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Farmer group as social determinant of farmer's perceptions on organic farming concepts and practice

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Abstract: ***The current industrial paddy farming promotes the reliance on agrochemicals, both synthetic fertilizers and pesticides, while neglecting to consider their negative effects on the environment. This paper examined farmers' perception of organic paddy farming practices, which is especially useful to set research agendas, for planning campaign strategies and developing messages for communication. The study conducted at Pereng village and Gentungan, Mojogedang sub-district, Karanganyar regency, Central Java province. A total of 30 organic and 30 conventional farmers were included in this survey. Majority of farner respondents was defined organic farming as the absence of chemicals used in farming, but there were farmer had define organic farming as very low level application of chemicals fertilizer. Only a few organic farmers were apply local seed and managing irrigation and none of them apply the crop rotation. Farmers' major sources of knowledge on organic farming concept and practice was a person as organic farming figure in the village who was farmer group leader. Farming experience and membership in farming group were associate with the perception of organic farming concepts.***

INTRODUCTION

A strategic option to accelerate development realization of the agribusiness competitive, sustainable and environmentally farming in order to improve the welfare of the people, especially farmers, is organic farming. Organic farming is recognized as an important system of agriculture and food production, that is environmentally sustainable and can generate several positive impacts to rural society. The World Board of the International Federation of Organic Agriculture Movements (IFOAM) approved the Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and good quality of life for all involved'.

Organic farming in Indonesia, still rare although its program in Indonesia has been initiated since "Go-Organic 2010" program launched by the Ministry of Agriculture in 2000. Based on SOEL survey in Giovannucci (2005), mentioned that the organic farming area in Indonesia was around 40,000 hectares (0.09 per cent to total area or equal to 0.33 per cent of total paddy area). By implementing organic farming practices, Indonesia farmers are expected to reduce their dependence on chemical fertilizers as well as preserving environmental sustainability (Hidayat and Lesmana, 2011).

Until recently, farmers' knowledge of organic farming has been ignored by researchers because decreasing dissemination. Scialabba's and Hattam's (2002) review of developing countries efforts in organic agriculture points out the weakness of institutional support for existing knowledge and exchane in organic agriculture. Singh and George (2012) conclude that even farmers are aware of some of the basic facts of farming but they were not aware of all aspects related to certification and standards given by different agencies Triyuyun research results (2011) showed that the perception of stakeholders in Karanganyar towards organic farming systems and the attributes of the technology is low, awareness of stakeholders on the environmental and economic benefits of organic farming are not always followed by changes in the behavior of farmers in adopting organic farming. Tarleton and Ramsey (2008) suggested that perception will gave influence on adaptive capacity, in case climate risk perception.

Several study has found that perception of farmer influenced by internal factors such as farmer characteristic. Sagay et al (2014) argued that internal factors was the main focus in improving farmers' perception in developing irrigation areas, which the main factor of perception formation was internal factors, followed by external factors. As Bagheri et al (2008) argued that there was significant relationship between perception towards sustainable agricultural technologies and variables consisting of age, educational level, educational discipline, years of experience in agriculture, farmer's cultivated area, sharecropping, diversity of farmer's rice varieties, out of farm income, contact with information sources/channels and extension participation. On the other side, Kallas et al (2009) identify the policy changes that have been more relevant in motivating adoption of organic practices. The result of Asadi et al (2009) showed that the first and the major effective factor in agricultural organic product diffusion is institutional factors.

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This paper intends to contibute to the existing literature by providing an empirical analysis of farmers' awareness and their knowledge about organic farming through perceptions and practice analysis, and compare the awareness of organic paddy farmer to conventional farmers.

METHODS

This study was conducted in Pereng and Gentungan viilage, Mojogedang sub-district, Karanganyar regency. In Mojogedang Sub-district, there is a small group of farmers practicing organic paddy farming. The sub-district of Mojogedang height is about 380 m above sea level, and lots of precipitation 2590 mm/year and soil type at this area is litosol and brown mediteran.

Irrigation is available throughout the year led farmers can cultivate three times during the year. People in Pereng who cultivate organic paddy embodied in a farmer groups, Rukun Makaryo, while organic paddy farmers in the village of Gentungan incorporated in the Tani Mulyo. Results of observation and learn from earlier studies tend a reduction in the number of organic paddy farmers.

The results presented in this paper are based on qualitative and quantitative methods of primary data collection and inquiry. In order to study the differences of two paddy farming systems, total of 60 farmers whom 30 farmers are dealing with organic farming and other 30 farmers from conventional farming were subjected for the interview in this study. Furthermore, qualitative and quantitative methods such as semi-structured and in-depth interviews, identification of key-informants, focus group discussion (FGD) and field visits were used to fulfill the necessary data needed in this study. Descriptive statistics and crosstab analysis with Somers'd procedure were used to analyzed data using the computer software SPSS. Somers'd measure the relationship between two variables ordinal scale that can be formed into a contingency table. The advantage of this formula can determine the direction a relationship. Somers'd calculated by the following equation:

$$\text{Somers'D} = \frac{Ns-Nd}{Ns+Nd+Ty}$$

Note:

Ns : concordant

Nd : discordant

Ty : column pair

RESULTS AND DISCUSSION

Farmer Characteristics

Table 1. Paddy Farmer Characteristics

Farmer Characteristics	Orgaic Farming	Conventional Farming
Age		
Mean (years)	48,47 years	56,40 years
St-dev	11,97	13,63
t-test	2,39*	
Education		
Mean (years)	8.33 years (junior high school)	6.07 years (primary school)
St-dev	2.92	4.49
t-test	2.32*	
Farm size		
Mean (years)	2,480 m^2	4,589.67 m^2
St-dev	2,430.04	4,658.68
t-test	2,19*	
Farming experience		
Mean (years)	6.73 years	31.13
St-dev	3.88	14.55
t-test	8.87*	

Note : * significant at 5% level, respectively

As shown in Table 1, the average age of organic paddy farmers are relatively younger than the conventional paddy farmers, on the other side, education of organic paddy farmers relatively higher than conventional paddy farmer, and statistically significantly different. Education and age were affecting farmer knowledge and acceptance of the new technologies. A study by Jamison and Lau (1982) mentioned that the success of Thailand, Korea and Malaysia in increasing the productivity of their agriculture sector was by education.

The average organic paddy farm size is about 2,480 m^2 which is lower than the average of the conventional farm. The analysis showed the farm size between both farming system was statistically significant different. Hidayat and Lesmana (2011) revealed in most countries, organic farming is typically small scale. Promoting organic farming on a small scale is intended to avoid food shortages in the short run.

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Farmer Perception and Practice: Organic vs Conventional Farming

Farmer perception is part of that personal dimension that makes farmer see situations differently as well as shapes their attitude in terms of their work environment. Perception is important for understanding farmer differences because how farmer perceived a situation determines how farmer behave. Farmer's behavior is based on their perception of what reality is, not on reality itself. Result of this study found that there was different perceptions and knowledge among farmers towards organic concepts, as showed at Table 2.

Majority of the organic farmer-respondent define organic agriculture as the absence of chemicals used in farming. Most farmers (83.3%) declared organic farming is farming without chemicals fertilizer and pesticide. However, not all organic paddy farmers had same perception, which 16.67% of farmers were gave practical answer that organic farming is the use of manure and pesticide used raw material from plants. On the other side, about 30% of conventional paddy farmers assume that organic farming is farming without chemical inputs, both fertilizers and pesticides, but 20% farmers said that organic farming is only without chemical pesticides and still allowed to use chemical fertilizers in low doses.

Table 2. Paddy Farmer Perception on Organic Farming Concepts

No.	Perception	Organic Farmer	Conventional Farmer
1.	Without chemical fertilizer and pesticide used	83.3%	30%
2.	Application of manure and pesticide from plant to increase farming production	16.7%	6.7%
3.	Without chemical pesticide used	0%	20%
4.	Manure application only	0%	10%
5.	Input prepare manually	0%	6.7%
6.	Farming to healthy soil	0%	3.3%
7.	Did not know	0%	23.3%

Source: primary data analysis (2015)

What was interesting that as many as 23.33% of conventional paddy farmers answered do not know about organic farming. This result proved that conventional farmer did not familiar with organic concepts, although quite a lot of conventional farmers understand that the organic farming is absence of chemical inputs. Conventional farmers assume that organic farming requires fertilizers and pesticides that are difficult to make.

The survey has shown that organic farmers perception about organic farming was not fully in accordance with the appropriate standards of organic farming as listed on the ISO 6729: 2013, which refers to the IFOAM Basic Standards for organic production and processing 2005 on organic food system establishes a system of organic food production, includes provisions on the production, preparation, marketing, labeling of products.

Table 3 depicts the respondents' practices toward paddy farming conducted at study sites.

Table 3. Differences between Organic and Conventional Paddy Farming Practice

Production stage	Explanation	
	Organic Farming	Conventional Farming
Pre-cultivation stage	Farm location near from the viilage	Disperse
Cultivation stage		
1. Use of fertilizer	Manure formulated with MOL (local microorganisms) were produced together by members of farmer groups, average amount of fertilizer 1,35 tons/ha	Chemicals fertilizer used: urea (315,26 kg/ha), SP36 (250,79 kg/ha), Phonska (330,21 kg.ha), ZA (238,33 kg/ha)
2. Use of pesticide	Pesticide from plant materials	Chemicals pesticide
3. Use of seed	Dominated menthik (local varieties), black rice (local varieties), and IR 64	Dominated use of IR 64 and ciherang
4. Aspects of land management and irrigation	Farmers plant paddy three times a year in their fields	Farmers plant paddy three times a year
5. Crop rotation	Farmers do not perform rotation for paddy cultivation	Farmers do not perform rotation for paddy cultivation
Post-harvest stage		
1. Packing and storage	Farmers didn't aware with packing and storage for organic products and do their own packing and storage	Farmers do their own packing and storage
2. Marketing aspects	Most farmers market their product through farmer groups, and few farmer had sold production to the paddy milling independently	Some farmers do marketing through paddy mills and traders around the village

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Source: primary data analysis (2015)

This research found that some organic paddy farmers respondents apply local seed and did not aware with crop rotation aspect and management of irrigation; few of organic farmer did not aware in post-harvest treatment and marketing their farm products. This results is similar with Pindozo et al (2014) which revealed that paddy farmers have only low to medium level of awareness on organic farming activties and markets for organic products.

Farmer Motivation

This study found that organic paddy farmers motivation adopted organic farming practices, primarily because of low cost of production under organic system (56.67% of farmers). The next biggest reason why farmers want to adopt organic farming is health concern factors, farmers feels responsible for the environment, land, and human health in the long term (23.33% of farmers).

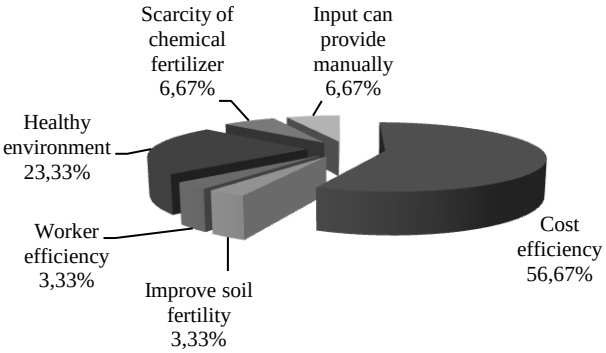

Figure 1. Farmers' Motivation in Organic Farming

Source: primary data analysis (2015)

Organic farmer respondent in this study were knowledgeable in producing in their own input. Since organic farming encourages the use of indigenous materials, lower costs are incurred. Farmers are encouraged to produce their own inputs using materials that can be easily found from their farm surroundings, such as manure. This study found only 17% organic farmers respondent didn't have livestock.

Conventional paddy farmers motivation did not adopt organic farming because of yields uncertainty (46.67%), complicated production system (20%), did not familiar to cultivate organic farming (10%), conventional cultivation has been hereditary (10%), did not know how to sale the organic product to reach higher price (6.67%), as well as long growth period of plants and the productivity of organic farming was not different with conventional farming (respectively 3.33%).

The distribution of the conventional farmers reasons didn't adopt organic systems in Figure 2.

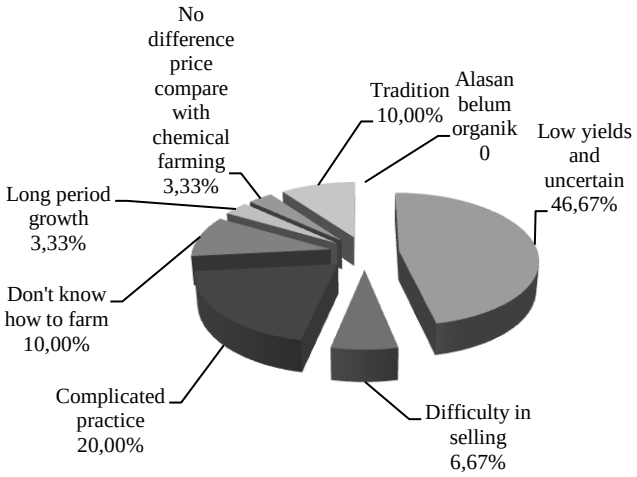

Figure 2. Conventional Farmer Reason Didn't Adopt Organic Farming

Source: primary data analysis (2015)

These study results are similar to several studies, Prompathansombat et al (2011) concluded that important factors on decision of adoption of organic farming that were positively significant included farm-gate paddy and attitude to conventional production problems, andalso water accessibility. Schneeberger et al (2002) revealed that Austrian farmers did not adopt organic practices due to fear of decreased income and marketing problems. Niemeyer and Lombard (2003) revealed that in South Africa, the lack of marketing opportunities, no premium paddys, and the lack of subsidies had kept the farmers from adopting organic practices. Kennvidy (2011) revealed that farmers shifted to organic farming in order to reduce the expenses on synthetic fertilizers, to avoid the negative effects of synthetic fertilizers to health, to utilize the available resources in the neighborhood, to conserve the environment as well as soil and water quality and to acquire the beneficial paddys on organic products

Factors Affecring Perception on Organic Farming Concepts

Why perceptions and knowledge among farmers organic on the concept of organic farming is different? And why conventional rice farmers also have different perceptions, even did not know about the practice of organic farming. Study literature mentions that the perception of person emerged as a response to information from the environment around them. Hamka (2002) states that the perception is one that occurs in the following stages: The first stage, the process of the arrest of a stimulus by means of the human senses; second phase, a process of continued stimulus received by receptors (sensory organs) through sensory nerves; third stage, the process of the emergence of individual consciousness about the stimulus received receptor; fourth stage, the results obtained from the process of perception in the form of comments and behavior.

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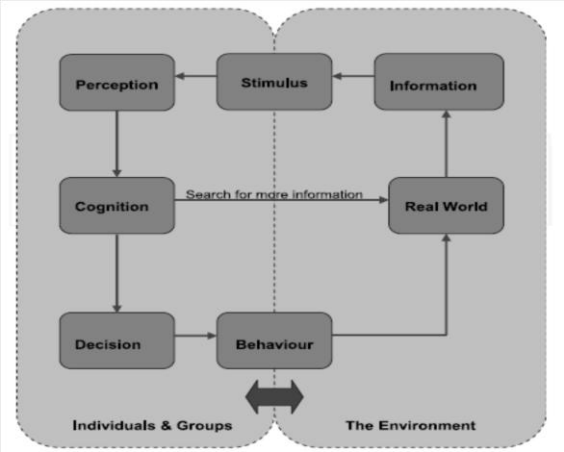

Figure 3. Perception Process

(Source: Kings and Ilbery, 2012)

A major theoretical issue on which psychologists are divided is the extent to which perception relies directly on the information present in the stimulus. Some argue that perceptual processes are not direct, but depend on the perceiver's expectations and previous knowledge as well as the information available in the stimulus itself. Stimulus from the environment in the form of information about organic farming. Information about organic rice farming is very important for the farmers perceptions and to change their practice, enhance knowledge on farming and production.

This study found that farmers' major sources of knowledge on organic farming was farmer group leader. Approximately 60% of organic farmer respondents replied the farmer group chairman Pereng elder farmer in the village is the first and primary resources of organic concept and practice. This result different with Pornpratansombat et al (2011) mentioned approximately 60 percent of organic rice farmers have got information from extension agents (government and NGOs agents), in form of group meeting. In addition, 18 percent of organic farms have got information from their neighbouring farmers (relatives and friends), while mass media (TV and radio) takes about 14 percent. Mahamud (2005) mentioned significant factors affecting the acceptance of organic rice production as level of organic agriculture knowledge and extension measures received from involved agencies.

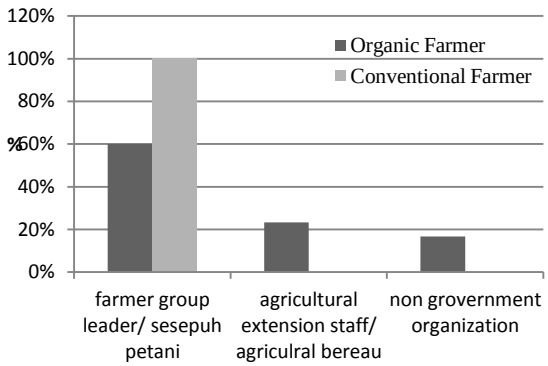

Figure 4. Source of Information of Organic Farming

(Source: primary data analysis (2015))

The emergence of organic farmers in the district Mojogedang greatly influenced by the role of an elder farmer who pioneered and disseminate information about the farm without chemicals. Mbah Paimanhadi is the chairman of farmer groups in the village Pereng Rukun Makaryo, which seeks to transmit the understanding and practice of organic on group members. His efforts led to their farmer groups receive recognition from an organic certification organization. Echoes of organic farming village Pereng even spread to other villages, namely Gentungan Village, District Mojogedang, and farmer groups Tani Mulyo which also received organic certification in 2014. Government agencies and non-governmental organizations have a role in assisting the organic farmer groups, the standards and requirements untu certified organic products. However, the farmers themselves play a key role since the farmer group leader gained knowledge through his own resources and initiatives.

Stimuli from the environment in the form of information heard from several sources of information, supported by evidence to be viewed directly from the experience of the chairman of the group of farmers who have practiced organic rice farming, encourage positive perceptions that organic farmers adopting organic farming; but on the other hand the experienceon organic farming did not necessarily encourage a positive perception of conventional paddy farmer, which is seen from still a number of conventional farmer who think organic farming is impractical and cumbersome in organic fertilizers preparation and pesticides.

There are three factors influenced the perception, first perceptor variable, the character of the object of perception, and situation factors. According Kallas, et al (2009), relevant factors that can influence the decision to convert from conventional to organic farming include: farmer characteristics, farm structure, farm management, exogenous factors, attitudes and opinions. Bagheri et al (2008) found that easy access to chemical fertilizer made negative perception about the application of manures, while educational level had a strong power in predicting of farmers'perception followed by extension participation and

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contact with experts which are all related to the knowledge of the respondents.

Table 4. Characteristics and Perception of Paddy Farmer

Characteristic	Organic farmer perception		Conventional farmer perception					
	Without chemical input (%)	Appliation of manure and pesticide from plant (%)	Without chemical input (%)	Only without chemical pesticide (%)	Manure application only (%)	Input prepare manually (%)	Farming to healthy soil (%)	Did not know (%)
Age								
≤ 29	0.00	6.67	0	0	0	0	0	0
30 – 39	3.33	0.00	3.33	6.67	0	3.33	0	0
40 – 49	36.67	6.67	6.67	0	6.67	0	0	0
50 - 59	23.34	3.33	10	6.67	3.33	3.33	3.33	0
≥ 60	20.0	0/00	16.67	6.67	0	0	0	23,.3
Education								
Uneducated	0.00	0.00	6.67	3.33	3.33	3.33	3.33	23.33
Primary school	36.67	10	16.67	10	0	3.33	0	10
Junior high School	16.67	3.33	0	0	6.67	0	0	0
Higher School	23.33	0.00	10	6.67	0	0	0	0
Diploma	3.33	0.00	3.33	0	0	0	0	0
University	3.33	3.33	0	0	0	0	0	0
Farm size								
< 2,500 m^2	60.00	10	10	10	3.33	3.33	0	13.33
2,500 – 5,000 m^2	33.33	6.67	13.33	3.33	3.33	0	3.33	6.67
< 5,000 m^2	6.67	0.00	13.33	6.67	3.33	3.33	0	3.33
Farming experience								
Less than 5 years	20	0	3.33	0	3.33	0	0	0
6 – 10 years	53.33	16.67	3.33	0	0	0	0	0
More than 10 years	10	0	30.04	20	6.67	6.67	3.33	23.33
Land status								
Own land	83.33	16.67	30	16.67	10	6.67	0	20
Rent land	0	0	6.67	3.33	0	0	3.33	3.33
Farmer group membership								
Active	83.33	16.67	20	10	0	6.67	3.33	0
Passive	0	0	16.67	10	10	0	0	23.33

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Source: primary data analysis (2015)

Table 5 outlines the relationship between perception and conditions of farmers using multiple regression analysis.

Table 5. Factors Affecting the farmer Perception on organic farming

Factors item	value	Sig.	Results of the study	Perception Direction
Farmer characteristic				
1. Age	0.118	0.197	80% organic farmer was below 60 years old, and 23.3% conventional farmer who didn't know the organic concepts was above 60 years old	Can not identified
2. Education	-0.204	0.064	100% organic farmer was educated and 50% coventional farmer that low educated gave wrong perception about organic farming	Can not identified
3. Farmer Experience	0.418**	0.000	More than 60% organic and conventional farmer with more than 10 years experience gave wrong perception about organic farming	Can not identified
Farming characteristic				
4. Farm size	0.050	0.566	More than 80% organic farmer with land size below 500 m^2 dare to do organic practice but conventional farmer which gave right or wrong perception was at all category of land size	Can not idetntified
5. Land status	0.491	0.196	100% organc farmer was own their land, and about 60% coventional farmer was own their land gave wrong perception about organic farming concepts	Can not identifiied
Social environment				
6. Membership of farmer in farming group	0.971**	0.000	All organic farmer was involved in farming group, which increase the chance of repetion of organic information and extension program, and more than 50% conventional farmer who passive in farming group gave wrong perception about organic farming concepts.	Positive

Source: primary data analysis (2015)

Note: ** are statistically significant

Table 5 depicts that there was significant associatiom between dependent variable, perception, and independent variables, farming experience and membership in farming group.

Tracing the souce of organic agriculture information in this study, it can be conclude that critical factor which gave big influence to adoption of organic farming is social environment, as seen at Figure 5.

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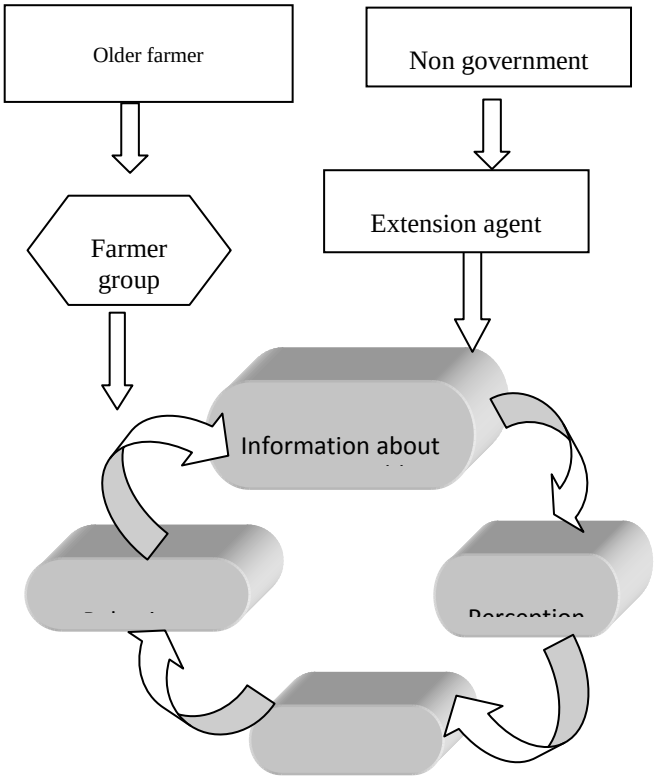

Figure 5. Farmer Perception Process on Organic Farming

At Mojogedang district, Karanganyar Regency

(Source: primary data analysis (2015)

Result of this study was similar with Herath and Wijekoon (2013), that participatory extension programs and better extension approaches such as farmer field schools could be recommended to change growers' attitude, knowledge and skills towards organic farming. It can be conclude that paddy farmers who can access more information through their participation in farming group have more accurate perception of organic paddy farming. Darr (2008) argued that innovations tend to disseminate more effectively in farmer groups vis-à-vis non-group networks, and the groups tend to be more effective when addressed by extension agents. Nuryanti and Swastika (2011) conclude that the roles of farmers' group are not only as the means of distributing government extension services, but also as the agent for new technology adoption.Hariadi and Widhiningsih (2015), farmer group role (as a unit of study, cooperation, and production) gives positive and significant effect towards innovation adoption

CONCLUSIONS

1. The result of the study showed organic paddy farmers have different characteristics with conventonal paddy farmers, where organic farmers relatively younger age, more educated, but more narrow area of land tenure.
2. The survey shows an understanding of organic farmers and the practice though not fully in accordance with the appropriate standards of organic farming and there are 23,3% conventional farmers who do not know about organic farming accurately.
3. Farming experience and membership in farming group were associate with the farmer perception of organic farming concepts.
4. Farmers' major sources of knowledge on organic farming is farmer elder who was also farming group leader. Easier access to information sources, the presence of extension staff and other institution concerns in organic farming also motivate higher adoption rates.

It takes effort more intensive dissemination of information about organic farming, either through extension program and direct demonstrations, or through mass media, newspaper or electronic media. Government and related institution can help farmers to restore the use of traditional or local seed varieties.

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