International Journal of Multicultural and Multireligious Understanding

http://ijmmu.com
editor@ijmmu.com
ISSN 2364-5369
Volume 7, Issue 4
May, 2020
Pages: 279-293

The Role of Institution and Innovation Attributes in the Adoption of Integrated Crop Management Technology of Lowland Rice of West Bandung and Sumedang Districts

Lukman Effendy

Associate Professor in Polytechnic of Agriculture Development (Polbangtan) Bogor, Indonesia

http://dx.doi.org/10.18415/ijmmu.v7i4.1639

Abstract

Studies on the role of institutions and innovation attributes in affecting the adoption of Integrated Plant Management Technology have been carried out in several subdistricts in West Bandung and Sumedang Districts, West Java Province. The objectives of this study were to: 1) describe the role of extension service institutions, farmer groups, and innovation attributes on the adoption of Integrated Plant Management, 2). analyze factors affecting the adoption of Integrated Plant Management, and 3) find strategies to increase the adoption of Integrated Plant Management. The study population was all group members who had participated in a program to increase rice-corn and soybean production (Pajale) with a total of 173 people in West Bandung District and 143 people in Sumedang District. A total of 124 people as sample were determined to follow the Slovin formula. Data and information were collected through interviews and direct observation to respondents using a closed questionnaire that has been tested for its validity and reliability. The results showed that the majority of respondents rated that; 1) the role of extension institutions, farmer groups, and innovation attributes were categorized as good; 2) extension institutions at the subdistrict level, farmer groups, and innovation attributes significantly affected (ά = 0.001) the adoption in both districts where $R^2 = 0.962$.

Keywords: *Extension Institutions; Farmer Groups; Innovation Attributes; Integrated Plant Management Technology*

Introduction

Since 2015, the government through the Ministry of Agriculture has launched a program to increase production called the Special Efforts (UPSUS) to Increase Rice, Corn and Soybean Production. The production target of each commodity is 73.4 million tons, 20 million tons, and 1.2, respectively. Particularly for lowland rice, cultivation technology is applied with an integrated approach called Integrated Plant Management Technology, which is an intensive plant management system to increase productivity and income of farmers and preserve the production environment through the management of land, water, water, plants, OPT, and climate in an integrated manner (Dewi and Hanifa, 2013).

As an innovation, technology component in Integrated Plant Management is divided into two groups, namely the basic technology component and the selected technology component. According to Nurhayati (2016), the basic technology component is a technology that is highly recommended to be applied in all locations, such as: (1) Use of new superior (or novel high-yealding), inbred or hybrid varieties, (2) Use of quality and labeled seeds, (3) Provision of materials through returning straw to rice fields or in the form of compost and manure, (4) Optimum plant spacing, (5) Fertilization based on crop requirements and soil nutrient status, and (6) OPT control with integrated pest control (IPM) approaches. While the selected technology components is adjusted to the conditions, wishes, and abilities of local farmers, such as (1) Soil management according to the season and cropping pattern, (2) The use of young seeds ≤ 21 days, (3) planting seeds of 1-3 stems per hole, (4) Effective and efficient irrigation, (5) Weeding performed with porcupine, and (6) Timely harvesting and unhulling of rice.

An innovation should have an appeal so that people are interested and willing to implement it. According to Rogers and Shoemaker (1995), the characteristics of innovation consist of: relative advantage, compatibility, complexity, trialability, and observability.

Various studies related to the dissemination or dissemination of Integrated Crop Management have been carried out by many researchers, including the characteristics of innovation related to the technology of Integrated Crop Management of corn plants as conducted by Dewi and Hanifa in 2013 and study on institutional factors carried out by Andriyanita and Hermawan in 2013. The results found that the characteristics of innovation affecting the adoption include observability characteristics, avoiding conflict with the local culture and cultural conditions, and the degree of ease of application. While institutional factors affecting include the existence of farmer groups, agricultural extension agents, and the existence of BPTP.

According to Law No. 16 Year 2006 concerning agricultural, fisheries and forestry extension systems article 8, extension institutions consist of: (a) Extension service institutions, (b) private extension service institutions, and (c) extension service institutions. District level extension institutions are generally in the form of Extension Centers or Agricultural, Fisheries and Forestry Extension Centers (BP3K). BP3K has a strategic role in the dissemination of technological innovation, mainly through facilitating the dissemination of technological and information innovation in accordance with Minister of Agriculture Regulation (Permentan) No. 26 of 2012. Furthermore, the regulation outlines that the role of BP3K is: as a program planner, disseminating innovation information and technology through extension activities, fostering farmer institutions, implementing learning models through demonstration plots, and building partnership networks.

Farmer groups are a form of farmer institution established by farmer members to fight for the interests of farmers so that their farming runs better, thus farmer group members can live well. According to Permentan Number 82 of 2013, the Farmer Group has three functions, namely: (a) Learning Class, that is a learning facility for members to improve their knowledge, skills and attitudes; (b) Collaboration Forum: that is a place to strengthen cooperation between farmers and with other parties; (c) Production Unit, where group members as a whole are a unity of the farm.

The study related to the interaction between the role of extension institutions in subdistricts, farmer groups, and innovation attributes to the process of technology adoption of Integrated Crop Management have still not much conducted. Therefore, this study was designed to determine the extent of the role of institutions and attributes of innovation to affect the adoption of Integrated Crop Management of lowland rice in West Bandung and Sumedang Districts. The objectives of the study were to: (1) describe the role of extension institutions at the subdistrict level, farmer groups, and the effects of innovation attributes on the adoption of Integrated Crop Management of lowland rice in West Bandung and Sumedang Districts; (2) analyze factors affecting adoption level of Integrated Plant Management Technology; and (3) find strategies for increasing the adoption of innovations in lowland rice cultivation in West Bandung and Sumedang Districts.

Framework Thinking

Rogers and Shoemakers (1995) define innovation as new ideas, or objects that can be perceived as new by the individual or community targeted by extension activity. Furthermore, innovation is also interpreted as an idea or ideas that are considered new even though it is no longer new information for other people (Rogers, 2003). In addition, Rogers (2003) explains that the speed of innovation adoption is influenced by the characteristics of innovation, in the form of: (1) Relative advantage; that is, the degree of an innovation is felt better than the idea it replaces, the degree of profit can be measured economically, yet the factor of comfort and satisfaction becomes a consideration. The greater the profits felt, the greater the chances of adoption; (2) Compatibility is the degree of conformity that is felt and remains consistent with existing values; (3) Complexity is the degree of complexity of an innovation or the degree of ease of an innovation to be understood and used; (4) Trialability is the degree of ease of testing in accordance with existing conditions; (5) Observability is the degree of ease of innovation immediately to be seen with the visible and perceived results.

Rogers and Shoemaker (1995) stated that the adoption of innovation as a decision involves four stages, namely: (1) the introduction or knowledge stage, (2) the persuasion stage, (3) the decision stage, and (4) the confirmation stage. Furthermore in 2003, Rogers refined their opinion to be: (1) the introduction phase, in which a person knows the existence of innovation and gained some understanding of how the innovation functions, (2) the stage of persuasion, in which a person forms an acceptable or unwilling attitude towards an innovation, (3) the decision stage, where someone engages in activities that lead to the choice to accept or not accept, (4) the implementation phase, where someone has used the innovation, and (5) the confirmation stage, where someone is looking for support for the decision he has taken. At the confirmation stage, a person can change his decision if he gets conflicting information. Several studies related to the adoption of innovations have been carried out. Burhansyah (2014) found that the factors affecting the adoption of agricultural innovations include (a) the distance from the settlement to the location of farming, (b) the distance from the settlement to the location of the source of innovation, (c) the level of formal education, and (d) farm area. Likewise, the results reported by Serah (2011) showed that the characteristics of innovation, social behavior, and communication channels have a positive effect on the adoption of agricultural technology. Meanwhile, finding results of Wahyu (2011) showed that the speed of innovation adoption is determined by; (a) characteristics of innovation, (b) characteristics of potential users, and communication channels.

In integrated crop management, the technology component is divided into two groups, namely the basic technology component and the selected technology component. The basic technology components (compulsory) consist of: (1) The use of new superior, inbred or hybrid varieties, (2) The use of quality and labeled seeds, (3) Provision of material through returning straw to the fields or in the form of compost and manure, (4) Optimum plant spacing, (5) Fertilization based on crop needs and soil nutrient status, and (6) Pest control using integrated pest control approaches. While the selected technological components is adjusted to the conditions, willingness, and ability of local farmers, among others: (1) Soil management according to the season and cropping pattern, (2) The use of young seeds $\leq$ 21 days, (3) planting seeds of 1-3 stems per hole, (4) Effective and efficient irrigation, (5) Weeding with porcupine, and (6) Timely harvesting and unhulling of rice.

Law Number 16 of 2006 Article 15 Paragraph (1) concerning the extension of agriculture, fisheries and forestry extension explains the hierarchy of extension institutions starting from the central to the subdistrict level. The law states that the Extension Centers have the task of: (a) arranging extension programs at the subdistrict level in line with extension programs at the district/city level, (b) conducting extension activities based on extension programs, (c) providing and disseminating information on technology, production facilities, financing, and markets, (d) facilitating institutional development and partnership of key actors and business actors, (e) facilitating the capacity building of civil servant instructors, extension agent instructors, and private extension agents through a continuous learning process, and (f) implementing the learning process through piloting and developing farming model for the main actors and business actors. In line with that, Regulation of the Minister of Agriculture of the Republic of Indonesia Number 26 of 2012 concerning Guidelines for Management of Extension Centers mandates that the main tasks of Counseling Centers at the district level (BP3K) are; 1) Arranging the extension program at the subdistrict level which is in line with the extension program at the district or city level which is a synthesis between the RKPD-RKPD in all districts and agricultural development programs in the subdistrict area that are prepared annually; 2) conducting extension activities based on established education programs; 3) provide and disseminate information on technology, production facilities, financing, and markets; 4) facilitate institutional development and partnership of key actors and business actors; 5) facilitating capacity building for civil servant instructors, extension institution; 6) facilitating the growth and development of economic institutions for key actors and business actors; and 7) implementing the learning process through piloting and developing a farming model for the main actors and business actors. One of the studies related to the role of institutions was reported by Suradisastra (2008), where the study concluded that the empowerment of agricultural institutions and farmer institutions was associated with socio-technical elements. Meanwhile, Puyung (2011) reported that agricultural extension institutions have not yet performed their functions optimally in providing services to farmers.

Farmer groups are a form of farmer non-formal institutions that are grown and developed from, by, and for farmers to strengthen and fight for the interests of farmers. Farmer groups are basically non-formal institutions in rural areas that have a function as: (a) Learning Classes, that is a place for teaching and learning for farmer group members to increase knowledge, skills and attitudes so that they grow and develop into independent farming so as to increase productivity and gain better income and life. (b) Collaboration Forum, that is, a place to strengthen cooperation both among the farmers in the farmer groups and between farmer groups and with other parties. Through this collaboration, farming is expected to run more efficiently and be able to deal with threats, challenges, obstacles, disruptions and more beneficial; and (c) Production Unit, where farming carried out by each member of the farmer group as a whole should be seen as a business entity that can be developed to achieve economical scale of business by maintaining quantity, quality and continuity.

The research hypothetical framework is a reflection of factors that are thought to be interrelated in affecting the adoption of integrated crop management in lowland rice. In this study, three independent variables (X) and one dependent variable (Y) were chosen. The independent variable is the affecting variable, while the dependent variable is the affected variable. The independent variables consist of: (1) The role of subdistrict level extension agency (BP3K) as X_1 including: program planning, extension services, capacity building, strengthening extension institution, and pilot farming; (2) The attributes of innovation (X_2) include: relative advantage, compatibility, complexity, trialability, and observability; 3) The function of farmer groups (X_3) consists of; learning class, collaboration forum, and a production unit. Schematically, the hypothetical framework of the study is presented in Figure 1.

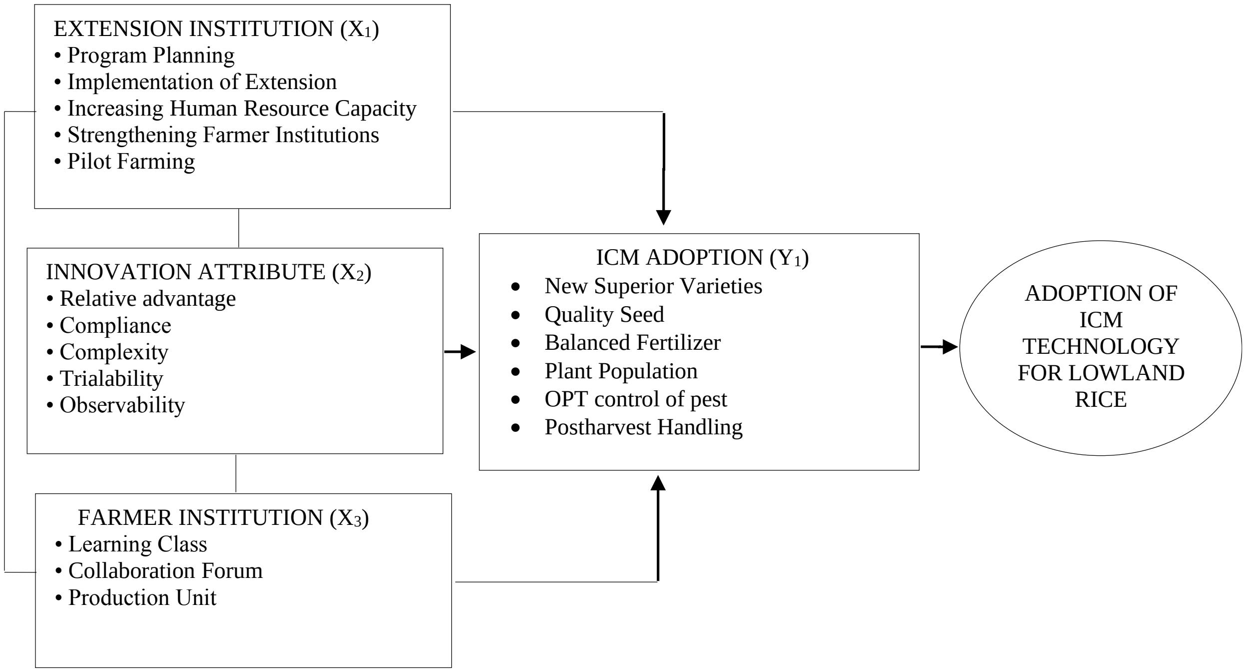

Figure 1. Hypothetical Framework for Research Variables

Methodology

The study was conducted in several subdistricts that represented the capacity of subdistrict-level extension institutions (BP3K) in West Bandung and Sumedang Districts. The number of BP3K in West Bandung district was 16 in each Subdistrict, while extension institution in Sumedang District was 26 and was under the Technical Implementation Unit of the Agriculture Development Office (UPTDP). The selected locations for West Bandung district were BP3K Cipongkor, BP3K Sindangkerta, and BP3K Gununghalu, while for Sumedang District were UPTDP South Sumedang and UPTDP Rancakalong. The study was conducted for three months (May-July 2018). Based on the approach, this study is an ex post facto form, that is, the study finds a cause or factor that caused the event to occur, and then continues with the survey method through interviews and direct observation with respondents.

The sampling technique used a probability sampling approach, particularly Simple Random Sampling, which is a simple random sampling without regard to strata in the population. The study population was members of farmer groups who had participated in a rice production improvement program (UPSUS Pajale) in several farmer groups in each district. Based on this approach, the total population in Sumedang district was 142 people, while in West Bandung district was 173 people. By adopting the Slovin formula, a total sample of 124 people was obtained. The sample calculation results using Slovin formula showed that from a population of 315 people, the sample size was 124 people consisting of 65 people from West Bandung district and 59 people from Sumedang district as presented in the Table 1.

Table 1 Sampling Framework and sample size in each District and Subdistrict

No	District	Subdistrict	Population (Person)	Sample [1)]
1	Bandung Barat	1. Cipongkor	54	20
		2. Sindangkerta	65	25
		3. Gununghalu	54	20
		Total I	***173***	***65***
2	Sumedang	1. South Sumedang	70	29
		2. Rancakalong	72	30
		Total II	***142***	***59***
		Total population I + II	**315**	**124**

[1)] *Proportionally determined*

The instrument used was a questionnaire containing questions or statements related to the research variables. The structure of the instrument is divided into three parts; firstly baseline data, which contains the respondent's identity such as name, residential address, and regional typology, name of the enumerator, date of interview, and signature. Second, it contains questions or statements related to free variables, namely: (X_1) Innovation attributes, (X_2) BP3K as a representation of subdistrict-level extension institution, (X_3) Farmer Groups as a representation of farmer institution, and dependent variable (Y) includes adoption of integrated plant management innovation. Before being used, the questionnaire was tested for its validity and reliability first by conducting: (1) Trial of 20 youths from the chilli farming community in Bogor district; (2) Reliability test using the Cronbach Alpha coefficient formula, where the instrument is classified as reliable if the coefficient value is between 0.6-1. The results of the reliability test indicate that the Cronbach Alpha value is 0.0895, thus the instrument can be used to collect data on the actual respondent.

Data collected using an interval scale with a value of 1-4, where the value of 1 indicates the lowest value which means not good or less important, while the value of 4 is the highest value which means very good or very important. The data collected was analyzed in two ways: 1) descriptive analysis was carried out to describe the role of extension services, farmer groups, and innovation attributes; 2) linear regression analysis was performed to determine the effect of factors of extension institutions, farmer groups, and innovation attributes by following the equation: $Y = a + b_1X_1 + b_2X_2 + b_3X_3$. Data analysis was performed using the statistical product solution service (SPSS) program version 2.1.

Result and Discussion

a. Average Variable Values of Each District

In general, the results of the study are described based on variables in each district. The average value of each variable is presented in the following figure:

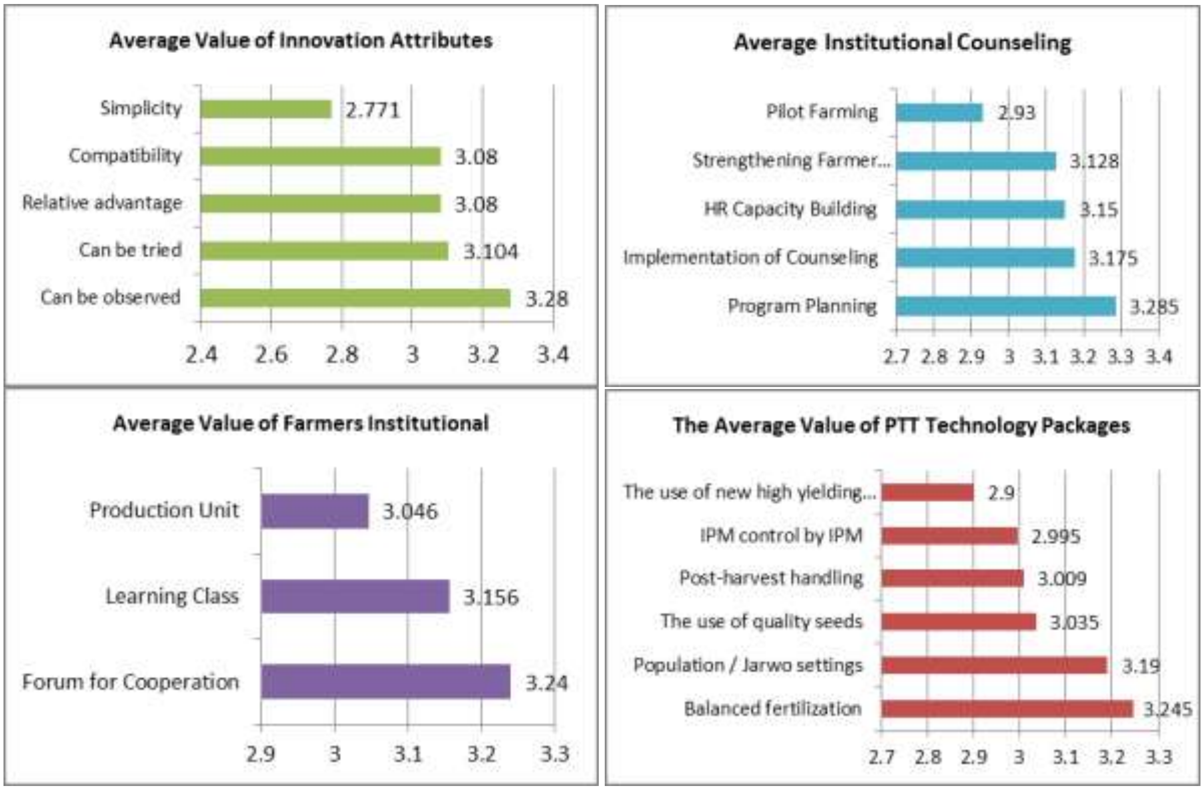

Figure 1. Average Value of Variables in Sumedang

According to Figure 1, the lowest average values of each variable in Sumedang district are: (1) complexity level for the innovation attribute, (2) pilot farming for the role of extension institutions, (3) production units for farmer institution variable, and (4) use of new high-yielding varieties. The results show that the level of complexity of an innovation is considered by farmers to be able to accept or adopt an innovation. Likewise, the role of extension institutions in providing pilot farming was not carried out properly. Furthermore, the function of the farmer group as a production unit is not running as expected. While the integrated plant management technology package that is still less adopted is the use of new high-yielding varieties. The average value of each variable in West Bandung district is presented in figure 2.

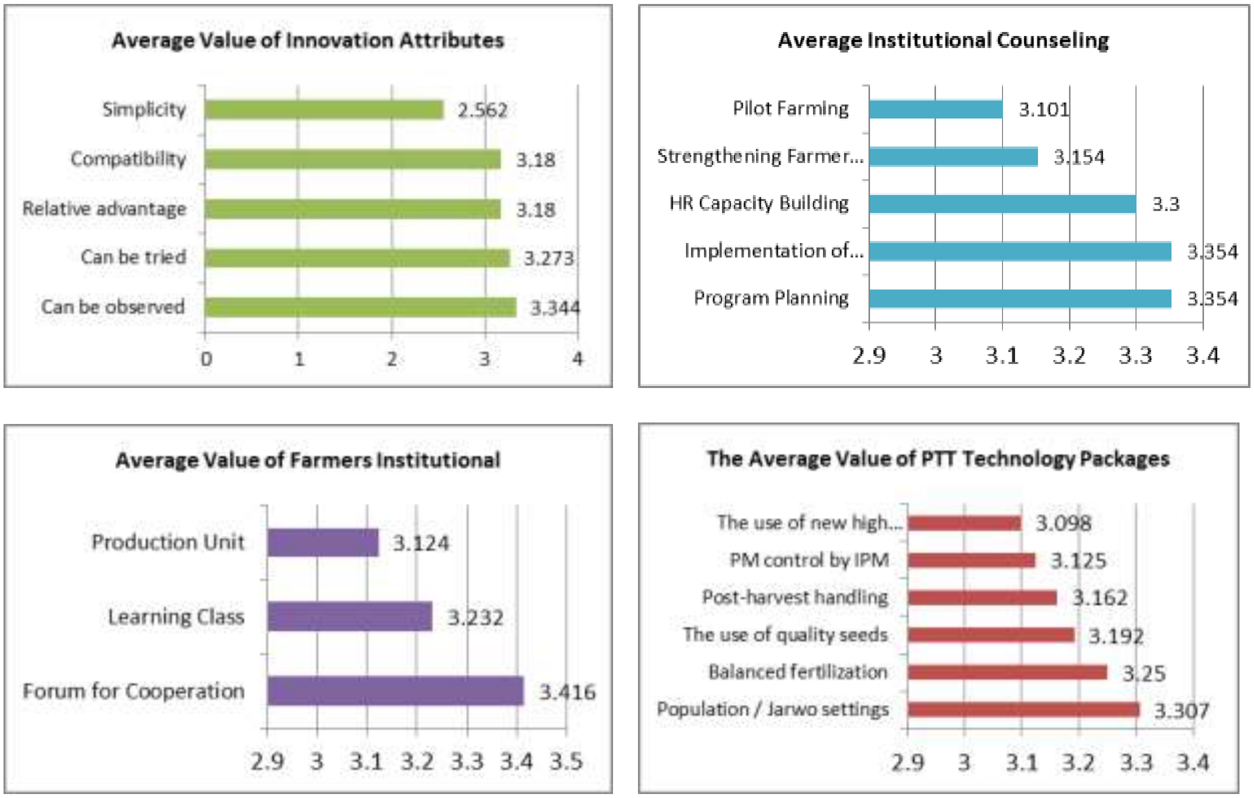

Figure 2. Average Variable Value in West Bandung

Figure 2 shows that the lowest average value of each variable in West Bandung district is: (1) complexity for variable attributes of innovation, (2) pilot farming for the the role of extension institutions, (3) production units for variable of farmer institutions, and (4) use of new high-yielding varieties. The results indicate that the level of complexity of an innovation is considered by farmers to be able to accept or adopt an innovation. Likewise, the role of extension institutions in providing pilot farming was not carried out properly. Furthermore, the function of the farmer group as a production unit is not working as expected. While the integrated plant management technology package that is still less adopted is the use of new high-yielding varieties.

b. The Average Value of Each Variable in the Combination of Sumedang and West Bandung Districts

The average value of each variable in the combination of the two districts is as follows.

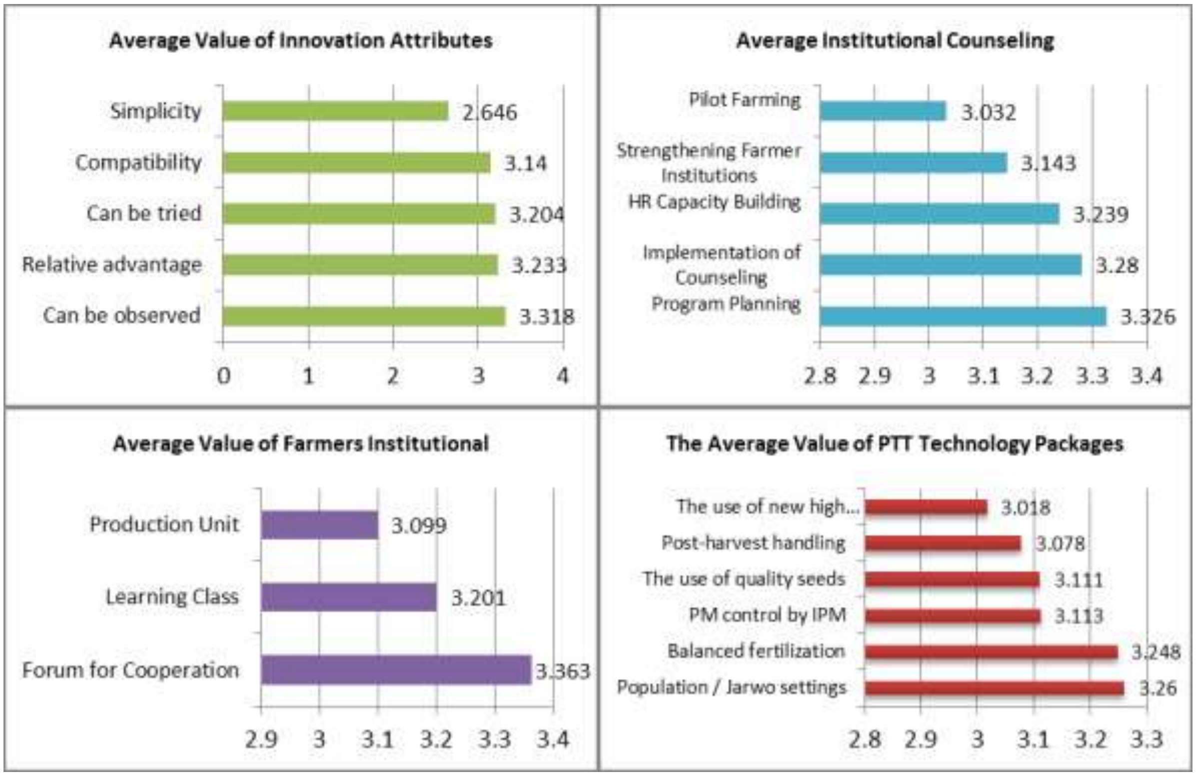

Figure 3. Average Value of the Combined Variables of the Two Regencies

Figure 3 shows that the lowest average value of each variable from the combination of the two districts, namely: (1) complexity for variable attributes of innovation, (2) pilot farming for the role of extension institutions, (3) productions unit for farmer institution variables, and (4) use of new high-yielding varieties. The results show that the level of complexity of an innovation is considered by farmers to be able to accept or adopt an innovation. Likewise, the role of extension institutions in providing pilot farming was not carried out properly. Furthermore, the function of the farmer group as a production unit is not running as expected. While the technology package of integrated crop management that is less adopted is the use of new high-yielding varieties. The average value and ranking of all indicators for each variable is presented in Figure 4.

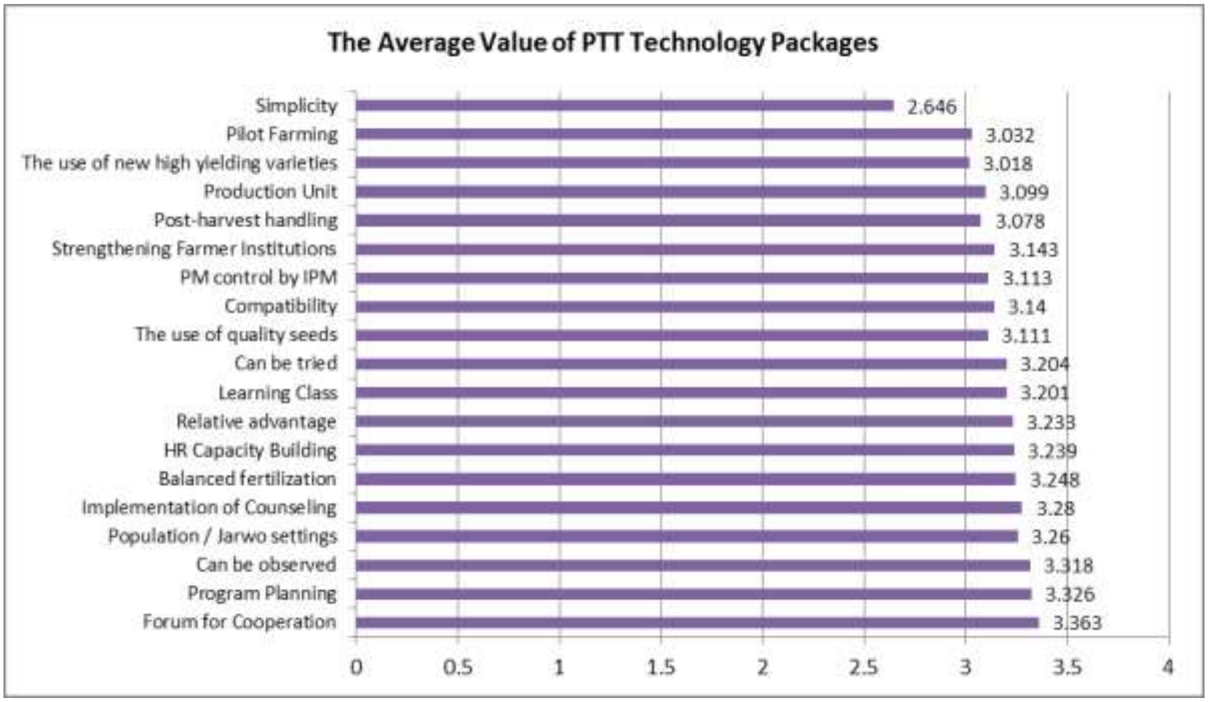

Figure 4. The Average Value of Research Indicators

c. The Effect of Extension Institution, Farmer Groups, and Innovation Attributes on Integrated Crop Management Adoption

The results show that the research variables significantly affect the adoption of PTT technology, which is specifically presented in Table 2.

Table 2 Regeresi Analysis Results

No.	Uraian	Unstandarized Coefficients B	Sig.
1.	R^2	0.962	
2.	Constant	0.061	0.302
3.	Institutional Counseling (X_1)	0.369	0.000 (sig)
4.	Innovation Attributes (X_2)	0.245	0.000 (sig)
5.	Farmers Institutional (X_3)	0.365	0.000 (sig)

The results of the regression analysis showed that the variables of personal characteristics, external support, and motivation significantly affect ($p \leq 0.05$) to adoption which is indicated by the equation: Y =

$0.61 + 0.369X_1 + 0.245X_2 + 0.365X_3$. These results indicate that if the extension institution (X_1), innovation attributes (X_2), and the farmer group (X_3) are zero (0), then the adoption level of integrated plant management (Y) is 0.61.

Furthermore, it can be explained that the coefficient value of b1 is 0.369 which explains the relationship between extension institutions (X_1) and the adoption level of integrated crop management (Y), which means that if the innovation attribute (X_2) and farmer groups (X_3) are constant, each increase in the value of extension institution factor (X_1) by one unit will increase the adoption level of integrated plant management (Y) by 0.369 units. Furthermore, the coefficient value of b2 is 0.245, which shows the relationship between innovation attributes (X2) with the adoption of integrated plant management (Y). It may be interpreted, if the factors of farmer groups (X3) and extension institutions (X1) are constant, then each increase in the value of innovation attributes (X2) will increase the adoption of integrated plant management (Y) by 0.245 units. Subsequently, a coefficient value of b3 of 0.365 explains the relationship between farmer groups (X3) and adoption of integrated plant management (Y). It means that if the extension institution (X1) and the innovation attribute (X2) are constant, then each increase in the value of the farmer group factor (X3) by one unit will increase the adoption of integrated plant management (Y) by 0.365 units. Therefore, the adoption level of integrated plant management will increase if the role of extension institution (X1), innovation attributes (X2), and the role of farmer groups (X3) increases. Thus, to increase the adoption level of integrated plant management, the role of extension institution at the sub-district level, identifier of innovations that can encourage the adoption of the innovation, and the role of institutions needs to be improved. Increasing the role of extension institutions and the role of farmer groups will make a greater contribution in increasing the adoption level of integrated plant management in the two districts studied. Based on Table 2, it is known that there are several indicators that obtain the lowest average and rank values, namely: the complexity of innovation for the attributes of innovation, pilot farming for the role of extension institutions, production unit for the role of farmer institutions, and the use of new superior varieties for integrated plant management technology implementation variables. This condition occurs both partially in each district and a combination of the two districts.

These results indicate that the level of complexity of an innovation has not been a major consideration for farmers in determining whether or not to adopt an innovation, both in Sumedang district and West Bandung district. In this case, farmers in the two districts prioritize the consideration of adopting an innovation because it can be observed both for the process and the results. These results are in line with the results obtained by Fatchiya, Amanah, and Indah (2016) that the process of adopting an innovation requires proper, good and worth consideration to be done by someone and the surrounding environment. Similar to Zulvera (2014), the level of innovation adoption is associated to the nature of innovation itself. Furthermore, the role of extension institutions (BP3K) in implementing pilot farming in the two districts has not been carried out properly, in fact the main task carried out is program planning. These results are also in line with the finding results obtained by Zulvera (2014) that extension support is associated with the level of adoption of agricultural innovations. In addition, Fatchiya, Amanah, and Indah (2016) stated that the application of innovation is closely related to the Extension Implementation activities.

The role of farmer institutions in making farmer groups as production units has not been as well as expected. This condition occurs in both Sumedang and West Bandung districts. As it is known that farming activities carried out by each member of the farmer group as a whole should be seen as a business entity that can be developed as a business unit. The function of the group that has been done well is by making the farmer group as a collaboration forum. These results are in line with the results obtained by Hardianto and Effendy (2014) that the function of farmer groups as a collaboration forum has been running relatively well in the preparation of programs in the form of RDK/RDKK. In a group, it is expected that good cooperation and trust between members should be maintained so that the process of technology adoption goes well.

Furthermore, the very low component of integrated plant management technology adopted was the use of high-quality superior varieties. The technology component of integrated plant management that is more often adopted in these two districts was the regulation of plant populations using Legowo row planting system and the application of balanced fertilizers. These results are in accordance with research conducted by Fatchiya, Amanah, and Indah (2016) that the process of adopting an innovation requires proper, good and worth consideration to be performed by a person or his environment. The results of the regression analysis showed that $Y = 0.61 + 0.369X1 + 0.245X2 + 0.365X3$. This proves that the variables studied have an effect (Rsquare= 0.962) on the increase in innovation adoption both in West Bandung district and in Sumedang district. Thus, the adoption of integrated plant management in both districts is largely determined by the increasing role of extension institutions at the subdistrict level, an increase in the role of farmer groups, as well as the characteristics of innovation that can encourage whether or not an innovation is accepted.

d. Strategy for Implementing Research Findings

As mentioned earlier, the results of the study found that there are 6 indicators of the research variables that obtain the highest and lowest scores. The highest score for each factor included; program planning for extension institution, observability for innovation attributes, collaboratin forum for the role of farmer groups, and regulation of plant populations with a Legowo row planting system. Meanwhile, the lowest scores included pilot farming, the complexity of innovation, production units, and the use of superior varieties as presented in Figure 2. According to these findings, a strategy that can be used to increase integrated plant management adoption is to begin by simplifying integrated plant management innovation by creating pilot plot through the use of superior seeds, and increasing the role of farmer groups as production units.

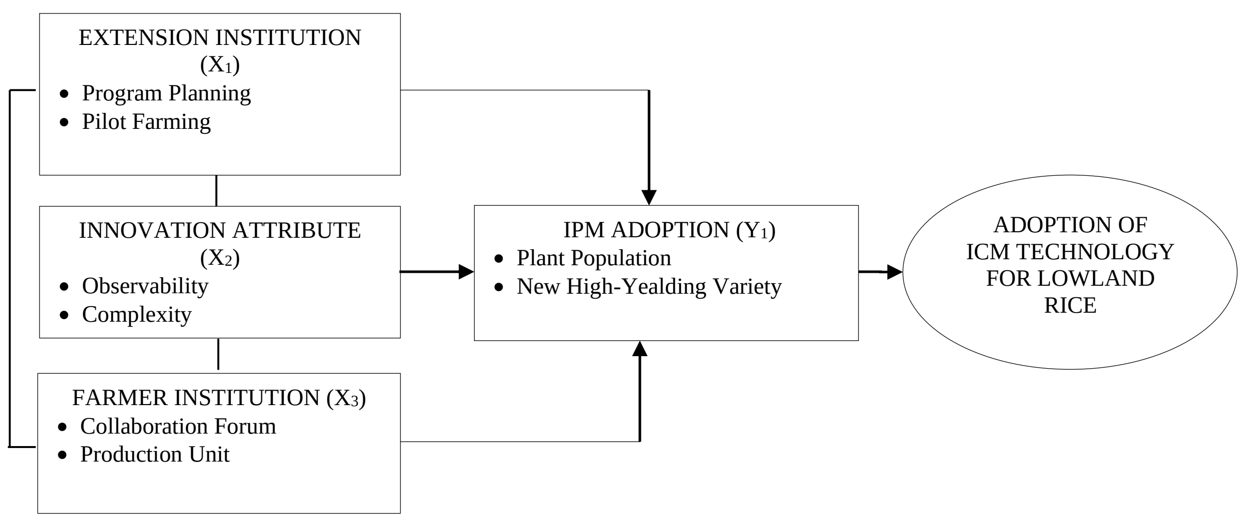

Figure 2. Research Findings Model

Conclusion

It can be concluded that: (1) the indicators that obtain the lowest average values in the two districts are: (a) the level of complexity for the innovation attribute variable, (b) pilot farming for the role of extension institution variable, (c) production units for the role of farmer institution variable, and (d) the use of new high-yielding varieties for integrated plant management technology variable; (2) extension institutions, innovation attributes, and farmer groups have a significant effect on the adoption of integrated plant management innovations in West Bandung and Sumedang districts; (3) the role of extension institutions at the subdistrict level and the role of farmer groups make a greater contribution than identifier of innovation factor; and (4) the strategy to increase the adoption level of integrated plant management can be started by simplifying integrated plant management innovation by creating demonstration plots through the use of superior seeds, and increasing the role of farmer groups as production units.

Recommendation

Based on the above conclusions, it is necessary to make efforts to: (1) reduce the complexity inherent in integrated plant management technology, particularly in regulating plant populations in the Legowo row planting system so that planting is easier to carry out without reducing plant population itself, (2) make good farming plots in the BPP environment and on farmers; land as an Extension Implementation institution functions (3) improve the function of farmer groups as a production unit, and (4) extension activities concerning the use of new high yielding varieties needs to be performed more intensively.

References

Burhansyah, R. 2014. Faktor-faktor yang Mempengaruhi Adopsi Inovasi Pertanian pada Gapoktan PUAP dan Non-PUAP di Kalimantan Barat. Jurnal Informatika Pertanian. Vol.23 No.1. 2014.

Departemen Pertanian. 2006. *Undang-Undang Nomor 16 Tahun 2006.* Jakarta: Pusat Pengembangan Penyuluhan Pertanian, Badan Pengembangan SDM Pertanian.

Departemen Pertanian. 2012. *Peraturan Menteri Pertanian Nomor 26 Tahun 2012*. Jakarta: Pusat Pengembangan Penyuluhan Pertanian, Badan Pengembangan SDM Pertanian.

Dewi, A. Y dan Hanifa, W. V. 2013. Kajian Karakteristik Inovasi Teknologi dan Kelembagaan yang Mempengaruhi Proses Adopsi Pengelolaan Tanaman Terpadu (PTT). Proseding Seminar Nasional Inovasi Pertanian Spesifik Lokasi. BBPPTP. Hal 98 – 107.

Effendy, Lukman. 2016. Model Peningkatan Kapasitas Penyuluh dalam Pemanfaatan Informai Iklim di Kabupaten Indramayu dengan Pendekatan Analisis Keberlanjutan. *Jurnal Informasi Pertanian* Vo.25 No.1 Maret 2016.

Fatchiya, A, Amanah, S, Indah, Y.K. 2016. Penerapan Inovasi Teknologi Pertaniandan Hubungannya dengan Ketahanan Pangan Rumah Tangga Petani. Jurnal Penyuluhan 12 (2): 190-197.

Hardianto, W, dan Effendy, Lukman. (2014) Peran Kelompok Tani Berbasis Padi (*Oryza sativa*. L) Dalam Penyusunan RDKK di Desa Karang Anyar Kecamatan Sikap Dalam (KIPA). Bogor: Sekolah Tinggi Penyuluhan Pertanian.

Kementerian Pertanian. 2012. Peraturan Menteri Pertanian Nomor 82 Tahun 2013. tentang Pembinaan Kelembagaan Petani. Jakarta: Pusat Pengembangan Penyuluhan Pertanian, Badan Pengembangan SDM Pertanian.

Marzuki G, Burhan N. 2000. *Statistik Terapan untuk Penelitian Ilmu-ilmu Sosial*. Yogyakarta: Gadjah Mada University Press.

Nurhayati. 2016. Metode Komunikasi Pendiseminasian Teknologi Budidaya Padi Sawah Berbasis Pemetaan Pengguna (disertasi). Bogor (ID): Sekolah Pascasarjana, IPB.

Puyung, M.J. 2011. Peranan Sumber Daya Manusia dan Kelembagaan Penyuluhan dalam Peningkatan Produksi Tanaman Pangan untuk Ketahanan Pangan di Daerah Merauke. Tesis Magister UNPA.

Rogers E.M. 1995. *Diffusion of Innovations* (*4-ed*). New York: The Free Press.

Rogers E.M. 2003. Diffusion of Innovations. 5th Edition. New York (US): The Free Press.

Serah, T. 2011. Pengaruh Karakteristik Inovasi, Sistem Sosial dan Saluran Komunikasi terhadap Adopsi Teknologi Pertanian. Tesis UNPA.

Suradisastra, K. 2008. Strategi Pemberdayaan Kelembagaan Petani. Jurnal Forum Penelitian Agro-Ekonomi. Vol.26 No.2. 2008.

Zulvera. 2014. Faktor Penentu Adopsi Sistem Pertanian Sayuran Organik dan Keberdayaan Petani di Provinsi Sumatera Barat (disertasi). Bogor (ID): Sekolah Pascasarjana IPB.

Wahyu, Y. H. 2011. Adopsi Inovasi Pertanian di Kalangan Petani di Kecamatan Gatak Kabupaten Sukoharjo. Jurnal Agrin Vol.15 No.2 Oktober 2011.

Appendix

Regression Analysis Results

Descriptive Statistics

	Mean	Std. Deviation	N
Y	3.1672	.30114	124
X1	3.1087	.28691	124
X2	3.2038	.38304	124
X3	3.2190	.37630	124

Model Summary

Model	R	**R Square**	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.981[a]	**.963**	.962	.05838	.963	1050.935	3	120	.000

a. Predictors: (Constant), X3, X1, X2

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.745	3	3.582	1050.935	**.000[b]**
	Residual	.409	120	.003		
	Total	11.154	123			

a. Dependent Variable: Y

b. Predictors: (Constant), X3, X1, X2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	**(Constant)**	**.061**	.059		1.036	.302
	X1	**.369**	.026	.351	14.242	**.000**
	X2	**.245**	.020	.312	12.269	**.000**
	X3	**.365**	.020	.456	18.232	**.000**

a. Dependent Variable: Y