

## RELATIONSHIP BETWEEN FARMER CHARACTERISTICS AND FARMER GROUP DYNAMICS WITH THE SUCCESS OF FARMER EMPOWERMENT PROGRAMS THROUGH AGRICULTURAL TECHNOLOGY AND INFORMATION

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### ABSTRACT

*Extension activities managed by farmers as a process of changing the behavior, mindset and attitude of farmers from traditional subsistence farmers to modern farmers with agribusiness insight through continuous learning are carried out with a learning by doing approach that focuses on developing managerial capacity, leadership and entrepreneurship of key actors in order to realize reliable agribusiness entrepreneurs. This study aims to examine how the relationship between farmer characteristics and group dynamics on the success rate of agricultural technology and information programs in the Tunas Walahir II Farmer Group, Pakapasan Hilir Village, Hantara District, Kuningan Regency from July to September 2022 with a sample of 25 farmers. This study used descriptive quantitative methods with data collection techniques through interviews. The data in this study is in the form of primary and secondary data. The analysis activities use the Spearman Level Correlation Coefficient Test (rs). The results showed that there was a real relationship between the characteristics of farmers (area of arable land and farming experience) with the success of agricultural technology and information programs, while the age of farmers and the level of education of farmers had no real relationship with the success of agricultural technology and information programs. There is a clear relationship between the dynamics of farmer groups and the success of agricultural technology and information programs.*

### KEYWORDS

*Characteristics of Farmers; Dynamics of Farmer Groups; Agricultural Technology and Information Programs*



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## INTRODUCTION

Agricultural extension is a learning process for the main actors and business actors so that they are willing and able to help and organize themselves access market information, technology, capital and other resources as an effort to increase productivity, business efficiency, income and welfare and increase awareness in preserving environmental functions (Ministry of Agriculture, 2017). With the issuance of Law no. 16 of 2006, starting in 2007 the Agricultural Extension Revitalization program was focused on implementing several sub-programs namely: (1) extension institutional arrangements; (2) increasing the quantity and quality of extension workers; (3) improvement of the extension administration system; (4) increasing leadership and farmer institutions and (5) developing a network of cooperation in extension and agribusiness.

Taking into account the reality of the implementation of existing agricultural extension and to answer the challenges of the Revitalization of Agriculture, Fisheries and Forestry (RPPK) in the context of reducing poverty and unemployment and increasing the competitiveness of the national economy, it is necessary to realize a resilient agriculture for strengthening food security, increasing added value and competitiveness agricultural products and increasing the welfare of farmers (Ministry of Agriculture, 2017).

As an educational activity, counseling is an effort to help create a conducive learning climate for key actors and their families, as well as business actors. One of the methods for developing the capacity of the main actors is through the implementation of extension activities managed by the main actors themselves (*Farmer Managed Extension Activities/FMA*). The farmer empowerment program through agricultural technology and information is a program that facilitates agricultural extension activities managed by farmers or FMA.

Learning activities facilitated by agricultural information and technology programs started at the village level. The learning process at the village level starts from a participatory village study as a basis for preparing business plans and learning activities which are carried out with the facilitation of self-help extension agents selected from and by the main actors and local business actors in a democratic manner (Ministry of Agriculture, 2017). The indicators for the success of agricultural information and technology programs include: (a) development of business institutions, (b) management development, and (c) business development (Ministry of Agriculture, 2017).

This method focuses on developing the managerial capacity, leadership and entrepreneurship of the main actors in the management of agricultural extension activities through a group approach that can support agriculture-based agribusiness systems (food crops, horticulture, livestock and plantations). In this regard, it is necessary to provide guidance in the context of growing and developing farmer groups into strong and independent groups to increase the income of farmers and

their families (Ministry of Agriculture, 2018). Iver and Page (2011) argues that a group is a collection or unit of people who live together, so that there is a reciprocal relationship, while Gerungan (2018) argues that a group is a social unit consisting of two or more people who interact intensively and regularly.

A farmer group is defined as a group of farmer or farmer people consisting of adult farmers (male/female) as well as cadet farmers who are bound informally in a group area on the basis of harmony and shared needs and are in an environment of influence and led by a farmer contact (Mardikanto, 2013). The dynamic level of farmer groups based on a sociological approach depends on several factors, namely (1) group objectives, (2) group structure, (3) task structure, (4) group coaching, (5) group unity/cohesiveness, (6) atmosphere group, (7) the pressure on the group, and (8) the level of group effectiveness (Djoni & Jaenal, 2020). This is in accordance with what was stated by Margono (2018) that the 8 elements of group dynamics are: (a) group goals, (b) group structure, (c) group functions, (d) developing and fostering groups, (e) group cohesiveness, (f) group atmosphere, (g) pressure on group, and (h) group effectiveness.

Dgroup dynamics will develop in a more advanced direction, determined by the characteristics of farmers as group members, including: age, level of education, farming experience and area of arable land (Rusidi, 2009). As for some of the elements of group dynamics include: group unity, group goals, group structure, task functions, develop and maintain groups, group atmosphere, group pressure or group pressure, and group effectiveness (Marzuki, 2016).

In order to develop this farmer group, the group dynamics are directed to plan and manage their own learning needs, so that it is expected that the learning process will take place more effectively and in accordance with the needs of the main actors. Learning activities facilitated by agricultural technology and information programs begin at the village level. The learning process at the village level starts from participatory village studies as a basis for the preparation of business planning and learning activities carried out facilitated by independent extension workers selected from and by key actors and local business actors democratically (Ministry of Agriculture, 2017). Therefore, it is necessary to optimally strive for the empowerment of farmer group dynamics in the implementation of agricultural extension activities managed by farmers in order to increase farm productivity and it is necessary to study the characteristics of farmers and group dynamics related to the success of farmer empowerment programs through agricultural technology and information.

Pakapasan Hilir Village is an area of Hantara District, Kuningan Regency, West Java Province. The population density of Pakapasan Hilir Village is 1,287 people/km<sup>2</sup>. With a population density, Pakapasan Hilir Village is a village that is classified as densely populated. This was emphasized by Sayogyo and Pujiwati (2014) that an area with a population of more than 300 people per km<sup>2</sup> is a dense area because the population and area are not balanced.

Geographically The area of Pakapasan Hilir Village, Hantara District, is a rice field area, so supporting activities are still colored by the role of rice field farming activities. This can be seen from the contribution of each sector of economic activity, where the agricultural sector provides the largest contribution. The agricultural commodity that is mostly cultivated by Pakapasan Hilir Village residents is paddy rice. For more details on the harvested area, production and productivity of rice in Pakapasan Hilir Village can be seen in Table 1.

**Table 1. Harvested Area, Production and Productivity of Lowland Rice in the Village Pakapasan Hilir Hantara District in 2022**

| Number | Commodity | Wide Area (Ha) | Production (Ton) | Productivity (Ton/ Ha) |
|--------|-----------|----------------|------------------|------------------------|
| 1      | Rice      | 121            | 811              | 6.7                    |

Source: UPT BPP Hantara database (2022)

Judging from the table data, it appears that the rice harvest area is 121 ha and the rice production produced is 811 tons, with a productivity of 6.7 tons per hectare. The types of livestock that are kept by the community are native chickens and sheep, these activities are only used as part-time activities. However, these livestock products can increase farmers' income.

Based on the description dIn this research, we will explore the relationship between farmer characteristics (age, education level, farming experience and land area) and group dynamics on the success rate of agricultural information and technology programs in Pakapasan Hilir Village, Hantara District, Kuningan Regency.

This study aims to examine how the relationship between farmer characteristics and group dynamics on the success rate of agricultural technology and information programs.

## RESEARCH METHOD

The method used in this research is descriptive quantitative method. The research was conducted on the Tunas Walahir II farmer group, Pakapasan Hilir Village, Hantara District, Kuningan Regency with the consideration that the farmer group is a farmer group that has received Farmer Managed Extension Activities/FMA learning facilities. The research was carried out from July to September 2022. The sample in this study was the number of members of the Tunas Wahir II farmer group of 25 people who were selected by census. The data collection techniques used in research include interview methods using questionnaires (Padmowihardjo, 2012).

To determine the relationship between farmer characteristics (age, education level, farming experience and land area) and group dynamics on the level of success of agricultural information and technology programs, Spearman's Correlation Coefficient Test (rs) is used with the formula stated by Wijaya (2010).

## RESULT AND DISCUSSION

Based on the results of group members' assessment of the dynamics of the Tunas Wahir II farmer group, it was classified as good, with an average score of group dynamics of 81.96 (87.93%). For more details about the dynamics of the Tunas Wahir II farmer group in Pakapasan Hilir Village, Hantara District, it can be seen in Table 2 as follows.

**Table 2. Results of Group Members' Assessment of Farmer Group Dynamics**

| No    | Group's dynamic criteria    | Score |         | Percentage (%) | Category    |
|-------|-----------------------------|-------|---------|----------------|-------------|
|       |                             | Hope  | Reality |                |             |
| 1     | Group's goals               | 6     | 5       | 83.33          | Clear       |
| 2     | Group's structure           | 6     | 6       | 100.00         | Complex     |
| 3     | Group's function            | 12    | 11.4    | 95.00          | Appropriate |
| 4     | Develop and guide the group | 18    | 16.92   | 94.00          | Success     |
| 5     | Group's unity               | 18    | 17.24   | 95.78          | Sinergy     |
| 6     | Group's atmosphere          | 12    | 11.48   | 95.67          | Conductive  |
| 7     | Group's pressure            | 9     | 6.8     | 75.56          | High        |
| 8     | Group's effectiveness       | 9     | 7.12    | 79.11          | Effective   |
| Total |                             | 90    | 81.96   |                | Dynamic     |

Information:

- 1) less dynamic category with a score of 30-50
- 2) quite dynamic category with a score of 51 – 70
- 3) dynamic category with a score of 71 – 90

Judging from the results of table 2, it shows that group members' assessment of group goals is classified as clear with a score of 5 (83.33%). This is because group goals are a source of motivation for members to actively participate in group activities. The objectives of the Tunas Wahir II farmer group are to accumulate capital, increase rice productivity, build cooperation between group members, and improve the skills and knowledge of farmer group members. The group members' assessment of the group structure is classified as complex with a score of 6 (100%). This is due to the existence of a communication relationship between group members and administrators in farmer groups in accordance with the position of each administrator and the role of these members. The reality in the field of the Tunas Wahir II farmer group is quite good,

Group members' assessment of group function is classified as appropriate, with a score of 11.4 (95%). This is because all activities carried out by the group to achieve common goals. The reality on the ground is that the Tunas Wahir II farmer group has carried out group functions well, this is indicated by the routine extension activities carried out by the group which are attended by its members, so that the group's function as a learning class goes well. Group members' assessment of developing and maintaining the group was classified as smooth with a score of 16.92 (94%). This is because the group always tries to develop and maintain the

group for the continuity of the group organization. The Tunas Walahir II farmer group always tries to develop and maintain the group well,

Group members' assessment of group unity is classified as compact with a score of 17.24 (95.77%). This is because cohesiveness is based on the amount of commitment (surrender) of its members which is influenced by the size of the group, group membership or group leadership. The reality on the ground, it turns out that the cohesiveness of group members is quite compact in all group activities, for example in rice planting activities they are always planted in unison. Group members' assessment of the group atmosphere was classified as conducive with a score of 11.48 (95.66%). This is because the atmosphere of the group is determined by the members of the group, its goals and the other members. The atmosphere of the Tunas Walahir II farmer group is quite harmonious, communication between members, or members and administrators is quite good.

Group members' assessment of group pressure/pressure was classified as high with a score of 6.8 (75.55%). This is because this group pressure serves both for adherence to group norms, and for uniformity in group activity. The reality on the ground is that the Tunas Wahir II farmer group adheres to group norms and uniformity in activities, for example group meetings are held regularly every month. Group members' assessment of group effectiveness is classified as effective with a score of 7.12 (79.11%). This is due to the success in carrying out their duties quickly and successfully and satisfactorily for each member in order to achieve group goals. The reality on the ground is that the Tunas Wahir II farmer group always carries out the group's tasks well,

Extension activities managed by farmers/FMA regarding the process of changing behavior, mindset and attitudes of farmers from traditional subsistence farmers to modern farmers with agribusiness insight through continuous learning are carried out using a learning-by-doing approach that focuses on developing managerial capacity, leadership and entrepreneurship of the main actors in order to create reliable agribusiness entrepreneurs (Ministry of Agriculture, 2019). Prior to the implementation of the FMA activities, participants were given material on identifying markets, analyzing village potential, and analyzing the selection of superior commodities as well as selecting and calculating the efficient and effective use of production facilities through the village rembugtani meeting process using the PRA (Participatory Rural Approach) method.

The farmer meeting was to develop a Village Extension Program which was then synchronized with an economic scale agribusiness learning plan, after which learning activities were determined which would be facilitated with FMA funds contained in the FMA learning proposal. The FMA learning activities that have been carried out by the Tunas Wahir II farmer group are the SRI method of rice cultivation techniques and the manufacture of organic fertilizers.

**Table 3. Results of Group Members' Assessment of the Success of the Agricultural Information and Technology Program**

| No    | FMA's Component        | Score |         | Percentage (%) | Category  |
|-------|------------------------|-------|---------|----------------|-----------|
|       |                        | Hope  | Reality |                |           |
| 1     | Committee's strengthen | 15    | 14      | 93.33          | Strong    |
| 2     | Management development | 15    | 13      | 86.67          | Good      |
| 3     | Effort development     | 15    | 8.64    | 57.60          | Developed |
| Total |                        | 45    | 35.64   | 79.20          | Success   |

Information:

- 1) less successful category with scores ranging from 15 – 25
- 2) category is quite successful if it gets a score ranging from 26-35
- 3) The category is successful if it gets a score ranging from 36 to 45

Based on the table, it is known that the assessment of group members on institutional strengthening is strong with a score of 14 (93.33%). This is because business institutional strengthening is carried out through the development of group organizational activities and the ability to cultivate capital. In strengthening farmer group institutions, group dues per month and per harvest season are quite smooth. This is evidenced by the existence of paddy fields owned by and on behalf of the Tunas Walahir II farmer group. Furthermore, the assessment of group members on management development was classified as good, with a score of 13 (86.67%). This is due to the occurrence of participation and active role of members which is enhanced through increased human resources such as training, internships, courses and others. In carrying out management development, all group members have the opportunity to receive training or courses in farming skills.

Table 3 shows the assessment of group members on business development, classified as developing, with a score of 8.64 (57.60%). This is because the type of business developed by the group is in line with the development of the area that has been determined in the group meeting. In terms of business development activities, the Tunas Wahir II farmer group is quite active in seeking business opportunities, even though the Tunas Wahir II farmer group has only cultivated one agricultural commodity, in order to strengthen the institution of the Tunas Wahir II farmer group they have also started a rice barn and saprotan stall business.

### **Correlation between Characteristics and Level of Success of Agricultural Information and Technology Programs**

In accordance with the hypothesis and framework that has been stated in the previous chapter, the following describes the close relationship between farmer characteristics including: age, education, arable land area and farming experience with the success of agricultural technology and information programs.

Based on the results of the calculation of Spearman's rank correlation coefficient, it appears that there is a significant relationship between the characteristics of farmers including: arable land area and farming experience with the success of agricultural information and technology programs. For more details, the relationship between farmer characteristics and the success of agricultural information and technology programs can be seen in Table 4 as follows.

**Table 4. The Relationship between Farmer Characteristics and the Success of Agricultural Information and Technology Programs**

| X variable         | Y variable  | rs    | category rs | tcount | t0.05 | Decision                       |
|--------------------|-------------|-------|-------------|--------|-------|--------------------------------|
| Farmer Age         |             | 0.137 | Very weak   | 0.663  | 2,069 | H0 is accepted, H1 is rejected |
| Arable Land Area   | Success FMA | 0.890 | Very strong | 9,338* | 2,069 | H0 is rejected, H1 is accepted |
| Farming Experience |             | 0.666 | Strong      | 4,283* | 2,069 | H0 is rejected, H1 is accepted |

Description: \* Significantly different

Based on the calculation results of the Spearman Rank Correlation statistical test, the value of  $r_s = 0.137$  is obtained, the coefficient value is included in the very weak category. This means that the relationship between the age of the respondent farmer and the success of the agricultural information and technology program is 0.137. From the results of the significance test,  $t_{count}$  is smaller than  $t_{0.05}$ , which is 0.663, which is less than 2.069 at the 5% significance level, meaning that there is no significant relationship between the age of the farmer and the success of the agricultural information and technology program. This indicates that regardless of the age of the respondent farmers it is still not related to the success of the agricultural information and technology program.

The results of this study are in accordance with research by Artika (2018), which states that variables related to farmer participation in agricultural project activity packages include education and social status but do not include age. Age is not related because farmers in several age levels can participate in FMA learning activities. This is understandable because by being fully involved in these activities they can expand their business and increase their income and welfare.

Judging from the calculation results of the Spearman Rank Correlation statistical test, the value of  $r_s = 0.890$  is obtained, the value of the correlation coefficient is included in the very strong category. This means that there is a relationship between the area of arable land and the success of agricultural information and technology programs of 0.890. From the results of the significance test, it was obtained that  $t_{count}$  was greater than  $t_{0.05}$ , namely 9.338, greater than 2.069 at the 5% significance level, meaning that there was a significant relationship between the area of arable land and the success of agricultural information and technology programs. This shows that the wider the farmer's arable land will be followed by the level of success of the agricultural information and technology program the better.

Farmers generally try to increase their yields by utilizing or doing things that can help increase agricultural yields. Therefore, farmers will try to find sources of information that can assist in efforts to increase agricultural yields, so that the wider the land they own, the more diligent the farmers will be because they will balance the expenses incurred for land management. This required information is usually provided in agricultural extension activities. In this case the size of the land area is positively related to the adoption rate of farmers. The wider the farming area, the faster the adoption, due to better economic capacity (Sarah, 2011).



Suganda (2021) said farmers with a narrow land holding area experienced many obstacles, when faced with the use of new technology. The narrow area of arable land will cause a small income for farmers so that to meet the need for food they usually cultivate their land with short-term goals and are more intensive, without paying attention to suitability with the ability of the land.

Based on the calculation results of the Spearman Rank Correlation statistical test, the value of  $r_s = 0.666$  is obtained, the value of the correlation coefficient is included in the strong category. This means that there is a real relationship between the experience of farming farmers with the success of agricultural information and technology programs of 0.666. From the results of the significance test, it was obtained that  $t_{count}$  was greater than  $t_{0.05}$ , namely 4.283, greater than 2.069 at the 5% significance level, meaning that there was a significant relationship between farmer farming experience and the success of agricultural information and technology programs. This shows that the longer the experience of farmers in farming will be followed by the level of success of agricultural information and technology programs the better. The experience of farming is closely related to attitudes and decisions that occur in farmers.

This is in line with Hadisapoetro (2012) that the experience of farming is closely related to attitudes and decisions that occur in farmers. Farming experience can also influence encouragement from within the farmer and factors outside the farmer's self to do something work in accepting a technology, such as rice farming technology. The longer the farming experience of a farmer, the higher the farmer's maturity in overcoming risks in managing his farming. Conversely, the lower the farming experience a farmer has, the lower the level of experience he has. In this case, a person's experience will contribute to his interest and hope to learn more in FMA learning activities (Makmur, 2011).

### **The Relationship between Group Dynamics and the Success of Agricultural Information and Technology Programs**

Based on the results of the calculation of the Spearman Rank Correlation statistical test, the value of  $r_s = 0.889$  was obtained, the value of the correlation coefficient was included in the very strong category. This means that there is a relationship between group dynamics and the success of agricultural information and technology programs of 0.889. For more details, the results of calculating the correlation coefficient between group dynamics and the success rate of agricultural information and technology programs can be seen in Table 5 as follows.

**Table 5. Group Dynamics Relationship with Success Agricultural Information and Technology Program**

| X variable     | Y variable  | rs    | category rs | tcount | t0.05 | Decision                       |
|----------------|---|-------|-------------|--------|-------|--------------------------------|
| Group dynamics | Success Agricultural Information and Technology Program | 0.889 | Very strong | 9,329* | 2,069 | H0 is rejected, H1 is accepted |

Description: \* Significantly different

Based on Table 5, it shows that the results of the significance test obtained tcount greater than  $t_{0.05}$ , namely 9.329 greater than 2.069 at the 5% significance level, meaning that there is a significant relationship between group dynamics and the success of agricultural information and technology programs. This shows that the better the dynamics of the group will be followed by the level of success of the agricultural information and technology program the better.

The level of group dynamics will indicate the level of development of the group itself. Farmer groups as production units require science/technology services, production facilities, capital/credit, easy and inexpensive processing and marketing of produce. It is in these farmer groups that there are many extension contacts in meeting various social, economic and technical cultivation needs, so that members of the farmer group give and receive each other and with the awareness that with cooperation a problem or job will be easier to face and implement.

Group effectiveness can only be achieved if the farmer group is dynamic, to what extent the group can understand its goals, or the basis of activity accompanied by the cohesiveness of its members so that after the goals are achieved satisfaction arises among the members. Group effectiveness has reciprocity with group dynamics, effective groups increase group dynamics and vice versa group dynamics increase group effectiveness (Rusidi, 2009).

The effectiveness of the group has reciprocity with the dynamics of the group, meaning that farmer groups have been able to empower their members so that they have independent strength, are able to implement innovation (technical, social and economic), are able to take advantage of the principle of economies of scale and are able to face business risks, so as to be able to obtain high levels of income and decent welfare, so that the dynamics of the group becomes better. Conversely, the more dynamic the farmer groups are in seeking business opportunities, the more effective the farmer groups will be in their farming activities.

## CONCLUSION

Based on the results of the research and discussion of the relationship between farmer characteristics and farmer group dynamics with the success of agricultural information and technology programs, it can be concluded that the dynamics of the Tunas Wahir II farmer groups are in the good category. The success of the agricultural information and technology program for the Tunas Wahir II farmer group was classified as successful. There is a significant relationship between farmer characteristics (arable area and farming experience) and the success of the agricultural information and technology program, while the age of the farmer and the education level of the farmer has no significant relationship with the success of the agricultural information and technology program. There is a clear relationship between the dynamics of farmer groups and the success of agricultural information and technology programs.

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