534.023, the quotient between *mean square regression* and *residual*. The F table value with a numerator df of 6 and a denominator df of 93 with a level of α = 0.05, then the result is 2.20. Meanwhile, the F count is 534.023. This means that the calculated F value is more significant than Table F. It can be concluded that the independent variables (farmer age, innovation characteristics, potential user characteristics, decision-making, communication channels and instructor qualifications) in the regression model jointly influence the dependent variable (the level of success in adoption and diffusion of IPDMIP field school technology innovation). The significance value is 0.000, smaller than α = 0.05, so H_0 is rejected. H_1 is accepted, meaning that there is a significant influence between the level of success and the factors that influence the adoption and diffusion of IPDMIP field school innovation.

2. T-test

The results of the t-test analysis in this research can be depicted in Table 4.18.2

Table 6 Results of t-test analysis

Variable	Unstandardized Coefficient B	Std. Error	t	Sig.
(Constant)	11,394	0.182	62,516	0,000 **
Farmer Age (X2)	-0.934	0.033	-28,092	0,000
Innovation Characteristics (X4)	0.088	0.016	5,338	0,000
Characteristics of Potential Users (X5)	0.694	0.019	36,326	0,000
Decision Making (X6)	-0.037	0.02	-1,833	0.070
Communication Channel (X7)	0.087	0.02	4,362	0,000
Extension Officer Qualifications (X8)	0.146	0.037	3,959	0,000

Source: Primary data processed, 2023

The hypothesis of this research is as follows:

1) There is a significant influence between Farmer Age (X2) and the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y)

The Sig value is 0.000 < 0.05, and the calculated t value is -28.092 > t table 1.985 (df = 94, α = 0.05). The regression coefficient value for the farmer age variable (X2) is -0.934. This value shows a negative influence (in the opposite direction) between the variable farmer age (X2) and the SL IPDMIP success rate (Y).

If the farmer age variable (X2) increases by 1%, the SL IPDMIP success rate variable (Y) will decrease by 0.934. Assuming that the other variables remain constant, H_0 is rejected, and H_1 is accepted. The variable farmer age (X2) significantly affects the adoption and diffusion success rate of IPDMIP field

school innovation in Kedungreja District, Cilacap Regency (Y). So, the younger the farmer, the more it influences the level of success in adopting and diffusion technological innovation in IPDMIP field schools. Young farmers certainly have more muscular physical conditions than older respondents.

The older the farmer, the less capable he is of achieving as a worker. The average age of farmers implementing field school activities is 55 years. Compared with workers' age, this age is considered close to the retirement age limit, so they tend to reduce heavy activities.

2) There is a significant influence between innovation characteristics (X4) and the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y)

The Sig value in the t-test analysis is 0.000, and the calculated t value is 5.338 > t table 1.985 (df = 94, α = 0.05). The regression coefficient value for the innovation characteristic variable (X4) is 0.08 8. This value shows a positive (unidirectional) influence between the innovation characteristic variable (X4) and the SL IPDMIP success rate (Y). This means that if the innovation characteristic variable increases by 1%, the SL IPDMIP success rate variable will increase by 0.0 88. Assuming that other variables remain constant, H_0 is rejected, and H_1 is accepted. The innovation characteristic variable (X4) significantly affects the adoption and diffusion success rate of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y).

The innovations presented in the IPDMIP field school have never been accepted or applied in the farming community of Kedungreja District. To receive new information or knowledge, farmers tend to be willing to accept these innovations. The same thing was also expressed by Tjiptono & Chandra (2012) that the level of adoption is influenced by several factors, including perceptions of the relative superiority of new products compared to existing products or methods; compatibility, meaning conformity with existing values and past consumer experiences; complexity, namely the extent to which the innovation or new product is easy to understand and use; divisibility, concerns the product's ability to be tested and used on a limited basis without high costs (related to purchase quantity, serving size and product portions). This research also shows that most farmers stated that from relative advantage, suitability, trialability, and visibility, they were very supportive of the IPDMIP field school program.

3) There is a significant influence between the Characteristics of Prospective Users (X5) and the level of success in the adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y)

The Sig value in the t-test analysis is 0.000, and the calculated t value is 36.326 > t table 1.985 (df = 94, α = 0.05). The regression coefficient value for the prospective user characteristic variable (X5) is 0.6 94. This value shows a positive (unidirectional) influence between the variable characteristics of potential users (X5) and the SL IPDMIP success rate (Y). This means that if the potential user characteristic variable (X5) increases by 1%, the SL IPDMIP success rate variable (Y) will increase by 0.694. Assuming that other variables remain constant, H_0 is rejected, and H_1 is accepted. The variable characteristic of potential users (X5) significantly affects the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y).

The characteristics of potential users (X5) on the level of success in adoption and diffusion of innovation (Y) in this research are very influential in capital and skills. The more sufficient capital (financial and production facilities) and skills obtained, the easier it will be to adopt technological innovations accepted in IPDMIP field schools. This is based on research by Talahatu (2014) that shows that someone with good skills will change the attitude of respondents in implementing integrated management in a good direction.

4) There is an insignificant influence between Decision Making (X6) and the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y)

The Sig value in the test analysis is 0.07 and the calculated t is -1.833 < t table 1.985 (df = 94, α = 0.05). The regression coefficient value for the decision-making variable (X6) is -0.0 37. This value shows a negative influence (in the opposite direction) between the decision-making variable (X6) and the SL IPDMIP success rate (Y). If the decision-making variable (X6) increases by 1%, the SL IPDMIP success rate variable (Y) will decrease by 0.037. Assuming the other variables remain constant, H_0 is accepted, and H_1 is rejected so that the decision-making variable (X6) has no significant effect on the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y). In this research, it is clear that both optional decisions (proximity of the instructor), collective decisions, and authority decisions have no influence on adopting the technology being delivered.

5) There is a significant influence between Communication Channels (X7) and the success rate of adoption and diffusion of IPDMIP field school innovations in Kedungreja District, Cilacap Regency (Y)

The Sig value in the t-test analysis is 0.000, and the calculated t value is 4.361 > t table 1.985 (df = 94, α = 0.05). The regression coefficient value for the communication channel variable (X7) is 0.087. This value shows a positive (unidirectional) influence between the communication channel variable (X7) and the SL IPDMIP success rate (Y). If the communication channel variable (X7) increases by 1%, the SL IPDMIP success rate variable (Y) will increase by 0.087. Assuming that the other variables remain constant, H_0 is rejected, and H_1 is accepted, so that the Communication Channel variable (X7) has a significant effect on the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y).

In this research, communication channels influence the adoption and diffusion of SL IPDMIP technology innovation because communication channels (X7) are an essential and sufficient element for the success of the innovation diffusion process. Innovation messages through communication channels are designed and created by change agents to be disseminated to audiences who are target adopters. Communication channels are not only a medium for disseminating or informing but also function to motivate and educate or teach something to the target audience (Rushendi, 2016).

6) There is a significant influence between the qualifications of instructors (X8) and the success rate of adoption and diffusion of IPDMIP field school innovations in Kedungreja District, Cilacap Regency (Y)

The Sig value in the t-test analysis is 0.000, and the calculated t value is 3.959 > t table 1.985 (df = 94, α = 0.05). The regression coefficient value for the instructor qualification variable (X8) is 0.1 46. This value shows a positive (unidirectional) influence between the instructor qualification variable (X8) and the SL IPDMIP success rate (Y). This means that if the instructor qualification variable (X8) increases by 1%, then the SL IPDMIP success rate variable (Y) will increase by 0.1 46. Assuming that other variables remain constant, then H_0 is rejected. H_1 is accepted, so the Extension Qualification variable (X8) significantly affects the success rate of adoption and diffusion of IPDMIP field school innovation in Kedungreja District, Cilacap Regency (Y).

In this research, the instructor's qualifications (X8) in the form of the instructor's empathetic ability in the IPDMIP field school have a significant influence. Before implementing the IPDMIP field school, extension workers explore the potential and problems in farming. Then, look for material that suits farmers' needs, which will later be presented at the implementation of the IPDMIP field school. In this case, the instructor acts as a motivator, facilitator,

and communicator so that the objectives of the IPDMIP field school program can be achieved.

CONCLUSION

The research results show high success in the adoption and diffusion of innovation in the IPDMIP field school in Kedungreja District, Cilacap Regency. Success indicators involve input (technology), process (frequency of meetings), output (productivity, income, farmer participation), and outcomes (changes in behaviour, attitudes, and skills). Technology adoption has a positive impact on farmer productivity and income. Factors influencing successful adoption involve farmer age, innovation characteristics, characteristics of potential users, and communication channels. Younger farmer age, evident innovation characteristics, adequate capital, and effective communication positively influence the successful adoption and diffusion of IPDMIP field school technology innovation.

REFERENCES

Bahua, M.I. (2016). Disruptive Innovation in Agricultural Extension in the Era of Industrial Revolution 4.0. PROCEEDINGS, 21.

Bobba, S., Eynard, U., Maury, T., Ardente, F., Blengini, G. A., & Mathieux, F. (2023). Circular Input Rate: novel indicator to assess circularity performances of materials in a sector–Application to rare earth elements in e-vehicles motors. Resources, Conservation and Recycling, 197, 107037.

BPPSDMP, P. (nd). Performance Report of the Agricultural Extension and Human Resources Development Agency for 2019. Agricultural Extension and Human Resources Development Agency.

Burano, RS, & Fadillah, A. (2020). Factors Influencing the Adoption of Rice Farmer Innovations in Padang Alai Bodi Village, East Payakumbuh District. Science Tower, 14(2).

Devi, IP (2022). Farmer Participation in Rice Cultivation Field Schools to Support the Government Program IPDMIP (Integrated Participatory Development and Management of Irrigation Project) in the Covid-19 Era in Kedunggalar District, Ngawi Regency.

Fadhilah, ML, Eddy, BT, & Gayatri, S. (2018). The influence of knowledge, attitudes and skills in implementing agribusiness systems on production among rice farmers in Cimanggu District, Cilacap Regency. Agrisocionomics: Journal of Agricultural Socioeconomics, 2(1), 39–49.

Fadhla, T. (2018). Analysis of Farming Business Management in Increasing Income and Rice Production in Tangan-Tangan District, Kab. Southwest Aceh. Visionary & Strategic Journal, 6(2).

Fidyansari, D., & Rafli, W. (2015). Comparative Analysis of Seaweed Farming between Milkfish and Without Milkfish Integration Systems in Balandai Village, Bara District, Palopo City. Perbal: Journal of Sustainable Agriculture, 4(1).

Firdaus, YA, & Mellita, D. (2021). Precast Concrete Marketing Strategy at PT Wijaya Karya Beton, Tbk Sales Area II. Management Development Scientific Journal, 4(1), 1–16.

Mahadiansar, M., Ikhsan, K., Sentanu, IGEPS, & Aspariyana, A. (2020). The paradigm for developing a national development model in Indonesia. Journal of Administrative

Science: Media for the Development of Administrative Science and Practice, 17(1), 77–92.

Marwanti, M., Adi, SH, Sosiawan, H., Sarwani, M., Irianto, G., & Wahab, MI (2023). Disruption of the National Rice Production System: Can Indonesia Meet Rice Needs in 2045? Triton Journal, 14(2), 403–421.

Meliyanawati, WS, & Tutik, D. (2018). Attitudes and Motivation of Rice Farmers on Adoption of Farmer Card Programs in Grobogan Regency. Journal of Agricultural Socioeconomics and Policy, 7(2), 176–187.

Nikmatullah, D. (2016). Effectiveness of group communication at the pepper integrated pest control (SL-PHT) field school at UPT Bukit Kemuning, North Lampung. Agrijati Scientific Journal of Agricultural Sciences, 1(1).

Sayifullah, S., & Emmalian, E. (2018). The influence of agricultural sector labour and agricultural sector government expenditure on the gross domestic product in the agricultural sector in Indonesia. Qu-Economic Journal, 8(1).

Siahaan, H. (2017). Analysis Of Farmers' Income And Level Of Efficiency Of Rice (Oryza Sativa) Farming In Palipi District, Samosir District.

Skd, W.N. (2017). Contribution of rice farming in improving the community's economic welfare (a case study of Terutung Megara Bakhu village, Lawe Wells subdistrict, Southeast Aceh district, Aceh). North Sumatra State Islamic University.

Single, LA (2022). Participation Of Farmers' Group Members In The Integrated Participatory Development And Management Of Irrigation (IPDMIP) Program (Case Study in Sri Way Langsep Village, Kalirejo District, Central Lampung Regency).

Utama, SP, Yuliarti, E., Sumartono, E., & Widiono, H. (nd). Projection Of Rice Availability And Potential For Expansion Of Rice Fields In Bengkulu Province. Proceedings, 100.

Wahyudi, JE (2016). Analysis Of Costs And Income Of Rice Farming In Gerung District, West Lombok Regency. Mataram University.