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The Effectiveness of Farmer Field School in Dissemination of Innovation: The Case of Orchids Farmers in Tangerang Banten and the Onion Farmers in Brebes Central Java

Ujang Maman, Eka Nurhandayanti and Hendrik Hexa Yoga

Agribusiness Program Study, Faculty of Science and Technology,
Jakarta Syarif Hidayatullah State Islamic University, Jakarta, Indonesia

Abstract: One of the problems of dissemination of innovation is knowledge and adoption gaps among audiences. Farmers have never acquired knowledge as a whole. Likewise, the implementation of an innovation is often incomplete. Dissemination of innovation through Farmer Field Schools (FFS) - which is a blend of dialogue, learning through experience and practice - hypothetically be able to reduce the kowledge and innovation gap. This study aims to determine the effectiveness of FFS in dissemination of knowledge and adoption of innovations to farmers participating in FFS cultivation of orchids in Tangerang district and farmers participating in FFS of onion integrated pest management in District Berebes. The X^2 test showes that age, education and farming experience have not had a significant effect on the knowledge and of innovation, which means that knowledge and adoption of innovation in the two groups of farmers are relatively equal. But in general, the FFS has not succeeded in driving innovation perfectly, because 39% of onion farmers are still unsure and 43% are very skeptical to obtain a good production results. Therefore, FFS should not only teach an innovation but rather to convince farmers about the obtained production results, as well as raises awareness about the importance of innovation as a problem solution faced by farmers.

Key words: FFS · Knowledge gap · Adoption of Innovation gap and innovation awareness

INTRODUCTION

Background: Dissemination of innovation often creates the effect of the knowledge and adoption of innovation gaps between different social groups, especially farmers. The ability to capture messages are often different from each other. Likewise, the ability to adopt an innovation is also difficult to occur equally. This happens because of the diversity of socio-economic status, education and experience. By such diversity, there are groups of people who are taking advantage of the dissemination of innovation. Instead, there are groups of people who are not able to take advantage of the diffusion of innovation activities [1]. This occurs especially if dissemination of information is done in a linear, one-way and using a big media [2]. In addition, the level of adoption of innovations is often decrease by the end of government budget and project. The case of Integrated Pest Management in Kubu Raya Region is an example of innovation decreasing [3]. It is predicted because of the low of farmer awareness of innovation [4]. Based on the facts, we need farmer's extension method that is dialogical, which is oriented to the empowerment and problem solving to encourage the farmer's awareness.

The spread of Farmer Field School (FFS) in Indonesia since 1980s is expected to be an alternative of extension education that can reduce the effects of knowledge and adoption of innovation gap. In Indonesia there was a Field School of Integrated Pest Management (FFS-IPM) for various agricultural commodities. FFS developed into ICM-FFS (Integrated Crop Management Farmer Field School) and also developed into GAP-FFS (Good Agricultural Practice Farmer Field School). Referring to Yorobe Jr. [5], FFS is a method for dissemination of information to make the farmers reduce their dependence on chemical pesticides in insect control

Corresponding Author: Ujang Maman, Agribusiness Department, Faculty of Science & Technology, Jakarta Syarif Hidayatullah State Islamic University, Jl. Ir. H. Juanda No. 95, Tangerang Selatan, Banten, Indonesia.

and plant diseases in agricultural. The question is: to what extent the FFS encourage homogenity of knowledge and adoption of innovation and farmers' awareness about the importance of innovation to solve the problems?.

Mancini and Jiggins [6] explained, the FFS has been formulated since 1970 and implemented in Indonesia since 1989 in an effort to address the widespread use of pesticides that cause the death of natural enemies of pests, resulting in the emergence of powerfull and dangerous pests causes the losses of farmers. On the other hand, the spread of FFS has shifted a paradigm and orientation of agricultural extension. Referring to Beltran's perspective [7], the changes aspects occurred by the advent of FFS is a change in the orientation of the extension, from: (a) a source system oriented extension to the user system oriented extension, where the need for innovation is not determined by the source system, but farmers must seek and find it; (b) one way traffic information submission to a dialogical information delivery, where farmers are not as recipients but as active participants; (c) transmission of information dissemination to the process of empowerment, learning, maturation, in which farmers are encouraged to make the best decision as a solution to the problems they face.

However, the classic paradigm of extension is still relatively strong and still very influential. Rogers' works which is first published in 1971 is the most influential book in the world of extension and has been reprinted many times. The book is often a reference in various extension school in Indonesia. Referring to the classic work of Rogers [8], the extension is a process of (1) delivery of (2) an innovation through (3) certain channels, in (4) a certain time frame, to the (5) users system. In line with this definition, Rogers identifies the factors that can affect the acceleration of innovation, both contained in the individual farmers as well as on the attributes of innovation itself. According to classical work of Rogers [8] as well as the contemporary studies of Dhill *et al.* [1], many individual characteristics influence the process of the adoption of innovations, like age, education and business units.

The attributes of innovations that can accelerate the rate of adoption are: (1) relative advantage, in the view of user about the usefulness of an innovation; (2) compatibility, ie suitability of an innovation with the existing values and practices; (3) the level of complexity of an innovation in the perspective of users, compared to the existing practice; (4) triability of an innovation in the user perspective; and (5) observability, which is the result of an innovation that appears visible in the user's perspective [8].

The assumptions in the classical diffusion is that innovation should come from a source which has better skills, more experienced and more worthy of reference. This assumption appears in other classical works of Lionberger [9] and reinforced by contemporary work of Roman [10] and Tram [11], that identified all factors that are preconditions of adoption of innovation occurrence, both from individual farmers, families, social groups, reference groups, situational factors and cultural factors. Individual factors that influence the rate of adoption of innovationsis age, level of education and psychological characteristics of a person. The success of a dissemination of innovation, in this perspective is the ability of extension agents to penetrate the diversity of social characteristics existed in a society. An extension activities is said to be "effective" when people have equality of knowledge, awareness of the importance of innovation and ultimately perform an adoption of innovation as expected by resource systems.

In linear communication model (SMCR model, the Source-Massage-Channel-Receiver) as well as in a classical diffusion model which is rather similar to the SMCR model, the effect of knowledge and adoption of innovation gap is inevitable [12]. Purwanto [13] explains that the audience often capture and interpret the message does not match to the expectations of communicators. According Purwanto's experience, this is often caused by differences in age, education, gender, social status, economic conditions, cultural background, temperament, health, popularity and religion. Cultural factors, according Mulyana [14], should be a particular concern in the process of massage delivering from the source system to the user system. The weakness in capturing the cultural factors is often a cause for the failure of message delivery.

As an alternative to the classical model of diffusion, Bordenave [15] proposed the use of "Freire Revolution" which ended the "mental transmission" in communication and extension. Extension in Freire's perspective, is not the transmission of messages but more dialogue, liberation, awareness and problem solving which are more recipient oriented, not oriented on the source system. Research extension, continued Bordenave, must be oriented to problem solving. Accordingly, the definition of extension, according to van Den Ban and Hawkins [16] is the involvement of a person to knowingly communicate information with the goal of helping one another to give an opinion so that they can make the right decision.

In this context, the real issue of the diffusion of innovation is the issue of paradigm - or even ideological issues. The classical model calls for equitable distribution of knowledge and the adoption of innovations, as well as

the need to penetrate the diversity of socio-economic factors to achieve the distribution of knowledge and diffusion of innovation in the diversity of socio-economic status. The model of dialogue, interactive and awareness - as in "Freire Revolution" - also rquires inequality of knowledge and adoption of innovation. However, the first viewpoint desires that the innovations should come from the other party, or reviewed from local knowledge, but the process of dissemination is in one way direction based on the assumption that the innovations will benefit the farmers. The second viewpoint requires that such innovation is based on the needs of farmers, based on the farmer's awareness and discovery, as an effort to solve the problems faced by farmers.

Framework Theory and Reasoning: Many researchs indicate that the FFS has been successfully disseminated knowledge, innovation and its application in society who have a diversity of socio-economic status. These studies were carried out, both in Indonesia and in various parts of the world. Mancini and Jiggins [6] conducted a study for two years, from 2002 to 2004, in twenty villages in Andhra Pradesh, Maharashtra and Karnataka, India. This experimental research analyzed the effect of Farmer Field School of Integrated Pest Management (FFS-IPM) of Cotton plants to the adoption of the innovation practices. The result is quite amazing that the participants of FFS-IPM farmers have reduced pesticide use as much as 78% over two years. The same trend is seen in the research of Yorobi Jr [5] of the onion FFS in Piliphina, which shows that farmers only slightly dependent on pesticides. Based on the results of face-to-face interviews with farmers, onion farmer budget for pesticide procurement has dropped dramatically.

As a benchmark, it should also pay attention to the research of Guo [17] regarding the effectiveness of the FFS for rice production in China. FFS influence varies depending on age, sex and cultivated commodities. FFS implementation is highly effective for increasing the farmers' knowledge about pest control, pesticide use and the agro-environment, but it is less effective for the improvement of knowledge about soil nutrients and cultivation. This effect is also getting smaller for women and those who are already relatively old. Therefore, FFS in this case is more effective for men who are relatively young. As a result, FFS has a limitations for dissemination of innovation for all people.

A research conducted by Godtland *et al*. [18] to the participants of FFS Potato in the Peruvian Andes, Peru showed different results. FFS participants are very diverse in terms of number of characteristics, such as age, education level, farming experience, arable land area, number of family, amount of livestock, family asset ownership and agricultural assets. This study assese knowledge of the participants put through FFS, Farmers Group members Andino which is a mix between FFS participants and not participants, non-participants farmer FFS and the head of the household. Material testing include knowledge of leaf rot, beetles, moths bulbs, pesticide control and anti-pest varieties. The results of test showed that the knowledge FFS participant are much higher than those with non-partsipan, farmer groups Andino and the head of the household in general, as presented in Table 1.

The research of Godtland *et al*. [18] among the participants of Potato FFS in Peruvian Andes, Peru showed different results. The participants of FFS are very diverse based on characteristics, such as age, education level, farming experience, arable land area, family number, own of livestock amount, family asset ownership and ownership of agricultural assets. The research examines the knowledge of the FFS participants, Farmers Group members of Andino which is a mix of FFS participants and non-participants and the head of the household. The test material includes knowledge of late blight andean weevil, potato tuber moth, knowledge of pesticide and the knowledge of resistant varieties. The result of test shows that the knowledge level of FFS participant are more higher than those with non-partcipants, farmer groups of Andino and the head of the household, as presented in Table 1.

As a benchmark, we need to compare between FFS participants and farmers exposed to mass media campaigns for a a specific theme. The research of Rajesus [19] compares the participants farmers of FFS and the farmers exposed to the mass media campaign of "No Early Spray" (NES) and a control group of farmers who did not receive any treatments. The study was conducted in several villages in South Vietnam; and aimed to determine changes in the behavior of farmers on pesticides with indicators of the amount of pesticide used. The results showed that the FFS has a higher effectiveness than the mass media campaign for the reduction of dependence on pesticides.

As a result of the benchmark, hypothetically we can say that the knowledge of FFS farmers participants in Indonesia, especially the onion FFS-IPM participants in the village of Kupu, Berebes, Central Java and farmers participant in FFS Good Agricultural Practises (GAP) on orchid land cultivation in South Tangerang will have a high knowledge as an influence of FFS activity. Similarly, the adoption of innovation in the two groups of farmers will produce the high level score of adoption of innovation.

Table 1: The Result of Knowledge Test of Potato FFS Participant in Peru

The Knowledge of	Head of Household	FFS Participants	Andino Participant	Non- Participant	P-Value
Late Blight	24	35	29	24	0, 06
Andean weevil	10	25	14	9	0, 02
potato tuber moth	6	15	17	6	0, 60
Pesticide	21	29	25	21	0, 04
resistant varieties	17	49	33	16	0, 00

Source: Processed From Godtland *et al*. [18]

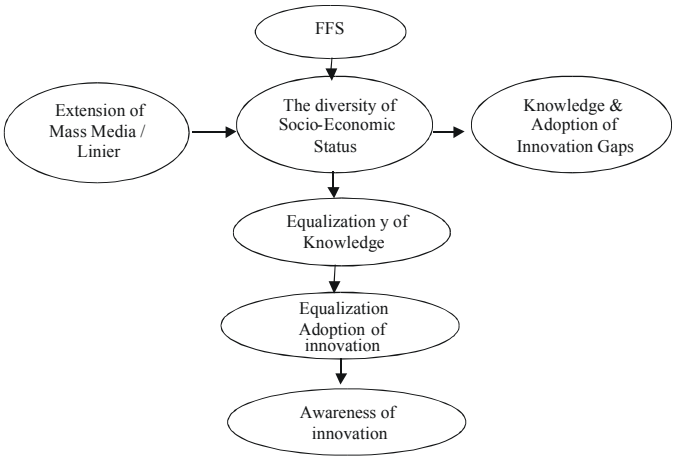

Fig. 1: Reasoning Framework Analysis of FFS Evectiveness InDiseminnation of Innovation

The such statement because it is generally known, with refereto the classical works of Rogers [8], Lionberger [9] and Rogers and Shoemaker [2], as well as the contemporary work of Roman [10], the mass media campaign and the linier way of extension is less effective in changing behavior. The mass media campaign is only effective to strengthen the existing knowledge. Conversely, the communication of personal contact that is dialogical, persuasive, with a homopili participants, will be effective to shape and change the attitudes and behavior. The several mentioned studies illustrate the effectiveness of the communication of personal contact in FFS Forum. However, the question is to what extent the knowledge and adoption of innovation equality has driven awareness of innovation of farmer to solve the problem? The Freire's perspective is not only to encourage knowledge and innovation adoption evenly, but to extent the farmers' helpless, awareness and ability to choose an innovation to solve their problems, as well as having the awareness to continue such innovations based on their needs and problem solving.

In this context, the Khan and Damalas's research [20] emphasized the importance of understanding the farmers' view on pesticides and their impact. On the basis of conducted research in Punjab, Pakistan, the researchers stressed that the understanding of the farmers' view on innovation is a major step to improve the efficiency of the management of cotton production in the South Asian part of country. If we associate it to the Freire's perspective, the inportant thing is not just a farmer's view, but the farmer's awareness about the urgency of innovations from farmers, by farmers and for farmers to get a significant solution to their faced problem. In the light of such cases, reasoning framework of this study is presented in Figure 1. By this contex, the target of FFS implementation should not only to disseminate knowledge and to encourage the equitable adoption of innovation, but rather create awareness about innovation as a solution, so that the diffusion of innovation and the adoption of innovation will be implemented continuously, not just a "project activity" only. The FFS event will take place and continue even if there is no Government budget again.

MATERIALS AND METHODS

Based on thetarget to explore awareness of FFS farmers participants, we should present the two studies of FFS of Good Agricultural Practice (GAP) on Orchid Cultivation in South Tangerang, Banten and the study of the farmers participant in FFS of red Onion at Kupu Village, Berebes, Central Java. The first is carried out during the November 2014-February 2015; and the second was implemented during Mey-August 2013.

The both studies apply the Slovin Formula [21] to decide a sample size with 90% of precicion. The number of sample in the firt research is 42 respondents and 67 respondents in the second research. The two researches are sample survey based on the conducted structured interview. Taking the sample is using the simple random technique; and the data analysis based on the *chi square* test to get information about the correlation about the diversity of farmers' characteristics to the knowledge and adoption of innovation gap.

The researchs are made as the basis to apply further analysis about the farmers's awareness of the important of innovation, based on their issues and to solve their problems in the best ways according to their view to get better socio-economic life.

RESULT AND DISCUSSION

The Characteristic of Land Orchid Farmer in South Tangerang: The farmers participants of FFS-GAP (*Good Agricultural Practices*) in the field of land orchid turn out of very heterogenous on the basis of age, level of education and farming experience. The ranges of heterogenity between 24 years age of the youngest and 75 years age of the oldest. About the education level, the range of diversity is between the uncomplete primary school as the lowest and the highest is higher education. Regarding farming experience, the lowest experience is one year or the lower and the higherst is farmers experience of 39 years for various commodities. The distribution of respondents by the diversity of the three variables are presented in Table 2.

Based on the heterogenity of the farmer in social, economy and education, to what extent the FFS has an ability to penetrate the homogenity of knowledge and adoption of innovation, particurely about the farmer of land orchid cultivation?.

The Knowledge and Adoption of Innovation of Land Orchid Cultivation: The farmer of FFS-GAP participants are expected to ecquire the knowledge in the higher score of 16. Refering to SOP of Land Orhid Cultivation published by Directorate General of Horticulture, Ministry of Agriculture [22], we construct 16 items of knowledge that should be possessed by orchid farmers. The sixteenth item of knowledge consists of: determination of the location, land preparation, beds preparing, installation of cantilever, preparation of quality seeds, planting, preparation of planting media, irrigation, fertilization, stitching, field sanitation, crop protection, harvesting, replanting, post harvest and recording.

The assessement applied to the farmers produced a diversity of knowledge, with a score range of knowledge from the lowest to the highest is 7- 15. Thus, there is a knowledge gap between the 1-9 items from the expected score of knowledge, namely 16. However, the majority of respondents, as many as 26 people (61.90%), acquire the high sore of knowledge, between 13-16. Respondents who had low knowledge, with a score between 7-9, are very small, only 7 (16.67% from the total respondents). Based on the knowledge score, in general, the FFS method has succeeded relatively to transfer the high knowledge to the farmers. More details about the scores of knowledge and knowledge gaps presented in Table 3.

Regarding the application of innovation of orchid cultivation, we formulated that farmers are expected to apply 28 items of innovation of land orchid cultivation. However, based on the observation of the farmer, the application of SOP orchid cultivation is relatively low, with a diversity of innovation scores between 14-28. The most respondents, namely 17 (40.48%), only succeeded in applying innovation of orchid cultivation as much as 19-23 items. The farmers who successfully apply innovation orchid cultivation in a relatively high level, with the score of 24-28, are only 14 farmers (40.48%), as presented more detail in Table 4. Therefore, the FFS in South Tangerang have been successful in transferring knowledge, but less successfully to encourage farmers to apply adoption of innovation of land orchid cultivation. Indeed, this also raises questions about the successfull of FFS to develop community awareness about innovation.

However, the diversity of knowledge about land orchid cultivation is not proven significantly. Chi-square test results which is relating between age, education level and farming experience to the level of knowledge about land orchid cultivation did not prove significant, as presented in Table 5. Therefore, even if the farmers are vary according to age, level of education and farming experience, their knowledge is relatively uniform. It is the advantages of FFS method that can transfer knowledge uniformly.

Similarly, the diversity of application of innovation of land orchid cultivation is also not proven significantly. It is based on the chi square test result that contribution of age diversity, education level and farming experience on adoption of innovation of land orchid cultivation did not prove significant, as presented in Table 6. It means, that although the farmers are vary according to the third aspect of the social characteristics, the adoption of innovation rate of land orchid cultivation among the farmers is relatively uniform.

Table 2: Distribution of Orchid Land Farmer in the Basis of Socio-Economic and Education

Characteristics	Category	Number of Respondents	Precentage
Age	24-40 Year	11	26.19%
	41-57 Year	21	50.00%
	58-75 Year	10	23.81%
Education	Not Complete to Complete Primary School	25	59.20%
	Unior to Senior High School	13	30.95%
	University	4	9.52%
Farming Experience	1-13 Year	17	40.48%
	14-26 Year	15	35.71%
	27-39 Year	10	23.81%

Table 3: The Distribution of Farmer According to the Knowledge of Land Orchid Cultivation

No	Knowledge of Orchid Cultivation	Knowledge gap of Orchid Cultivation	Number of Respondent	Precentage
1	Low (7-9)	7-9 items(High)	7	16.67%
2	Moderate (10-12)	4-6 items(Moderate)	9	21.43%
3	High (13-16)	0-3 items(Low)	26	61.90%
	-	-	42	100%

Note: The Expected Knowledge is 16 items.

Table 4: Distribution of Farmers According to Adoption of Innovation of Land Orchid Cultivation

No	Adoption of Innovation Scores	Adoption of Innovation Gaps	Number of Resp	Precentage
1	14-18 (Low)	10-14 item (High)	11	26.00%
2	19-23 (Moderate)	5-9 item (Moderate)	17	40.48%
3	24-28 (High)	0-4 item (Low)	14	33.33%
	Total	-	42	100%

Notes: The Expected Adoption of Innovation Scores is 28.

Table 5: The Correlation of The Characteristics of Socio-Economic of Farmer With the Knowledge Level of Land Orchid Cultivation

		Knowledge		
No	Characteristics of Farmer	X^2	Df	Significancy
1	Age	1.770	8	0.778
2	Education	4.343	8	0.362
3	Farming Experience	2.526	8	0.640

Table 6: The Relationship of The Socio-Economic Characteristics of Farmer to the Adoption of Innovation of Land Orchid Cultivation

		Implementation of Land Orchid Cultivation Innovation		
No	Farmer Characteristics	X^2	Df	Significancy
1	Age	3.601	8	0.463
2	Education	1.464	8	0.833
3	Farming Experience	3.372	8	0.498

The Red Onion Farmer Characteristics in Kupu Village, Berebes, Central of Java: If the FFS has been successfully transfer knowledge and encourage the adoption of innovation of land orchid cultivation in a relativeuniform, whether the FFS methods give the same effect to the onion farmers in Berebes? Based on a review of our research, it appears that the farmers of FFS-IPM participants in Kupu village, Berebes, are vary according to age, education, farming experience, frequency of extension presence and source of information of integrated pest management (IPM) and arable land size. The first three variables (age, education and farming experience) became the focus of our attention as an effort to compare its contribution to the knowledge and adoption of innovation. Distribution of farmers based on three variables is presented in Table 7.

The data presented in Table 7 shows, the range of age of FFS-IPM onion partcipant is between 25 to 68 years. The majority (24 people or 36% of the total sample) were aged 25-41 years, a relatively young. They older farmer, between 49-68 years, is 21 people (33% of the total sample). Those who enter the category of middle age (42-48 years) are 22 people (33%).

Table 7: Distributionof Farmer According to The Social and Economic Characteristics

Respondent Characteristic	Categorisation	Frequency (people)	Precentage (%)
Age (Year)	25-41	24	36
	42-48	22	33
	49-68	21	31
Education Level	Incomplete Elementary School	5	7
	Elementary School (ES)	27	41
	More than ES	35	52
Farming Experience	1-15 Year	20	30
	16-24 Year	18	27
	25-45 Year	29	43
Frequency of Extension Presence	Rarely	23	34
	Often	44	66
Source of IPM Information	Extension Agen	43	64
	Non-Extension Agent	24	36
Arable Land Size	0.125 ha	21	31
	0.25 ha	32	48
	0.5 ha	14	21

Regarding level of education, in general, participants of FFS in Kupu Village are relatively well educated, although it is still diverse in the range of the incomplete primary school until more than primary school. The majority of the farmer (35 persons or 52%) get more than elementary education. Those who claimed complete primary school is 27 people (41%). While those who claim incomplete primary school is relatively small, only 5 people (7%). The diversity of this level of education can be a limiting factor for equal distribution of knowledge and adoption of red onion adoption of innovation.

The diversity also occurs in farming experience, with a range of 1 until 45 year. Most of farmers are relatively highly experienced, ie as many as 29 people (43%) had a farming experience between 25-45 years. The farmers who get experience between 1 to 15 years are 20 people (30%) and they who get experience between 16 to 25 years are 18 people (27%). The strong farming experience will be a probability of a motivating factor - or otherwise it can be a limiting factor - for distribution of knowledge and adoption of innovation of red onion in the village of Kupu, Berebes, Central Java.

Knowledge and Implementation of Red Onion IPM In Kupu Village, Central Java: Forthe Red Onion Integrated Pest Management (IPM) in the village of Kupu, Berebes, Central Java, we formulated nine indicators of knowledge that must be owned by farmers, ie the knowledge of: (1) the use of *kerodong* gauze in the control of caterpillars; (2) use of neon lights in combating moth caterpillars onions; (3) the use of cutting leaf attacked by worm onions; (4) the use of biological agents to eradicate the pest thrips; (5) the use of yellow traps to control pests; (6) the application of cropping rotation as a means of pest control; (7) the land watering; (8) the use of chemical pesticides; and (9) the spraying of chemical pesticides. Distribution of farmers according to the knowledge of onion IPM presented in Table 8.

A total of 40 respondents (60%) have a very high level of knowledge, with the knowledge score between 7-9. Those who have a low knowledge, with the score 0-2 is only 4 farmers (6%). Therefore, in this context, the Red Onion FFS-IPM in Village of Kupu successfully to disseminate the knowledge well. The knowledge level is relatively uniform, in spite of the diversity of socio-economic characteristics of farmers. In other words, the diversity of socio-economic characteristics of farmers do not contribute significantly to the level of farmers' knowledge. *Chi-square* test results are presented in Table 9 which proves that age, education level and farming experience do not significantly associated with the level of knowledge about Red Onion IPM. Therefore, the Red Onion FFS-IPM in the village Kupu has successfully disseminating knowledge uniformity to farmers even though they are diverse in socio-economic and education.

Regarding the adoption of IPM innovation, we formulated 28 items of innovation that should be adopted by farmers in the red onion cultivation. This is in accordance with the extension materials in Red Onion FFS. The farmers who are successfully apply innovation well, ie whose score is between 17-24, it is only 26 (39%); while those who are successfully apply innovation with scores between 9-16 is 40 people (60%), as presented in Table 10. Therefore, the red onion FFS-IPM in the village of Kupu, Berebes, successfully disseminating knowledge, but less successfully to encourage adoption of IPM innovation.

Table 8: Distribution of Farmers According to Knowledge and Knowledge Gap of Red Onion IPM

No.	Score of Knowledge	Score of Knowledge Gap	Frequency (People)	Precentage (%)
1.	Low (0-2)	≥ 8 items(High)	4	6
2.	Moderate (3-6)	4-7 items(Moderate)	23	34
3.	High (7-9)	0-3 items(Low)	40	60
	Total		67	100

Notes: The expected Score of Knowledge is 9 item;

Table 9: The Relation of Socio-Economic Characteristics of Farmers to The Knowledge of Red Onion IPM and Its Gap

		Knowledge Level		
No	Farmer Characteristic	X^2	Df	P
1	Age	5.936	4	0.204
2	Education Level	10.889	4	0.028
3	Farming Experience	4.565	4	0.335
4	Extension Presence	1.307	2	0.520
5	IPM Information Source	0.264	2	0.877
6	Arable Land Size	3.272	4	0.513

Table 10: Distribution of FarmersAccording to Red Onion Adoption of Innovation and its Gap

No.	Score of IPM Adoption	IPM Adoption Gap	Frequency (People)	Precentage (%)
1.	Low (0-8)	16-24 items	1	1
2.	Moderate (9-16)	8-15 items	40	60
3.	High (17-24)	0-7 items	26	39
	Total		67	100

Note: The Expected Score of Innovation is 28.

Table 11: Perceptions of Farmers Toward The Observed Output

No.	Criteria	Number of Farmer	Precentage (%)
1.	Unconfident (0-1)	29	43
2.	Less Confident (2-3)	26	39
3.	Strongly Confiden (4-5)	12	18
	Total	67	100

Table 11: The Corelations of the Socio-Economic Characteristics of Farmer to The Adoption of IPM Innovation gap

		Adoptionof IPM Innovation		
No	Farmer Characteristics	X^2	Df	P
1	Age	5.108	4	0.276
2	Education Level	3.837	4	0.428
3	Farming Experience	5.091	4	0.278
4	Extension Presence	1.726	2	0.422
5	IPM Information Source	1.226	2	0.542
6	Arable Land Size	3.629	4	0.459

The low level of IPM adoption is not surprising because the most of farmers are still unsure of the output to be obtained from the adoption of IPM, as shown in the data presented in Table 11. A total of 29 farmers (43%) are still skeptical about the results to be obtained. The farmer who really believes the results to be obtained from the IPM adoption of innovation are only 12 people (18%). Therefore, FFS-IPM should be able to better convince the farmers for the results to be obtained, not only the dissemination of innovation. In the Roger's perspective [8], the observability of the results from the certain innovation is one of the important factors which encourage the adoption of innovation.

Fornunately, It's just despite the adoption of IPM innovation is not perfect, but there has been a relative uniformity of IPM adoption for all participants of FFS-IPM, despite there have been diverse of socio-economic and education. The X^2 test results, as

presented in Table 11, show there is no socio-economic characteristics variables contributed significantly to the adoption of IPM innovation. That is, the adoption of innovation occurs uniformly for all farmer participants of FFS-IPM.

In the light of the description of fact in the FFS-IPM of Kupu village, there is a tendency that the implementation of FFS, tend only to get succsess to disseminate the knowledge; and also successful to encourage the adoption of innovations evenly, but it has not succeeded in raising the awareness of farmers to solve the problems they face in the endegeneous perspective of farmers, by farmers and for farmers. FFS has not succeeded in realizing the empowerment and maturation of farmers as expected in the perspective of Freire [15], in which the farmers should have the maturity to deal with and solve problems well. The growth of knowledge and the development of adoption of innovation, it is not because of an encouragement from the outside, but it is because of their own consciousness as a way to solve problems. The activities of intervention from outside is only as a facilitator to raise awareness of farmers themself. It apparently has not yet been reached in the implementation of FFS in Kupu Village.

However, it has been very worrying that the project activity of FFS is still highly dependent upon the government's budget. By the absent of government budget, the adoption of innovation will decrease, or even cease. The Feder's evaluation of FFS of IPM in Indonesia [23] reported the trend of increasing the use of pesticide and decreasing the yield both for the pre and post FFS program and also for the FFS members and the farmers exposed to the IPM innovation. The same trend also appeared in Jailanis's report about the level of IPM adoption of innovation [3], that ex members of FFS are in the low level position of IPM implementation. Of course, it needs the more contemporary research to acquire the evidence of farmer awareness as the impact of FFS.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions: In the light of data presented above, there are several conclusions that we can draw, as follows:

- The Farmer Field School (FFS) is an alternative extension model, that is dialogical, farmer problem solving oriented and it has succeeded in disseminating knowledge equally on heterogeneous social groups of farmers, as it appeared in the FFS of Good Agricultural Practice (GAP) for land orchid farmer in South Tangerang and red onion farmer in Kupu Village, Berebes, Central of Java.
- FFS have also been successfully in encouraging adoption of innovation evenly, though the circumstances of farmers is very diverse in terms of social, economic and education. But, unfortunately, the adoption of innovation does still not perfect, there are still adoption of innovation gaps from the expectedstandard of innovation;
- The FFS still get disadvantage side of the farmer extension, that the FFS has not succeeded to empower farmers, mature and form farmer learners, who are able to solve the problems based on theirown needs. But, on the contrary, the farmers are still skeptical about the results obtained from the IPM practice of innovation. Therefore, there is still doubt about the continuity of the implementation of innovation after expire of the projects and no-budgets provided by Government.

Recommendations: Based on the above conclusions, we sholud convey the recomendation for policy holders, extension practitioners and researchers, as follows:

- The extension models of FFS has already been "on the track, " that it should be continued, to achieve the dissemination of knowledge evenly to diverse of farmers. But, unfortunately, it still need to improve dialogical process, refers to the fact, to make it more touching farmer's desire to solve the problems they face, so it has the impact for the maturation of farmers; and making them have an ability to sort out the issues and choose the right way to solve the issue;
- Orientation FFS implementation should be more emphasized on farmer empowerment, farmer desire to learn, farmer aware of the problems they face and their desire to solve problems and belief to obtain a successfull matter based their choice.
- It needs to conduct FFS activities which are integrated with the empowerment of farmers, as well as it needs to further study that analyzes the impact of FFS activities to increase farmers' awareness of innovation, problem-solving skills, the desire to continue the innovation and the impact of innovation for productivity of farming and improving the quality of life of farmers.

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