

# FARMER EMPOWERMENT IN THE MANAGEMENT OF RICE FARMING IN TWO DISTRICTS IN WEST JAVA

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## ABSTRACT

Efforts to integrated food security and farmer empowerment have become an important issue today. Accordingly, the objectives of this study were to analyze the level of participation of farmers in their group and the empowerment of farmers in the management of rice farming and the factors associated with it, and to analyze the impact of farmer empowerment on sustainability efforts. Fieldwork was conducted in May to June 2012 in two districts in West Java, by taking 239 farmers who had attended the farmer field school. Quantitative data were analyzed statistically based on the descriptive technique and Structural Equations Modeling (SEM). Qualitative data were collected through in-depth interview and observation to support the quantitative data. The results showed that: (1) The levels of farmer participation in the farmer group and the farmer empowerment were classified as low. The variables that significantly affected the levels of farmer participation in the farmer group were: intensity of empowerment and personality traits. The variables that significantly affected the levels of farmer empowerment were: farmer participation in the farmer group, intensity of empowerment, physical and socio-economic environment, personality traits, and availability of agricultural information. (2) The prospects for sustainability efforts were classified as low. The level of farmer empowerment significantly affected the sustainability of farming; and (3) The increasing level of farmer empowerment can be achieved by better management of empowerment process, with increasing farmer participation in the farmer group, strengthening the availability of agricultural information, and the physical and socio economic environment.

Keywords: *empowerment, participation, capacity of farmers, business sustainability*

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## Introduction

The "green revolution" program during the New Order (*Orde Baru*) that emphasized transfer of technology, target of production and productivity, and thus enabled Indonesia attained rice sufficiency in 1984, had caused

another problem. The approach used, which did not prioritize human factor (farmers), had resulted in high level of local dependence on central government, central government dependence on donor countries, fragmentation among subsectors of agribusiness, lack of synergy, lack of function (termination) of local

institutions, lack of self-supporting farmers, growing dependence on government assistance, and jeopardized or failure in continuity of agricultural development (Chambers 1993, Pasandaran dan Adnyana 1995, Uphoff 1988).

The objective of extension is for farmers to have the knowledge of, to be willing to, to be capable of and to be self-supporting in overcoming their problems properly and satisfactorily. In other words, self-supporting farmers can only be generated by using an approach that prioritizes human factor and its learning process, which is also known as participatory extension (Chambers 1993, Sumardjo 2010, Uphoff 1988).

Act No 16, 2006 concerning System of Agriculture, Fisheries and Forestry Extension (*Sistem Penyuluhan Pertanian, Perikanan, dan Kehutanan/SP3K*), and Agricultural Development Plan 2010-2014 became the umbrella for the implementation of programs for improvement of quality (empowerment) of human resources in the aspects of agriculture, fisheries and forestry. According to Padmowihardjo (2005), empowerment is greatly needed for enabling farmers participate as subject, rather than as object of development.

In dealing with the challenge of changing environment (progress in other aspects and decrease/omission of barriers of tariff due to globalization), farmers are expected to change their mindset from way of thinking that focuses only on their own needs (subsistence) to way of thinking that is responsive to changes and is agribusiness oriented. Farmers are required to be capable of making the best and profitable decisions for their farming.

Agricultural extension programs that had been conducted for the last two decades has started adopting an approach that prioritize farmers. The approach is expected to empower farmers and thus enable them make the best and profitable decisions for their farming. Farmer empowerment activities that adopt this kind of approach foster activities of farmer groups, which function as medium for group

cooperation and mutual learning among group members.

Previous research (Hakim *et al.* 2009, Marliati 2008, Subagio *et al.* 2008, Suprayitno 2011, Utama *et al.* 2010, Yunita 2011) had not yet viewed empowerment process through group and field schools as a medium for improvement of empowerment of extension subjects. Some of the research conducted by the abovementioned researchers about farmer empowerment also had not yet fully referred to the objectives of extension as stipulated in the meaning of extension according to Act No. 16/2006 on *SP3K*. Therefore, it is important to implement this research.

In connection with the above matter, the research problems were formulated as follows: (1) How is the level of farmer participation in farmer group and the level of farmer empowerment in the management of rice farming? (2) To what extent are found the determinant factors of farmer participation level in their group and farmer empowerment level in the management of rice farming? (3) What is the impact of farmer empowerment in the management of rice farming on farming sustainability? The objective of this research is to address these problems.

## Conceptual Framework

In an effort to empower farmers, agricultural extension workers utilize farmer groups as medium, and subsequently farmers are expected to participate in their group activities because they have benefited from their group. Appropriate empowerment process is expected to increase farmer participation in their group. In order to increase farmer participation in their group, it should be supported by good individual characteristics, physical social economic environment, availability of information/innovation, and farmer personality traits.

Appropriate empowerment process that is supported by high level of farmer participation in their group, physical and social cultural environment, good personality traits, and

availability of adequate information/innovation are deemed to increase farmer empowerment in the management of agribusiness-based farming. High empowerment in farming management will subsequently produce impact on farming sustainability.

Changes in politics and economy that take place at global, national, and local levels, and at community and farmer levels have brought about the awareness that extension using conventional approach is inappropriate because it does not prioritize human resources (farmers) and their learning process. The new paradigm places farmers as subject of agricultural development. When agricultural extension is viewed as a process of empowerment, and not as a process of transfer of technology, quality of farmers as human resources will support agricultural development in the present and future. Extension is not about “changing farming methods”, but rather, it is “changing the farmer” (Soedijanto 2003). In other words, extension that results in self-supporting or empowered farmers can only be achieved if it is implemented using an approach that prioritizes human resources and their learning process.

## Research Method

This research was conducted in West Java Province, one of the main centers of rice production in Indonesia. The locations selected were Karawang District and Cianjur District. Both districts were selected to represent different agroecosystems in northern and southern parts of West Java. Two subdistricts were selected from each district based on information from the Office of Agriculture or Executing Agency for Extension of Agriculture, Fisheries, and Forestry at district level. From each subdistrict, two villages were selected based on information from Head of BP3K/Coordinator of Extension at subdistrict level. The villages selected had a minimum of two farmer groups that had attended field school activities, especially SLPTT or SLPHT and SLUBA. Data collection in the field was conducted in May-June 2012.

The population in this research were members of farmer groups in the selected villages who had attended a minimum of one or several field schools (especially SPTT). In this research, 30 respondents were selected from each village, with the requirement that from each farmer group, three respondents were group administrators and 12 respondents were members randomly selected. The total number of respondents taken was 240 persons, in which 239 of them fulfilled the requirement. By using the theorem/principle of a minimum of five times research indicators (manifest variables), the minimum total number of samples to be taken was  $5 \times 39 = 195$  respondents.

This research used survey method, which was filling in a questionnaire that had been tested for validity and reliability and supported by in-depth interview. Collection of primary data was also conducted by interviewing key informants, such as extension workers, community figures, and related officials of agricultural institutions in the research area.

Data processing used quantitative analysis, which was supported by information based on qualitative data (Moleong, 1991). The quantitative analysis used statistics that comprised: 1) descriptive analysis, 2) variance test (t-test) analysis, and 3) Structural Equation Models analysis (Kusnendi, 2008).

## Results and Discussions

### Socio-Economic Characteristics of Farmers

Average characteristics of the respondents' social economy are presented in Table 1. Age characteristic of the respondents was in the interval of 18-81 years old, with average age of 52 years and most (64.0%) were in the interval of 40-61 years old and belonged to productive age category. Experience in farming was in the interval of 1-67 years, with an average of 25 years and the biggest percentage (48.9%) was in the interval of 1-23 years. Level of formal education was in the interval of 0-18 years, with an average of 6.9 years, and the majority (71.5%) completed or attended but not completed elementary school. The occupation of majority

of the respondents (86.2%) was as farmers. Most (80.3%) of the farmers' non-formal education

(field school/related) was in low category (2-20 hours), with an average of 19.4 hours.

Table 1. Average category of respondents in West Java based on research variables and results of variance test

Variable	Measurement	Average		Total	Sig (t-test) <sup>2</sup>
		Karawang	Cianjur		
Age	Year	52.3	52.1	52.2	0.879
Experience in farming	Year	25.2	24.8	25.0	0.879
Level of formal education	Year	6.9	6.5	6.7	0.279
Scale of farming	Hectare	2.1	0.6	1.3	0.000**
Level of cosmopolitan	Score <sup>1</sup>	47.0	61.0	54.0	0.000**
Non-formal education	Hour	19.8	19.1	19.4	0.706

Note: <sup>1</sup>) Average Score: Low: 0-59; Medium: 60-79; High: 80-100

<sup>2</sup>) \* significant at P<0.05 dan \*\* significant at P<0.01

### Pattern of Empowerment

Table 2 shows that the pattern of farmer empowerment conducted by extension workers was in the category of less intensive, with total average of 56. In Karawang, farmer empowerment was in the category of less intensive in all aspects. It was different in Cianjur, where empowerment in the aspects of technical capability development, innovative behavior development, and strengthening of farmer participation was in the category of sufficiently intensive. On the other hand, aspects of group development and strengthening of access to resources were in the category of less intensive, whereas aspect of developing the capability to

partner was in the category of extremely less intensive. This shows that extension workers were relatively lacking in developing farmer groups, especially in developing the group as medium for cooperation among farmers and for learning together among group members, and they were also weak in strengthening the group access to resources and the capability to partner.

Table 2. Average category of respondents in West Java based on variables of empowerment pattern and results of variance test, 2012.

Variables	Measurement <sup>1</sup>	Average		Total	Sig (t-Test) <sup>2</sup>
		Karawang	Cianjur		
Development of technical capability	Score	56	73	64	0.000**
Development of innovative behavior	Score	58	72	65	0.000*
Strengthening farmer participation	Score	58	71	64	0.000**
Group development	Score	49	66	57	0.000**
Strengthening of access to resources	Score	46	47	46	0.699
Developing capability to partner	Score	40	37	38	0.297

Note: <sup>1</sup>) Average Score: Low: 0-59, Medium : 60-79; High: 80-100

<sup>2</sup>) \* significant at P<0,05 and \*\* significant at P<0,01

### Physical and Socio-Economic Environment

Average scores of physical and socio-economic environment are shown in Table 3, which were categorized as less supportive, with total average of 56. Aspects that were

sufficiently supportive were support from farmer figures and agribusiness institutions. Aspects that were mainly less supportive were support from government policies, agricultural experts, and

availability of infrastructures. Aspect of government policy was of low category, which means that there was a lack of government support for agricultural development. According to farmers, the low support was mainly in terms of guaranteed certified seeds, policy on prices of

Table 3. Average category of respondents in West Java based on variables of physical and socio-economic environment and results of variance test, 2012.

Variables	Measurement <sup>1</sup>	Average		Total	Sig (t-Test) <sup>2</sup>
		Karawang	Cianjur		
Government policy support	Score	48	45	46	0.434
Farmer figures support	Score	58	68	63	0.001**
Infrastructure support	Score	58	51	55	0.001**
Agribusiness institution support	Score	60	64	62	0.084
Agricultural expert support	Score	47	58	53	0.000**

Note: <sup>1</sup> Average Score: Low: 0-59, Medium : 60-79; High: 80-100

<sup>2</sup> \* significant at P<0,05 and \*\* significant at P<0,01

### Farmer Personality Traits

Average scores of farmer personality traits are shown in Table 4. Farmers had adequate personality traits to support their empowerment, with average total score of 61. Score of spirit of hard work was high. Farmers had a high spirit of

hard work to succeed in their farming. Aspects that were still lacking were the courage to take risk and creativity. Farmers had a tendency to wait for evidence from other farmers who had applied or see first results of demonstration plot conducted by extension workers prior to applying an innovation.

Table 4. Average category of respondents in West Java based on variables of farmer personality traits and results of variance test, 2012.

Variables	Measurement <sup>1</sup>	Average		Total	Sig (t-Test) <sup>2</sup>
		Karawang	Cianjur		
Level of spirit of hard work	Score	75	87	81	0.000**
Level of confidence	Score	70	70	70	0.091
Level of courage to take risk	Score	43	49	46	0.063
Level of creativity	Score	45	48	47	0.342

Note: <sup>1</sup> Average Score: Low: 0-59, Medium : 60-79; High: 80-100

<sup>2</sup> \* significant at P<0,05 and \*\* significant at P<0,01

### Availability of Agricultural Information

Average scores of availability of agricultural information are shown in Table 5. Availability of agricultural information was classified as lacking or relatively limited, with total average of 54, and

was significantly different among farmers in two districts. This comprised four aspects of the variable of agricultural information availability: meaning of information, type of information, quality of information, and credibility of

information provider. Average scores of farmers in Cianjur were better than those of farmers in Karawang in all aspects. Most of information received by farmers were related to farming, such as control of pests and diseases and

technique of land preparation. This kind of information was frequently provided by extension workers because problems related to pests and disease occurred most often and became a scourge for farmers.

Table 5. Average category of respondents in West Java based on availability of agricultural information and results of variance test, 2012.

Variable	Measurement <sup>1</sup>	Average		Total	Sig (t-Test) <sup>2</sup>
		Karawang	Cianjur		
Meaning of information	Score	50	61	56	0.000**
Type of information	Score	45	56	50	0.000**
Quality of information	Score	49	64	56	0.000**
Credibility of information provider	Score	48	60	54	0.000**

Note: <sup>1</sup> Average Score: Low: 0-59, Medium : 60-79; High: 80-100

<sup>2</sup> \* significant at P<0,05 and \*\* significant at P<0,01

Agricultural information that were accessible to farmers, but considered relatively lacking were: (1) suitability between market information with farmers’ needs, particularly information derived from mass media (television, newspaper) and internet; (2) diversity of information derived from mass media, internet, agricultural insitutions, and agricultural research centers; (3) information that contains agribusiness issues, particularly information on market and environment issues; and (4) farmers’ confidence in the available information and the credibility of the information provider, particularly those derived from internet.

Distribution of levels of farmer participation in group as a whole is shown in Figure 1, which shows that the level of farmer participation in group was classified as low. The level of participation of most respondents (72.8%) was in low category and not different in both locations. This shows that activities of group had not been conducted in participatory, as suspected by Sumardjo (2012). The group members either had not been involved sufficiently by the administrators, especially in activities of planning, implementation, and monitoring; or the members considered the activities were sufficient to be conducted by group administrators only.

**Level of Farmer Participation in Group**

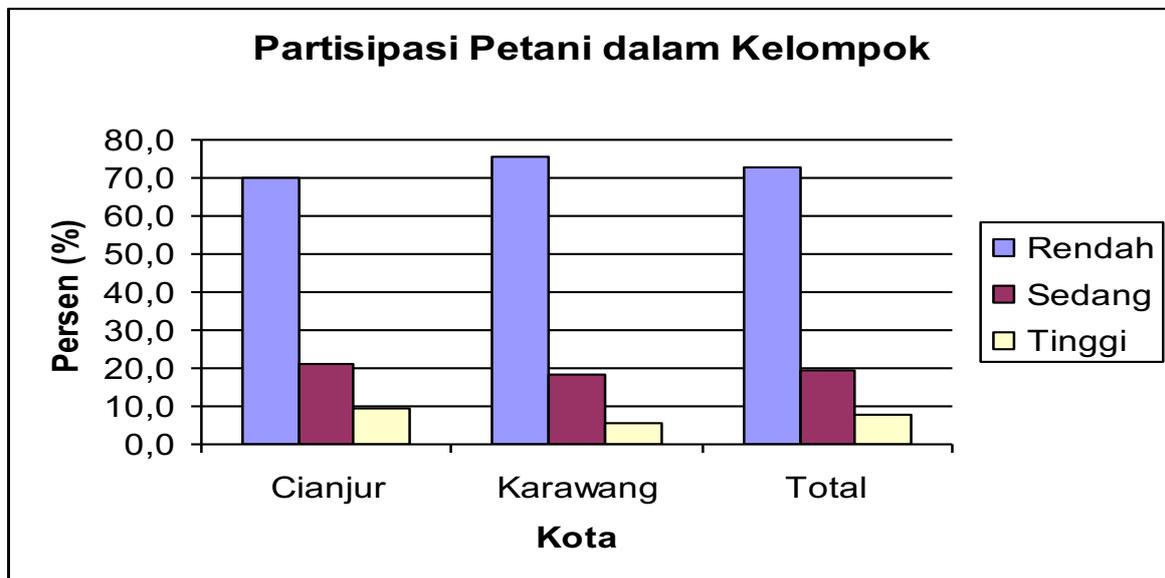


Figure 1. Distribution of farmer respondents in West Java based on participation level in group, 2012.

Average scores of farmer participation level sorted according to aspects are shown in Table 6. Farmer participation level in group was classified as low, with total average of 41. A relatively better level of participation was in aspect of benefiting from results, with average score of 55, which was significantly different

between farmers in Karawang and those in Cianjur. Aspect of participation level in benefiting from results for farmers in Cianjur was classified as medium with average score of 61, whereas in Karawang it was classified as low with total average of 48.

Table 6. Average scores of participation level in group of respondents in West Java and results of variance test.

Farmer Participation	Average		Total	Sig (t-Test) <sup>2</sup>
	Karawang	Cianjur		
Level of participation in planning	38	38	38	0.956
Level of participation in implementation	38	36	37	0.523
Level of participation in evaluation	33	35	34	0.526
Level of participation in benefiting from results	49	62	55	0.000**
Total	40	43	41	

Note: <sup>1</sup>) Average score: Low: 0-59, Medium: 60-79; High: 80-100

<sup>2</sup>) \* significant at P<0,05 and \*\* significant at P<0,01

The difference was because farmers in Cianjur acknowledged that farmer groups were beneficial for them. The benefit, other than increased knowledge related to management of farming, was in economic aspect, wherein farmers in Cianjur quite often received market information from farmer groups concerning price of undried rice grain and dried rice grain. The presence of farmer groups also facilitated other farmers in Cianjur in obtaining agricultural production inputs, such as seeds, fertilizers and pesticides. The prices of these inputs tended to be lower than those sold in stores or kiosks. The benefit of farmer groups

that had not been received to the maximum by farmers in Cianjur was convenience in selling their produce (rice) because during harvest they still had to sell their produce to middlemen.

### Level of Farmer Empowerment

Distribution of respondents based on level of farmer empowerment in management of farming is shown in Figure 2. The figure shows that as a whole most respondents (61.51%) were classified as low, as mentioned in the findings of Marliati (2008) concerning farmers in Riau. This describes that farmers lacked empowerment or capability in facing current challenges in management of farming.

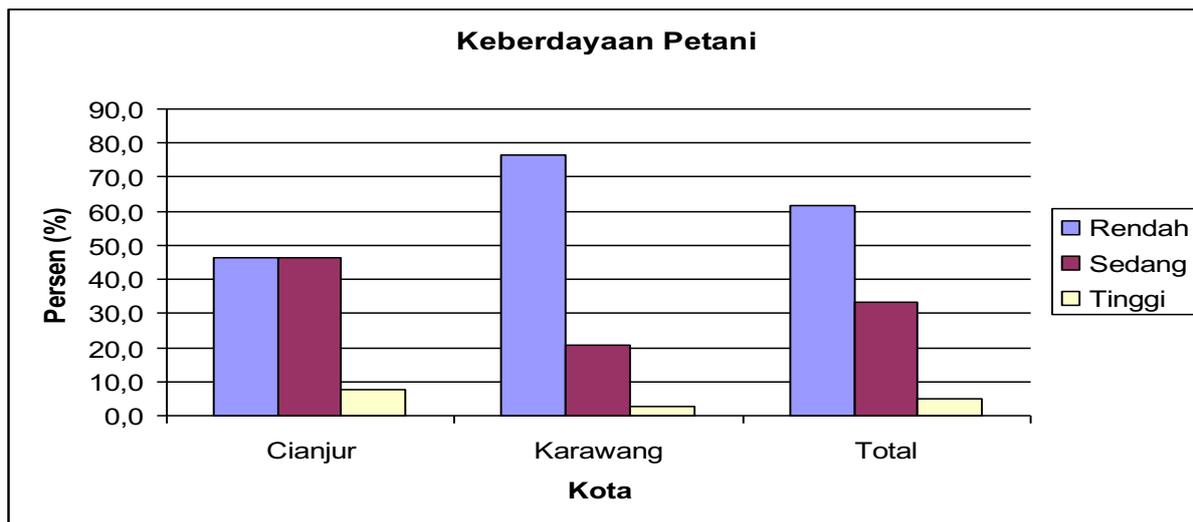


Figure 2. Distribution of respondents in West Java based on level of farmer empowerment in management of farming, 2013.

Based on location, empowerment level of farmers in Cianjur was relatively higher than that of farmers in Karawang. The graph shows that percentages of farmers who were classified as low and medium were relatively the same. Meanwhile in Karawang, most farmers were classified as low.

The levels of farmer empowerment in management of farming were sorted out

Table 7. Average category of respondents in West Java based on variable of farmer empowerment level and results of variance test, 2012.

Farmer Empowerment	Average		Total	Sig (t-Test) <sup>2</sup>
	Karawang	Cianjur		
Level of capability to access agricultural information	42	53	48	0.000**
Level of capability to make decisions	61	64	62	0.139
Level of capability to access market	49	57	53	0.000**
Level of capability to manage finance	54	59	56	0.045*
Level of capability to partner	57	57	57	0.940
Level of capability to adapt	53	60	56	0.013**
Total	53	59	56	

Note: <sup>1)</sup> Average score: Low: 0-59, Medium: 60-79; High: 80-100

<sup>2)</sup> \* significant at  $P < 0,05$  and \*\* significant at  $P < 0,01$

Aspect of capability to access agricultural information obtained the lowest score. The low score in empowerment level of capability to access agricultural information was related with farmers' limited capability to access agricultural information, which mainly still hinged on information from extension workers and fellow farmers/farmer figures/farmers from other villages during face to face communication.

according to aspects (Table 4). Average score of level of farmer empowerment was 56, which was classified as low. However, in aspect of capability to make decisions, the score was adequate, which means that farmers were quite capable of making good decisions for their farming.

Access to research institutions, mass media (newspaper, televisions, radio) and internet/cyber extension was still very limited. This is different from findings of Mulyandari (2011), Hakim and Sugihen (2009) about vegetable farmers. Another low farmer empowerment, especially that in Karawang, was in the capability to access market, which was caused by farmers' tendency to sell rice grain at

harvest time (harvest dried rice grain) and because the market was controlled by middlemen who came to villages. In general, farmers had no alternatives to sell their rice/rice grain to other places.

**Prospect of Business Sustainability**

Distribution of respondents based on level of business sustainability (Figure 3) shows that as a whole, most respondents (88.28%) were classified in low category and

none was in high category. Likewise, it was the same when sorted by location. Overall, the scores for prospect of rice farming sustainability were classified in low category with total average of 52 (Table 5). This means that even though there was a probability for improvement, the prospect was weak. It is different with findings of Fatchiya (2010) about fish cultivators/farmers in West Java.

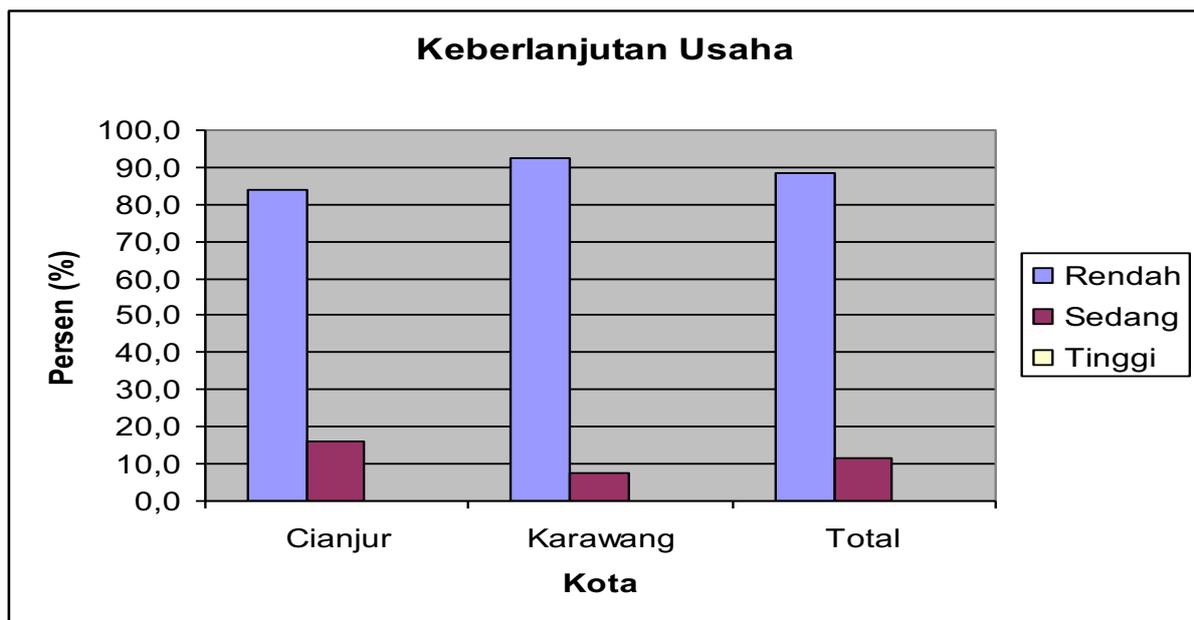


Figure 3. Distribution of respondents in districts in West Java based on variable of business sustainability level, 2012.

In aspect of business, field school was assessed capable of increasing farmers' production and income, which were relatively higher in Cianjur than in Karawang. In Karawang, the rice field lacked the support of soil pH and microorganisms, which, coupled with increasing pests,

constrained the prospect of production increase. In aspect of welfare improvement, the condition in both locations was relatively the same, wherein agricultural extension was assessed capable of increasing farmers' welfare.

Table 8. Distribution and average category of respondents in West Java based on variables of business sustainability level and results of variance test.

Business Sustainability	Average		Total	Sig (t-Test) <sup>2</sup>
	Karawang	Cianjur		
Progress of business aspect	50	55	52	0.019*
Progress of ecological aspect	45	58	52	0.000**
Progress of social aspect	53	52	53	0.377

Total	44	50	52
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Note: 1) Score: Low: 0-59, Medium: 60-79; High: 80-100  
 2) \*\* significant at P<0,05 and \*\* significant at P<0,01

Increase of production is still possible with necessary improvement efforts. This is in line with findings of Nainggolan *et al.* (2012). According to extension workers, at present wetland agriculture lacks the support of soil pH and microorganisms condition due to increased tendency of the use of pesticides, and increased pest problems. This causes constraint in the prospect of production increase. One of the efforts for improvement conducted by the government at this time is implementation of land improvement activities through providing support or providing organic fertilizers in forms of granule and liquid and manure.

With regard to ecological aspect, farmers in both districts, especially in Karawang, were classified in low category. This is different from findings by Barzman and Desilles (2002), Davis (2008), Erbaugh *et al.* (2010) and Sadono (2001). In the use of pesticides, farmers tended to apply them more frequently and gave less attention to ecological aspect. In Cianjur, farmers applied pesticides as pest/disease control, whereas in Karawang there was indication of returning to the old way, which was prevention ('precaution' and scheduled) as in the days of Bimas (Sadono 2001). Failure in harvest in Karawang due to stem borers and leafhoppers during the 2009/2010 planting season had driven farmers to return to the old way, which was the use of pesticides as first and primary way of controlling pests, but lacking attention towards environment.

In choosing the pesticides to use, some farmers still had the principle of 'not exterminating the white blood and the red blood', which means the pesticides they chose contained chemical substance that would not kill 'white blood' animals, such as spiders, and 'red blood' ones, such as eels and frogs, because these animals were pests' natural enemies. However, other farmers were not concerned with such matter, as long as the pests that

attacked their crops were controlled, eradicated. In fact, as a 'precaution', they applied the pesticides before the pests attacked their crops.

Concerning social aspect, distribution of respondents shows that most respondents (72.4%) were classified in low category and none was in high category. The average score was 53 and the conditions were relatively the same in both districts. This shows that agricultural extension that is supported by government policy on base price of rice grain and others was deemed adequate to improve farmers' welfare, even though the improvement was relatively little. However, with the ratio of rice grain base price and average price of fertilizers that almost reached two (around 1.8), it was considered profitable enough, provided the minimum production did not decrease due to pests and diseases and the production cost did not continue to increase.

**Analysis of Dominant Factors that Affect Participation Level, Farmer Empowerment Level and Business Sustainability Level**

Compatibility test of construct model on dominant factors that affect farmer participation in group, level of farmer empowerment in management of farming, and level of business sustainability is shown in Figure 4. Figure 4 shows that even though the value of *p*-count = 0.000 (< 0.05), viewed from measurement of other main GFI, the following values were obtained: *Root Mean Square Error of Approximation* (RMSEA) = 0.059 (≤ 0.08), value of *Comparative Fit Index* (CFI) = 0.981 (≥ 0.90) and GFI = 0.900 (≥ 0.900). Accordingly, the recommended model of construct measurement fitted with the data. This means that the model could estimate the matrix of covariance among variables of population indicators, which were not different from the matrix of covariance of sample data. The model can be used as basis for making generalization of the phenomena under study.

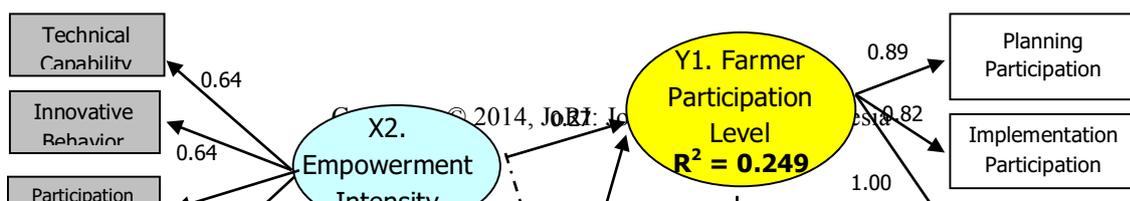


Figure 4. Final Estimation of Parameters of Structural Model/Hybrid Model (t-value)

**Note:**

Chi-Square=304.76, df=166, P-value=0.00000, RMSEA=0.059, CFI=0.981, GFI=0.900, RFI=943

- (X2) empowerment intensity: (X2.1) intensity of technical capability development, (X2.2) intensity of innovative behavior development, (X2.3) level of participation strengthening, (X2.4) level of group development.
- (X3) physical and socio-economic environment: (X3.1) policy support, (X3.4) level of group development, (X3.5) agribusiness institution support.
- (X4) farmer personality traits: (X4.3) level of courage to take risks.
- (X5) availability of agricultural information: (X5.1) meaning of agricultural information, (X5.2) type of agricultural information, (X5.3) quality of agricultural information, (X5.4) credibility of agricultural information provider.
- (Y1) level of participation in group: ((Y1.1) level of participation in planning, (Y1.2) level of participation in implementation, (Y1.3) level of participation in evaluation.
- (Y2) level of farmer empowerment: (Y2.1) level of capability to access information, (Y2.2) level of decision making capability, (Y2.3) level of capability to access market, (Y2.4) level of financial management capability, (Y2.5) level of capability to partner, (Y2.6) level of capability to adapt.
- (Y3) prospect of business sustainability: (Y3.1) economic aspect, (Y3.3) social aspect.

**Level of Farmer Participation in Group**

Data in Table 9 shows that the level of farmer participation in group was directly affected by variables of empowerment intensity and of farmer personality traits, with each

effect was 0.274 and 0.322. The joint effect (R<sup>2</sup>) of both variables was 25 percent. The equation of the structural model is:

$$Y1 = 0.274 * X2 + 0.322 * X4, \quad R^2 = 0.249 \dots \dots$$

(Equation 1).

Table 9. Direct Effect and Indirect Effect Inter-Variables of Research

Inter-Variables Effect	Effect Coefficient			
	Direct	Indirect Through	Value	R <sup>2</sup>

Independent Variable		Dependent Variable		Y1	Y2	Y1 and Y2	Total	of t at $\alpha = 0.05$	
Empowerment Intensity (X <sub>2</sub> )	→	Participation Level	0.274	-	-	-	0.274	4.149	0.249
Farmer Personality Traits (X <sub>4</sub> )	→		0.322	-	-	-	0.322	4.962	
Empowerment Intensity (X <sub>2</sub> )	→	Empowerment Level	-0.188	0.085	-	-	-0.103	-1.151	0.730
Physical, Socio-Economic Environment (X <sub>3</sub> )	→		0.414	-	-	-	0.414	5.290	
Farmer Personality Traits (X <sub>4</sub> )	→		0.254	0.099	-	-	0.353	6.256	
Availability of Agric. Information (X <sub>5</sub> )	→		0.406	-	-	-	0.406	6.294	
Level of Participation in Group (Y <sub>1</sub> )	→		0.309	-	-	-	0.309	5.676	
Empowerment Intensity (X <sub>2</sub> )	→	Business Sustainability Level			-0.126	0.057	-0.069	-1.143	-
Physical, Socio-Economic Environment (X <sub>3</sub> )	→		-	-	0.278	-	0.278	4.747	-
Farmer Personality Traits (X <sub>4</sub> )	→		-	-	0.066	0.171	0.237	5.316	-
Availability of Agric. Information (X <sub>5</sub> )	→		-	-	0.273	-	0.273	5.414	-
Level of Participation in Group (Y <sub>1</sub> )	→		-	-	0.208	-	0.208	5.017	-
Farmer Empowerment Level (Y <sub>2</sub> )	→		0.673	-	-	-	0.673	7.659	0.452

Farmer personality traits were the first factor that have a stronger effect on level of farmer participation in group. Farmer personality traits describe the aspects that are attached to a farmer in connection with the preparedness to develop oneself in conducting an advanced/modern farming. These personality traits that characterize preparedness to develop oneself is needed in dealing with farming challenges at present and in the future, such as changes in political, economic, global, national, local, and other farmers (Baharsjah 1997 cited by Purnama *et al.* 2004, Sumardjo 1999a).

Effect of farmer personality traits was reflected by one indicator, which was the courage to take risks. The courage to take risks ( $\lambda=1.00$ ) strongly shaped the latent variable of farmer personality traits. Therefore, increasing the courage to take risks had a large potential in increasing farmer participation in group; and thereby resulted in participatory group activities.

Results of SEM analysis show that the coefficient value of farmer personality traits was positive. This means that farmer personality traits had a positive effect on farmer

participation in group. As has been explained before, in general, farmer personality traits were classified as medium category (see Table 25), but based on the indicator of courage to take risks, they were in low category (average score 46), which means farmers lacked the courage to take risks. Hence, increasing farmers' courage to take risks will increase farmer participation in group.

Empowerment intensity was a second factor that affected farmer participation in group. Empowerment intensity shows various activities or actions that are conducted by agricultural extension workers in educating, guiding, and facilitating farmers. This is conducted in the attempt to increase farmers' capability to manage their farming in accordance with the present and future conditions and challenges that characterize advanced and business oriented agriculture (better business).

Group development was the strongest indicator ( $\lambda = 0.89$ ) that reflected the variables of empowerment intensity, followed by indicator of participation development ( $\lambda = 0.85$ ). Other indicators that also reflected the variables of empowerment intensity were indicators of

strengthening of innovative behavior ( $\lambda = 0.64$ ) and development of technical capability ( $\lambda = 0.64$ ).

Results of SEM analysis show that the coefficient value of the effect of empowerment intensity was negative. This means the higher the empowerment intensity, the lower the level of farmer participation was in group. Farmer empowerment intensity in both districts in West Java was classified as low and had negative effects. This finding shows that empowerment intensity conducted so far was not quite appropriate. In other words, empowerment intensity was not conducted in accordance with extension principle, which was to prioritize human aspect and learning process (Chambers 1993, Uphoff 1988), nor participatory extension (Sumardjo, 2010), or it was still at the stage of 'changing farming techniques', not yet 'changing the farmers' (Soedijanto, 2003). Therefore, it can be said that so far the farmer empowerment that was conducted was still mainly top down, not yet in compatible with the farmers' needs and social economic condition. The approach that should be conducted is participatory and originates from farmers' needs and social economic condition.

### Level of Farmer Empowerment

Level of farmer empowerment was also indirectly affected by variables of empowerment intensity and level of farmer participation in group, in which each effect was 0.085 and 0.099. Meanwhile, the joint effect ( $R^2$ ) of these variables was 73.0 percent. The equation of the structural model is:

$$Y_2 = 0.309*Y_1 - 0.188*X_2 + 0.414*X_3 + 0.254*X_4 + 0.406*X_5, \quad R^2 = 0.730$$

..... (Equation 2).

There are five determinant factors that affected farmer empowerment level in management of farming. The effect of these five variables was direct, and the biggest effect (based on coefficient value of standardized regression/ $\beta$ ) was the variable of physical and

socio- economic environment ( $\beta = 0.414$ ). The next was variable of availability of agricultural information ( $\beta = 0.406$ ), followed by level of farmer participation in group ( $\beta = 0.309$ ), farmer personality traits ( $\beta = 0.254$ ), and the smallest was empowerment intensity ( $\beta = -0.188$ ). Other factors that indirectly affected (through intermediary variables) the farmer empowerment were variables of farmer personality traits (X4) and empowerment intensity (X2).

Indicator of agribusiness institutional support was the strongest indicator ( $\lambda = 0.84$ ) that reflected the variable of physical and socio-economic environment, followed by indicator of agricultural expert support ( $\lambda = 0.82$ ), and government policy support ( $\lambda = 0.52$ ). Field findings show that, as a whole, physical and socio-economic environment was classified in low category, and thus less supportive towards farmer empowerment. When sorted by indicators, agribusiness institutional support was of medium category, which means it adequately supported farmer empowerment. However, agricultural expert support and government policy support were of low category or classified as less supportive environment. If the role of the three indicators are increased, in a sense that interface of the three indicators occurs with increasing farmers' demands, then farmer empowerment is expected to increase.

Agribusiness institutions in rural areas are mainly stores/distributors of agricultural input, middlemen, *gapoktan*/joint farmer group (managing PUAP fund to be loaned to members of *gapoktan*). The distributors of agricultural input, particularly pesticides suppliers, are institutions that vigorously offer their products even to farmer groups or individuals and often with 'lure' in form of gifts (t-shirts, hats, even tours to tourist attractions). In term of supply of agricultural inputs, the distributors are quite good in catering farmers' needs. However, in terms of environment friendly agricultural development, it is endangering the effort to increase farmers' awareness of conservation of environment function (UU No. 16/2006). This is caused by the lure/gifts, which can make farmers, even farmer groups, decide to buy the

pesticides offered, even if there are no signs of pest attack found.

Another agribusiness institutional is middlemen, who buy rice grain from farmers. At harvest time they visited farmers who were harvesting. Farmers considered the middlemen provided the help they needed because these middlemen purchased farmers' rice grain at a profitable price, which was at government benchmark price, and sometimes even at a higher price. Middlemen can also provide loans the farmers need for farming, which will be returned after harvest.

In each village under research, there was also *gapoktan* (joint farmer groups). Until present, some *gapoktan* still manage PUAP (development of rural agribusiness) fund to help farmers in their need for capital in management of their farming. One of the *gapoktan* that succeeded in managing the fund had expanded the fund from Rp. 100 million in 2008 to around Rp. 165 million in 2012. This *gapoktan* conducted annual member meeting every year, and attained second prize *gapoktan* at district level. Some other *gapoktan* were no longer managing PUAP fund because of difficulties in returning of loans by farmers, and thus the *gapoktan* were no longer able to provide further loans.

Agricultural expert support was the second indicator that reflected the physical and socio-economic environment supporting the increase of farmer empowerment in management of their farming. According to farmers, the support was, among others, from universities conducting community service, monitoring pest problems, and providing agricultural consultations.

Government policy support was the third indicator that reflected the physical and socio-economic environment supporting the increase of farmer empowerment in management of their farming. This support was classified as low category, which means there was a lack of government support in agricultural development. According to farmers, the lack of support was mainly in providing guaranteed labelled seeds, policy concerning agricultural inputs (seeds, fertilizers, pesticides) accessible for farmers, and

support in supply of agricultural machines and tools (rice grain threshers, hand tractors, rice grain storage).

According to farmers, the quality of labelled seeds was not very different from seeds produced by farmers through selection of good tassels from plants that were of relatively equal height. The tassels were selected and cut off one day before harvest, and thus were separated from harvest as a whole. According to farmers, labelled seeds sold in agricultural input stores were quite expensive, around Rp. 40,000 – 50,000 thousand per sack (5 kg). Price of fertilizers was specified by the government at the highest retail price, which according to farmers was reasonable for them. For example, the price of urea fertilizer during the previous planting season was Rp 1,800 – Rp 1,900 per kg, Phonska fertilizer Rp 2,300 per kg. According to farmers, expensive agricultural input was pesticides. There was no government stipulation concerning price of pesticides. Due to the high price of pesticides, farmers had to allocate a budget of around Rp 2 million per hectare.

Government policy support was good in terms of stipulation of rice grain base price, which was profitable enough for farmers, and support in supply of agricultural input at appropriate time for farmers. Base price of rice grain was considered profitable enough, with the ratio of around 1.8 compared to average price of fertilizers.

### **Level of Farming Sustainability**

Level of business sustainability was directly affected by level of farmer empowerment, in which the effect was 0.673. However, it was indirectly affected by variables of empowerment intensity, physical and socio-economic environment, farmer personality traits, availability of agricultural information, and level of farmer participation in group through variables of farmer empowerment level and variables of empowerment intensity, and farmer personality traits through joint variables of participation level in group and farmer empowerment level. Each of the indirect effects

were: -0.126; 0.278; 0.066; 0.273; 0.208; 0.057; and 0.171. The joint effect ( $R^2$ ) was 45.2 percent. The equation of the structural model is:

$$Y_3 = 0.673*Y_2, \quad R^2 = 0.452$$

..... (Equation 3).

The determinant factor that affected the level of business sustainability was level of farmer empowerment in management of farming ( $Y_2$ ). The effect of the variable was direct, which was (based on the coefficient value of standardized regression/ $\beta$ ) 0.67. The effect of farmer empowerment on level of business sustainability was reflected by all indicators that were formulated in the hypothesis model. The indicator of capability level of farming management ( $\lambda = 0.82$ ) was the strongest indicator that reflected the variables of farmer empowerment level in management of farming. Other indicators respectively were: level of adapting capability ( $\lambda = 0.80$ ), level of capability to partner ( $\lambda = 0.79$ ), level of accessing information capability ( $\lambda = 0.76$ ), level of making decisions capability ( $\lambda = 0.76$ ), and level of accessing market capability ( $\lambda = 0.66$ ).

As a whole, the level of farmers' business sustainability level was classified in low category (Figure 5). This was caused by farmers' lack of power, which showed that in management of their farming, farmers were less capable in facing the present challenges around them.

The indicator of level of farming management capability was the strongest indicator that reflected the variables of farmer empowerment level in farming management, with the value of  $\lambda = 0.82$ . This indicator was classified in low category, with average score of 56 and was significantly different in both districts. Farmers in Karawang had lower capability level than farmers in Cianjur. Farmers' capabilities were quite good in terms of: land cultivation technique, planting method, pest observation method based on recommendation, formulating farming plan, and calculating risks in development of farming/application of new

technology. Farmers' capabilities that were relatively low were in: conducting simple bookkeeping of farming and creating or finding a local technology to develop their farming.

Level of adapting capability was the second indicator that reflected farmer empowerment level in farming management, with the value of  $\lambda = 0.80$ . This was classified as low category, with average score of 56. Adapting capability was quite good mainly in the practice of new agricultural technology (planting using *legowo*/row system, seed saving nursery, etc.), use of harvest/post-harvest technology, such as rice grain threshing machine and rice grain drying machine. Farmers' relatively low capability was in the use of internet/cyber extension to obtain agricultural information, and in the practice of agricultural technology to produce healthier products (pesticide free).

Capability to partner was the third category that reflected farmer empowerment in farming management. This was classified as low category, with average score of 57. The low capability was caused by the absence of institutions providing production input and absence of marketing institutions. When production inputs in farmer groups ran out or were no longer available, farmers tended to buy them from stores or kiosks.

Level of capability to access market was the last/sixth indicator that reflected the level of farmer empowerment in farming management, with the value of  $\lambda = 0.66$ . Market certainty is an important factor in farming development. As Mosher (1978) had said, the presence of market and the incentive of agricultural products are basic requirements/essential factors in mobilizing and developing agriculture in rural areas.

In selling their produce, farmers chose to directly sell to middlemen because middlemen were not difficult to find and the price they set was relatively reasonable and satisfactory. This was also the reason for the absence of an alternative marketing institution. The price received by farmers was in accordance with the benchmark price stipulated by the government,

and could even be higher than the benchmark price.

## Conclusions

The level of farmer participation in farmer group was classified as low. This means that farmer groups were not adequately involving their members in group activities or were not participatory. Factors that had significant effect on farmer participation level in group activities were empowerment pattern and farmer personality traits.

Farmers were classified as lacking in power, which means they lacked the capability to face present challenges surrounding them in the management of their farming. Factors that significantly affected the level of farmer empowerment were: level of farmer participation in group, pattern of empowerment, physical and socio-economic environment, farmer personality traits, and availability of agricultural information.

Farmers' lack of power had impact on the prospect of their business sustainability, which was classified as low. In spite of the low category, development of business aspect and social aspect still had prospect for improvement. With regard to aspect of ecology, farmers tended to pay little attention. They used pesticides more often, and in fact, it was conducted as preventive measure through regular use of pesticides. The reason was there was an increasing tendency in the frequency of pest attack. In fact, harvest failure due to planthoppers and stemborers occurred in Karawang in 2009/2010.

## Suggestions

In order to increase farmer empowerment, extension needs to be implemented through improvement of group activities. The reason is that empowerment pattern has significant and positive affect through participation in group. Farmers need to be involved in group activities, not only at the stage of benefiting from results, but from stage of planning, implementation, and evaluation/monitoring of group activities. Hence, benefits of a group as medium for

farmers learning together and working together will be enjoyed by group members.

Efforts to increase farmer empowerment through improvement of participation in group need to be strengthened with support in availability of adequate agricultural information, development of farmer entrepreneurship so farmers have more courage to take risks and be creative, increase in support of physical and socio-economic environment through increase in government policy support, agribusiness institutional support, and agricultural expert support.

In activity of controlling pests and diseases, confidence and capability of farmers need to be increased so they understand and practice various tactics of pest control (observation of pests, physical and mechanical control, biological control, and others), which are ecologically reasonable/ acceptable and are socio-economically profitable.

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