

Revitalization of Linier Model of Extension to Disseminate the Paddy Crop Failure Insurance

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Abstract

The linier model of extension has seemingly been left and replaced by the dialogue model implemented broadly in farmer field school (FFS). The incomplete successful of FFS has brought out the question of its effectiveness. By the fact, the research aims to revitalize linier model of extension to disseminate the paddy crop failure insurance (PCFI). Based on the 75 samples defined by Slovin formula with 0.08 error probability and data collection conducted in Rangkas Bitung District, Banten, Indonesia, Mei-June 2018, the sequence model of “perception-implementation-interest” could be adopted to encourage farmer’s membership of PCFI. In the light of chi square test, land size, participation of extension, and harvest fail experience has a significant effect to strengthen the model.

Keywords: Perception, implementation, farming interest, and paddy-crop failure insurance.

INTRODUCTION

The effort of food self-sufficiency in Indonesia faces serious the problems. The youth farming unwillingness; their tendency to work outside agricultural field; and the tendency of land selling due to high demand for the land in line with the dynamics of development has given the strong challenge for food self-sufficiency. Losvitasari *et al.* [24] shows the small interest of farming within the youth who are used to tourism activities in Tanah Lot, Tabanan, Bali. They prefer to work in the tourism because it is more prestigious and earn more.

Dwipradnyana’s research [6] in Subak Jadi, Tabanan, Bali shows the same tendency. Likewise, Asmara’s research [2] in Bogor City, West Java; Barokah *et al* [4] in Karang Anyar, Central Java; and Handari [8] in Magelang, Central Java described

dissatisfaction of farming and tended to shift to other jobs due to small income of the rice cultivation. Dwipradnyana [6] found around 85% of sample farmers have viewed, that agricultural land never provided the expected results. Furthermore, more than 75% of farmers strongly agree and agree that agricultural land is a commodity. The same study revealed that 75% of farmers agreed and strongly agreed that agricultural land conversion could solve the economic problems of farmers.

The tendency of farmers to leave the paddy farming is because of its high risk of crop failure due to drought, pest and plant disease attacks. Feder *et al.* [7] revealed the various innovations and extension in the paddy farming sub-sector, including integrated pest management had not fully succeeded to avoid crop failures. In this context, Wastra and Mahbubi [28] emphasized, the agricultural sector is dependent strongly on the season. According to the Directorate General of Food Crops [5], within a period of six years (2011-2016), there was a crop failure of 3,849,813 ha, with in detail of 906,736 ha by floods, 1,135,302 ha by drought, and 1,187,775 ha by pest attack.

The issue of crop failure needs a serious attention, because this will affect the economic resilience of farmer families. The Indonesian food agriculture is known is a family farming system. According to Rahardjo [22], it is characterized by a narrow land, farming is more subsistence (fulfilling family needs), equipped with horticulture, and sometimes with small numbers of livestock. The existence of this family farming is very important as a national food provider. The Indonesia's triumph to achieve food self-sufficiency in the 1980s was inseparable from the role of the family farmers.

Based on the 2013 agricultural census, NDPA [3] revealed the number of rice farming families in Indonesia was 14 147 thousand, down from 14 206 thousand in the 2003 population census. The same sources indicated the average area of land ownership in Indonesia is 0.69 ha. For more detail, in Sumatra averaged 0.68 ha, in Java 0.61 ha, in Bali and Nusa Tenggara 0.72 ha, in Kalimantan 0.78 ha, in Sulawesi 1.32 ha, while in Maluku and Papua 2.72 ha.

The harvest failure certainly causes suffering the narrow land farmer, and will disrupt resilience of their economy. A study in Cianjur District, West Java, Indonesia indicated the crop failure was one of the factors for the negative perceptions of the youth on rice farming. This negative perception has a significant effect on farming unwillingness, and even leads to the tendency of land selling [17]. The in-depth interviews with farmer group leaders in the same location showed the absence of assurance for farmers is an internal factor to encourage the tendency of land conversion. To mitigate this tendency, according to farmer groups, it is necessary assurance the farmers, both for stability of selling prices and crop failures [18].

The Ministry of Agriculture of The Republic of Indonesia as an effort to assure the family farmer has socialized the paddy crop failure insurance (PCFI) program. However, this program raises a question about farmers' perception on PCFI and its membership inclination. Theoretically, the positive perception on a program is a

prerequisite for participation. Hersey and Blanchard [5] emphasized, positive perceptions on certain objects will encourage someone to behave in a certain way to the object. The positive perception and the tendency of membership in PCFI are expected to increase the willingness of farming. This allegation is based on research that the provision of fertilizer subsidies and direct relief of paddy mean production in Cianjur Regency has a very significant effect on the farming interest. However, this strong influence is merely for land owner farmers and for the over 40-years farmer, but it has no evidence for the young farmer [9].

By the condition, an effective persuasive model is necessary to disseminate the PCFI program. Therefore, this research aims to formulate the extension model to encourage positive perception and membership inclination of PCFI, as well as its effect on the farming interest. The model should be formulated by considering the farmer characteristic, the existed perception on the PCFI, and the membership tendency. For this purpose, the research should be conducted within the farmer who has received socialization of this program. Referring to the Ministry of Agriculture, The Republic of Indonesia [11], one of the regions that have received the socialization of farming insurance is Lebak Regency, Banten, Indonesia specifically the Rangkasbitung District. This paper, for this aim, is model of dissemination of PCFI based on the research in the above mention location.

LITERATURE REVIW AND FRAMEWORK ANALYSIS

Reorientation of Diffusion of Innovation Model

The linier model of diffusion of innovation even though has been considered a classical work, but it is still needed, especially by the fact the farmer field school (FFS) model - as a representation of dialogue and interactive model to foster the problem awareness [12] - is not fully successful to realize the human learners. Practically, this model is difficult to avoid knowledge and innovation gaps [16]. The influence of socio-economic variables is difficult to eliminate. The case of entrepreneurship development for rice seed breeding farmers in Serang, Banten is an example of diversity of innovation outcomes due to differences of farmer resources [29]. The case of entrepreneurial skills extending for small business trainee in West Java is another example of training outcome diversity although the both cases have adopted FFS technique [19].

In the light of this empirical evidence, reorientation of this classical model is inevitable. The socialization of PCFI, in which it is carried out in a linier communication [11] could basically become a stone corner for reorientation of the linier model of agricultural extension. This process is expected to produce an effective model of diffusion of innovation, specifically for encouraging the importance of the PCFI based on the linier and classical model of agricultural communication.

Sequence of Perception-Implementation-farming interest

Perception

The classical model of Lionberger's [13] illustrated that innovation starts from awareness about the importance of innovation, and sequentially followed by interest, acceptance and finally an innovation trial. The model is in line with Rogers' model [23] but in different sequences of diffusion processes. For Rogers [23], the process of diffusion and adoption of innovation starts from knowledge, persuasion, decision making, implementation, and confirmation. The diffusion process can simply be described in the learning hierarchy of knowledge-interest-action [10].

However, for the PCFI diffusion, analytically in this research, it doesn't start from knowing but from perception. Between the knowledge and persuasion there is a close relationship. Referring to Rogers [23], the mental activity at the knowledge stage is "knowing" or absorbing information; while in the persuasion stage, the mental process is mainly an "affective" or the feeling of innovation. At the "persuasion" stage according to Rogers [23], there is a perception on the object; and this perception will only occur if there is sufficient knowledge about the innovation. In Pickens analysis [21], perception is the result of the interpretation and organization of sensations to be a meaningful experience. Pickens [21] emphasized, perception is a person's point of view of another party. This point of view, he continued, is closely related to attitudes or beliefs, such as judging of someone based on his belief. In the light of these arguments, the more important thing in the persuasion process is perception, in which it includes the knowledge.

In line with Pickens, van Den Ban and Hawkins [27] explained, "Perception is the process of receiving information or stimuli from the environment and turning them into psychological awareness." Therefore, when someone receives stimuli through the eyes, ears, or other senses, the different interpretations will occur. In this context, citing Avila and Purkey, Maman [15] asserted, perception is someone's interpretation of something that seems to them. Therefore, perceptions are arrests, interpretations, and judgments on the meaning of an object captured through the senses. Positive perception of an innovation will encourage adoption of these innovations [15], 2008).

Regarding perceptions about PCFI, referring to Rogers [23], it will not be separated from six patterns in the viewpoint of farmers, namely the offered innovation: (1) having or less having relative advantages; 2) having or lacking compatibility with socio-cultural values, beliefs, and with the needs of farmers; (3) has a level of complexity versus lack of complexity; (4) have or lack of level of trialability; (5) have or have less visible results; and (6) obtain or lack support from the social system.

Implementation

Referring to Rogers (1983), the culmination of the innovation process is decision making by the community, where they are interested in implementing an innovation offered. In the context of PCFI - as an innovation - the peak that must be analyzed referring to Rogers [23] is the tendency of farmers to become participants.

Hypothetically, based on Rogers's logic [23], perceptions of relative advantage, suitability, complexity, testing, and social support will have a strong influence on PCFI's membership. This hypothesis is reinforced by Rogers' discovery (1983) as following: (1) A total of 29 out of 43 studies (67%) proved that positive perceptions of relative advantage influence the rate of innovation adoption. (2) As many as 18 out of 27 studies (67%) prove that positive perceptions of compatibility are factor for innovation adoption. (3) A total of 9 out of 16 studies (56%) proved that perceptions of complexity negatively affected innovation adoption. (4) A total of 9 out of 13 studies (69%) supported that positive perceptions of trialability had a significant effect on innovation adoption. (5) A total of 7 out of 9 researches prove that perceptions of observability have a positive effect on innovation; and (6) the total of the 8 researches (100%) showed that social support was a factor for innovation adoption.

Based on the material of PCFI program [11], the indicators of PCFI participation tendencies are: (a) farmers feel that PCFI is very necessary in rice farming practices; (b) feeling protected in carrying out rice farming practices if they become PCFI members; (c) tendency a willingness to become the PCFI members; (d) feeling able to manage the finances to pay the PCFI premium; (e) feeling no problem to allocate money for the PCFI premium; (f) feeling that they have family support to set aside money for the PCFI premium; (g) feeling happy to be a PCFI members; (h) feeling happy to invite other farmers to become PCFI members; and (i) feeling of getting support from other farmers to become a PCFI members.

These indicators are indeed more attitudinal. However, the boundary between attitude and behavior is very thin. Pickens [21] emphasized, attitude is a strong tendency to act because of an individual's internal drive. According to Pickens [21], between perception and attitude is an inseparable series. If perception is a person's response to cognitive stimuli, then the attitude is the tendency of someone emotionally to act according to that knowledge.

Farming Interest

The tendency of PCFI membership is hypothetically factor strengthens the farming interest. According to Arviani *et al.* [1], farming interest is a feeling of pleasure in running a farming business. In line with that, Panurat [20] suggested four dimensions of interest measurement in a Likert scale, namely: satisfaction, pleasure, willingness, and preference for rice farming practices.

Losvitasari *et al.* [14] uses three dimensions of measuring interest, including: pleasure, attraction, and involvement. In line with Panurat [20], Arviani *et al.* [1] and Losvitasari *et al.* [14], Handayanti [9] defines the interest in farming as a willingness and pleasure to do rice farming. Based on these definitions, Handayanti [9] suggests three indicators of interest in farming, namely: willingness, pleasure, and habits. Correspondingly, Maman *et al.* [17] suggest indicators of farming interest, namely feeling of: valuable, respectable, valued, more suitable for him, more social status, and more appropriate to work and pursue farming.

Farming interests tend to increase in line with the aids, attention and appreciation of other parties. Handayanti [9] found, direct fertilizer aids, fertilizer subsidies, direct seed relief, and seed subsidies encouraged farming interest. For Arviani *et al.* [1], the increasing of farmer income and appreciation for their social status contributed significantly to increase the farming interest.

Strengthening the Sequence of Perception-Implementation

Lionberger [13] shows that age and education level is factors for the formation of perceptions about innovation. In addition, communication behavior and exposure to media are variables for the growth of attention and positive view about an object. According to Lionberger [13], participation of extension, friends, and media usage are factors for formation of perceptions and attitudes.

The research of Rogers [23] supported the role of socio-economic status, personality attributes (age, sex, and level of education), and communication - such as participation in extension, and knowledge seeking activities - as contributors to perceptual formation. This is in line with subsequent research, such as Jahi [10], that segmentation of audiences based on socio-economic and personality variables is important for the occurrence of a positive response to an innovation.

A number of contemporary researches show its compatibility with these classical studies. In the case of responsiveness to the diffusion of innovations of shallot cultivation in Berebes, Central Java, and orchid farmer in Tangerang, Maman *et al.* [16] found that age, education level, and farming experience were factors for the innovativeness. In addition, the frequency of attendance in extension activities, the owned resources, and sources of information about innovation were the important factors for the responsiveness to the innovation [16].

The study of the relationship between participation and entrepreneurship for agribusiness field school participants in Serang, Banten found that experience and level of education played an important role in the tendency for entrepreneurial implementation; while for the entrepreneurs in West Java, the variables that significantly influence the tendency of entrepreneurial implementation are participation in training, education and experience as small entrepreneurs [19].

Based on the research, the inclination of PCFI's membership must be analyzed by taking into account the socio-economic diversity and social status of farmers. Even though farmers already have a positive perception, the decision making of PCFI's participation requires an analysis of the socio-economic characteristics of farmers. This is in line with Sadati *et al.* [24] at his research in Behbahan, Iran in which he found five strongly significant and five significant variables affected the adoption of agricultural insurance. The five strongly significant variables included: participation in extension activity, land size ownership, amount of land area ownership, dry land ownership, and experience of crop failure. The five significant variables are: farming experience, literacy rate, agricultural revenue, satisfaction with insurance, and experience in agricultural insurance.

The study of Tsikirayi *et al.* [(26) in Zimbabwe was in line with Sadati *et al.* [24], that farmer preferences for agricultural insurance are influenced by: age, experience, education, reputation of insurance companies, land size ownership, satisfaction with insurance, income, and risk aversion.

MODEL HYPHOTESIS

The model is the relationship between variables in a certain pattern to achieve certain goals. Referring to theories based on the linier model of innovations diffusion, there is a strong prediction that there will be a perception-implementation sequence. That is, the perception of an innovation will be followed by the implementation of that innovation. In the context of PCFI’s diffusion, the main goal is the growing interest in farming to acquire food self-sufficiency. Referring to a number of theories and on the basis of research objectives, the implementation of PCFI’s membership is expected to have a significant effect on the farming interest. The model formulation is presented in Figure 1.

The perceptions of PCFI and participation in this program will get stronger in the segment of audience that has certain characteristics. This study aims to explore the characteristics of farmers which are predicted to have a strong influence on the sequence of perception-implementation-interest. For this purpose, the resulted model will contribute academic benefits to develop theories of innovation diffusion; and practically, it will also benefit to accelerate the application of PCFI program among rice farmers to support the willingness of paddy farming achieve staple food self-sufficiency.

The model even come originally from PCFI diffusion, the urgency of it could be completely implemented in the various innovation related to the farmer social and economic life.

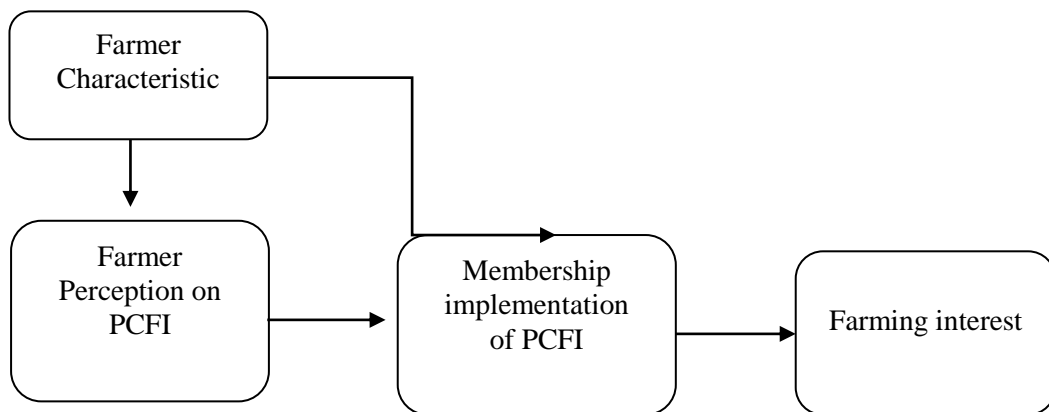


Fig 1. Formulation of PCFI diffusion Model

RESEARCH METHODS

The research population was three farmer groups in three villages of Rangkas Bitung District, Banten, Indonesia, included: Nameng, Koletan Wetan, and Citeras. This three farmer groups have 131 people as the recipient of PCFI socialization. Based on Slovin formula [25] with 0.08 of sampling error probability, the sample size is 75 people. To determine the respondents, the research took the sample randomly and proportionally from each farmer group. The farmer characteristics are antecedent variables; the perception of PCFI is independent variable; the membership tendency of PCFI is within variable; while the dependent variable is farming interest.

Data collection was conducted during February-Mei 2018 by closed questionnaire, especially for perception, tendency of PCFI's membership, and farming interest. Previously, the questionnaire got validity and reliability test, analyzed in Alpha Cronbach procedure. This procedure resulted coefficient 0,814, in which it indicated the high reliability of this research instrument.

Data analysis adopted a chi-square procedure to correlate the characteristics of farmers with perceptions of PCFI and membership tendency in PCFI. This statistical procedure is also used to connect between perceptions of PCFI, membership tendency, and farming interest. The last three variables are measured by a Likert scale in interval measurement. Therefore, the three variables are categorized into three levels of ordinal scale to meet chi-square requirements. The variables which have the strong effect to the tendency of PCFI's membership will be identified to formulate the model of PCFI diffusion within the farmers.

RESULT AND DISCUSSION

Farmer Characteristic Data

The research respondents generally are in middle age, between 31-50 years (as many as 73.3%). Young farmers (15-30 years) are only 4 people (5.3%), while old farmers (51-55 years) are only 16 people (21.4%). In terms of education, all respondents had only elementary school, even the amount of 33 people (44%) are un-graduation of elementary school. This means that better educated people are outside the agricultural sector; and the agricultural sector is for lower education people.

The land size ownership is generally less than 0.5 ha. Clearly, a total of 42 farmers (56%) have less than 0.5 ha of land. Those who have land above 0.5 ha are only 33 people (44%). However, even though the land owned is narrow, attendance in extension activities is relatively higher. For more detail, 41 farmers (54.6%) claimed frequently attend the agricultural extension. Those who claimed present occasionally in agricultural extension is merely 33 people (44%); while those who claimed never attend the agricultural extension were merely 1 person (1,4%). The farmers, as the conclusion, actively participate in agricultural extension. Regarding farming experience, almost all farmers experienced between 1-20 years (as many as 71 people/94.7%). But most of them (49 people/65.3%) claimed un-experience of crop failure.

Table 1. Farmer Distribution Based of Social-Economic Characteristic, Perception on PCFI, Tendency of PCFI Membership, and Farming Interest

Characteristic	Category	Frequency	Percentage
Age	15-30 Years	4	5.30
	31-50 Years	55	73.30
	51-55 Years	16	21.40
Education	Ever attended ES	9	12.00
	ES Ungraduated	24	32.00
	ES Graduated	42	56.00
Land Size Ownership	Less than 0.5 ha	42	56.00
	More than 0.5 ha	33	44.00
Extension Attending	Never Attending	1	1.40
	Occasionally Attending	33	44.00
	Often Attending	41	54.60
Farming Experience	1-10 years	45	60.00
	11-20 years	26	34.70
	21-30 years	4	5.30
Crop Failure	Never	49	65.30
	Ever	26	24.70
Perception of PCFI	High	32	42.70
	Moderate	40	53.30
	Low	3	4.00
Tendency of PCFI Membership	High	39	52.00
	Moderate	14	18.70
	Low	22	29.30
Farming Interest	High	32	42.70
	Moderate	18	24.00
	Low	25	33.30

The Sequence of Perception-Implementation-Farming Interest Data

Farmers' perceptions about PCFI were mostly in the moderate position (40 people/53.3%). Those who had a high perception were 32 people (42.7%). Conversely, those who tend to be negative towards PCIF are only 3 people (4%). However, in terms of implementation, those with high or moderate participation tendencies were 53 people (69.7%). The research also found 22 people (29.3%) place the low participation tendency. However, regarding their interest in farming commonly is in the high position. Clearly, the research found 32 people (42.7%) were categorized into high position; 18 people (24%) in the medium category; and those with low interest were only 25 people (33.3%).

In the light of chi-square test, farmer's perceptions about PCFI are significantly related to the tendency to membership implementation. The research also found strong indication that the tendency of membership participation is a driving factor for farming interest (Table 2). Thus, the sequence of perceptions-implementation-farming interest is still an important factor in the diffusion of innovations, and this is a basic model that could probably be strengthened by the characteristics of farmers. However, the suitability of PCFI with farmers' habits and beliefs is very important because the farmers who have a high perception of PCFI are still relatively small.

Table 2. The Relationship of Sequence Perception-Implementation-Farming Interest

Variable	PCFI Implementation			Farming Interest		
	χ^2_{count}	χ^2_{table}	Significance	χ^2_{count}	χ^2_{table}	Significance
Perception	51.831	9.488	0.000*	-	-	-
Implementation	-	-	-	43.733	9.488	0.000*

The variables Strengthen the Sequence of Perception-Implementation-Implementation-Farming Interest

To obtain the right model for the diffusion of PCFI, this study explored six antecedent variables which hypothetically contribute highly to the sequence of perception-implementation-farming interest. These variables included: age, education level, paddy land size ownership, participation in extension activities, farming experience, and experience of crop failure. The results of the chi-square test found that three antecedent variables were significantly associated with the formation of positive perceptions of PCFI, namely: (1) paddy land size ownership, (2) participation in extension, and (3) experience of harvest failure. From the three variables, the research found two variables significantly and very significantly associated to the tendency to membership implementation of PCFI, namely: (1) the land size ownership, and (2) participation in agricultural extension (Table 3). Thus, even though the positive perceptions of PCFI have been formed, the strong persuasion is still needed for the implementation of membership participation in PCFI. This finding is important for the

development of a sequence of perceptual-implementation-of-interest models, both academically and practically, specifically for the PCFI socialization planning.

Table 3. The Association of Farmer Characteristic to the Perception and Membership Tendency of PCFI

Farmer Characteristic	Perception about PCFI			PCFI Implementation		
	χ^2_{count}	χ^2_{table}	Significance	χ^2_{count}	χ^2_{table}	Significance
Age	4.348	9.488	0.361	2.431	9.488	0.657
Education	6.763	9.488	0.149	9.488	1.024	0.906
Land Size Ownership	10.631	5.991	0.005**	11.896	5.991	0.003*
Extension Participation	43.851	9.488	0.000**	44.282	9.488	0.000**
Farming Experience	4.513	9.488	0.341	2.697	9.488	0.613
Crop Failure Experience	11.375	5.991	0.003**	2.981	5.991	0.225

The Model of Diffusion of PCFI Inovation

To encourage the diffusion of PCFI innovations as an effort to foster the farming interest, the perception-implementation-farming-interest sequence model could be the effective process. This model will be more effective for farmers who have sufficient land, experience of crop failures, and who are actively participate in agricultural extension (Fig 2)

Therefore, to strengthen the sequence model of perceptions-implementation-farming interests, it needs the farmer as the role model to disseminate the PCFI program. The Farmers who can be the role models are those who have three above mentioned characteristics. This role model farmer could be the main driver to extend the positive perceptions about PCFI and to encourage other farmer to participate routinely in agricultural extension.

However, this extension model is effective merely to encourage the farming interests for farmers who are relatively low-educated, old, experienced in crop failure, and landowners. The appearance of this model comes from farmers who have these characteristics. Whereas for young and more educated farmers, it should create other models suitable with their socio- economic conditions.

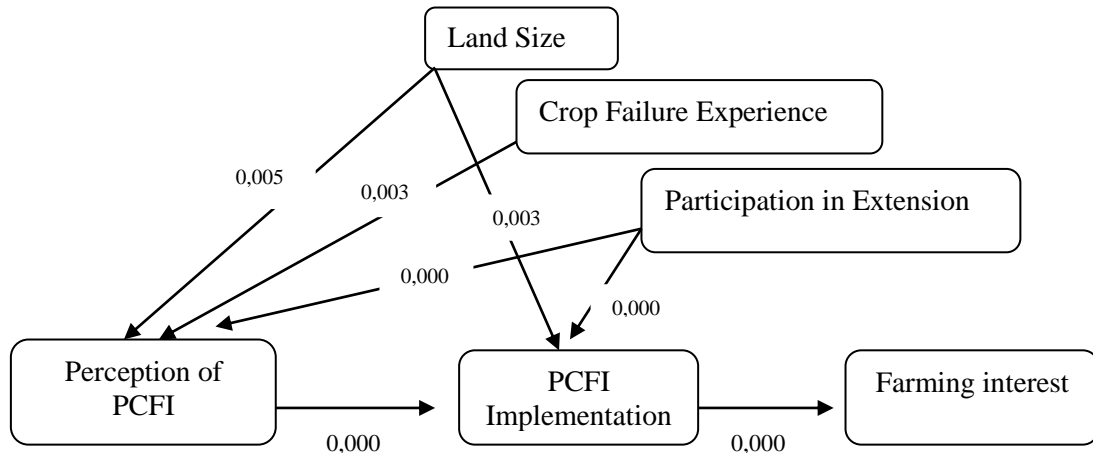


Fig 2. Diffusion of Innovation Model of PCFI to Encourage Farming Interest

CONCLUSION

The linear model even though is considered a classic model that has rarely been used in agricultural extension activities, it turns out that it still has the power to be used in the dissemination of the PCFI program to encourage the farming interest. However, the implementation of this model requires segmentation of audiences based on socio-economic characteristics, especially land size, crop failure experience, and extension participation.

In addition, based on the process of its formation, this model is only suitable for farmers who are low educated, land owners, relatively old, and experienced farmers. Therefore, it needs further research to create the right model to encourage farming interests for young people. It is also necessary to create the model of PCFI extension suitable with the farmer's belief and tradition to let this sequence model will get more effective.

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