# Farmers Participation in Irrigation Management and Its Influence on Production and Productivity of Rice Farming

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**Abstract**: Utilization and management of irrigation, especially in the tertiary is the duty and responsibility of farmers involved and cooperate in farmer water user associations (P3A). This is confirmed in Article 1 No. PPRI. 20 of 2006 that, the utilization and management of tertiary irrigation network would be the part of farmers and requires an organization known as farmers' water user associations (P3A). Through such participation, farmer members of P3A may gain knowledge derived from the results of their interactions with fellow members of P3A or other parties related to irrigation activities and ultimately may affect the achievement of the production and productivity of rice farming optimal. This study intends to examine the extent to which members of P3A farmer participation in irrigation management affect the production and productivity of rice farming in each tertiary, Bila Kalola irrigation. Survey method in this study is intended to obtain the required data through questionnaires to 324 farmer members of P3A in 41 affiliated P3A, which influence the participation of farmers on production and productivity of rice farming are analyzed through simple regression analysis and analysis of Cobb-Douglas production function. The results showed that: the more active participation of farmers in irrigation management activities, the increasing of production and productivity achieved, although this hypothesis has not been fully proven in each tertiary on Bila Kalola irrigation.

**Keywords:** Participation of farmers; production; productivity

## 1. Introduction

Agricultural production by farmers is aimed to obtain the production (output) is optimal by using and combining various factors of production (inputs) are available. The desire of farmers to obtain optimal yield can be influenced by several factors, which by Soetriono, et al., (2006) classified by; consisting of bio-physical factors of climate, soil and water, and socioeconomic factors that comprise the internal factors of the condition of farmers as producers and external factors that support among other conditions; marketing, institutional, production technology and government policy.

By Adjid (1985), the factors that influence the optimization of production in the agricultural sector, described as a form of production constraints that often lead to the realization of the productivity gap for potential outcomes. If farmers are able to

manage the production constraints faced in farm production, the actual productivity achieved can be moved up closer to potential productivity. Physical environmental factors, largely a production constraints derived from nature, requires the intervention of the farmer as a farm manager to support socio-economic environmental factors, factors of production technology and characteristics of the individual farmer.

Based on the description proposed by Soetriono and Adjid, it appears that the key to achieving optimal production is the ability of farmers to manage a variety of factors that affect the production and overcome the various obstacles encountered, so that the actual productivity to the productivity potential can be achieved.

Discuss the importance of the availability of production factors and the role of farmers in farming activities, a guarantee for the availability of water resources is also important to note. The availability of water resources for use in farm production process provided for in article 41 of The Water's Rule No.7, 2004 that the raw water supply in the agricultural sector can be done through the development of irrigation. Irrigation infrastructure is facilitated by the government to regulate the natural water to meet the needs of farming, sustain agricultural production and secure environment which is often translated as a form of production technology.

Utilization and management of irrigation water which is then distributed in each tertiary irrigation network can not be done individually but in a group which formed as a place for farmers to cooperate with other farmers. Utilization and management of irrigation in groups defined by Soenarno (1998) that the distribution of water, especially in tertiary irrigation network is the authority of farmers who joined the farmer water user associations as the beneficiaries and irrigation management. The involvement of farmers in a group to utilize and manage the irrigation water, is also affirmed in article 1 No. PPRI. 20 of 2006 which states that the utilization and management of irrigation that would be the part of farmers, require an organization in a given region is known as the Farmer Water User Association (P3A).

Utilization and management of irrigation, followed by the formation of P3A as beneficiary organization and irrigation management, also conducted in one area of irrigation in South Sulawesi Province namely Bila-Kalola irrigation. This stretch of farm irrigation irrigate an area of 1,053 hectares, where the water flowed into each class through a network of tertiary irrigation utilized and managed by 70 P3A through participatory principles in the management of the organization's activities; construction, operation, and maintenance of irrigation farming production.

The purpose of the participatory principle here is to involve farmers P3A members in various activities of the organization, and according to Cohen and Uphoff (1980) is the participation of the community or farmer group members to be involved in the planning, implementation or organizing, directing and monitoring activities. As shown in Table 1, through the principle of participation, the highest productivity is achieved by farmer members of P3A in tertiary Tanasitolo (45.82) is not

**Table 1**. Area Harvested and Production of Rice Based on Plots Tertiary, in Bila Kalola Irrigation, 2006

| No. | Tertiary Plots | Harvested Area (ha) | Productions (tons) | Productivity (quintal/ha) |
|---|---|---|---|---|
| 1 | Belawa | 230 | 1.027 | 44,65 |
| 2 | Maniangpajo | 105 | 475 | 45,21 |
| 3 | Tanasitolo | 372 | 1.704 | 45,82 |
| 4 | Duapitue | 103 | 459 | 44,52 |
| 5 | Pituriase | 246 | 1.087 | 44,20 |
| | Total | 1.053 | 4.752 | - |

Sources: Technical Data-Bila Kalola Irrigation, Wajo, 2007.

much different from the productivity in the tertiary Maniangpajo (45.21), while the productivity achieved in tertiary Belawa, Duapitue and Pituriase approximately equivalent.

The difference in the productivity of irrigated rice fields, according Pasandaran (1991) is not only determined from the large-small managed lands but also depend on the role of farmers to participate in group activities, especially in the use and management of irrigation. Based on the phenomenon that occurs in Bila Kalola irrigation, farmer participation in various activities of the organization does need to be made to promote improved even considering one of the many causes of the irrigation network built by the government often does not meet the needs and desires of farmers.

The problem of this study are: the extent to which the participation of farmers in the management of the organization P3A affect irrigation performance demonstrated by the level of productivity achieved in tertiary and irrigation groups. While the purpose of this study was to analyze the influence of peasant participation in the organization of P3A management on the performance of irrigation indicated by the level of productivity achieved in tertiary and irrigation groups.

Furthermore, the results of this study, is expected to be useful for some parties, namely; 1) for the development of science, particularly the economics of production, farming science and farm management; 2) for farmers, by obtaining information about the importance of cooperation and participation in the group or their participation in the management of organizations in a variety of activities in order to provide irrigation performance changes in the level of productivity achieved; 3) for the government, to create, establish or revise regulations and laws related to the empowerment of farmers and 4) for other researchers, in addition to researching information on topics related to farmers' participation in the activities of the organization and its influence on production and productivity of rice farming.

## 2. Rationale Framework

### *2.1 Utilization of Water Resources Irrigation*

Available water resources naturally, in its utilization requires human intervention to fulfill their daily needs both for the household sector, the industrial sector as

well as for the needs of production in the agricultural sector. In the agricultural sector, in addition to production activities required the availability of factors of production required the availability of water resources that can be done through the provision of irrigation facilities. Ellis (1992) explains that the provision of irrigation, related to the supply and demand of water as one of the variables in farm production.

According to Kurnia (1995) there are four main components that can be used as a measuring tool to see the reliability or performance of irrigation technology, namely: Being able to increase production or productivity. The size can be used, among others, the production (yield), the planting area and cropping intensity; Steadiness of water distribution system by increasing the size of the reliability and predictability in the amount and timing of administration; The creation of water sharing in a fair and equitable so as to eliminate conflicts between farmers or between farmers and the government; Ensuring sustainable development with measures of physical and technological quality (which also involves aspects of costs) and environmental preservation.

Utilization and management of irrigation in the agricultural sector for the purpose of increasing production, can be done through intensification, diversification and improvement of cooperation of farmers. At the time the water needs in the agricultural sector is increasing, especially during the dry season water use by all farmers should be organized and managed in such a way through distribution to each tertiary.

Schrevel (1998) explains that the water distribution is a problem that is much more difficult to solve than the problem of construction of irrigation. One reason is that the water distribution involves many parties and competing interests collide. The same thing also expressed by Helmi and Ambler (1991) that the distribution of water is a matter that relates to the utilization and management of river water by a number of irrigation networks and how to build a view of the network and establish coordination among farmer groups among irrigation water users.

The importance of cooperation of farmers in the use and management of irrigation has been mentioned in article 1 No. PPRI. 20, 2006 which states that the utilization and management of irrigation that would be the part of farmers, require an organization that becomes a container for water user farmers in a region called the farmer water user associations and abbreviated P3A.

The existence of water user organizations farmer associations (P3A) formally with the organizational structure, AD/ART, mandatory dues for members and regular meetings are conducted, not a guarantee that their duties and responsibilities as the main irrigation management in tertiary network can run well . Pasandaran (1991) says that, P3A often can not carry out their duties and responsibilities as irrigation management because of government policies that are less flexible in which the target is the preferred formation of P3A as much as possible in an irrigated area without considering the needs and abilities of the farmers themselves.

Meanwhile, according to Siskel and Hutapea (1995) to carry out their duties and responsibilities as irrigation management, especially in tertiary irrigation, farmers P3A members need to consider some of the following;

a. On the construction and development of irrigation, farmers should be involved and members of P3A told why built irrigation networks in the region at the same place or be invited to prepare a variety of issues related to the use of irrigation later.
b. The form of participation or the participation of farmers are members of P3A participate and contribute more actively to provide and contribute labor, thought, even when their funds in various irrigation management activities.
c. The role of the farmer members of P3A should not on coercion but on the basis of self-awareness is growing in the farmer.
d. Give freedom to farmers to determine the activity which they think are profitable so that their participation can be maximal.

Thus, measuring the success of P3A achieve organizational goals is not enough just to see how big the production generated by each farmer members of P3A, but how the increased production due to farmer participation and cooperation in the organization of P3A.

Farmers' participation in organizational management P3A is basically their efforts to interact with other farmers and also to contribute labor, even thought the budget that can be produced right decisions related to the use and management of irrigation in farming activities. Expectations of farmers, through the participation they can arrange or manage performance in providing and distributing irrigation water for use in farm production process. Of 4 benchmarks proposed by Kurnia (1995) to look at the reliability or performance of irrigation technology, the most easily measured is how much production (yield) is achieved by the planting area (productivity).

The production function is used to determine the relationship of the products produced by the factors of production in the production process. According Mubyarto (1987) production function is a function that shows the relationship between the physical production (output) with the factors of production (inputs). There are three important mathematical form and is often used in the production function analysis, namely polinominal quadratic, square root and polinominal Cobb-Douglas function. However, the use of the production function to analyze agricultural products more frequently used Cobb-Douglas function.

### *2.2 Rationale Framework*

Irrigation can function optimally to provide and regulate water to support agricultural production activities when water resources are available throughout the season. In the rainy season the availability of water for use in the production process can be maintained, but during the dry season when water supply is limited, the effort required to manage and split water into tertiary channels in turns through the utilization of irrigation

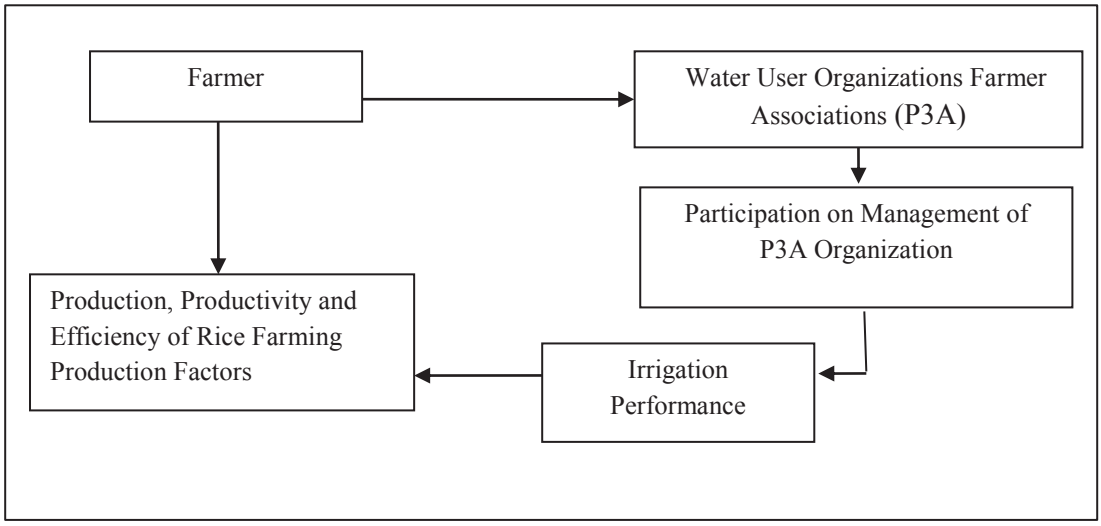


**Figure 1**. Rationale Framework

infrastructure. When production decisions made by individual farmers and not based on knowledge as a result of the collaboration, communication and interaction with other farmers in a cluster, can be assured that the production achieved better not even no longer compatible with the organization's goals set earlier. In a schematic frame of mind described can be seen in Figure 1.

## 3. Materials and Methods

### *3.1 Object of Research*

The object of research is irrigated When Kalola (BK) located in South of Sulawesi which serves to convey and distribute water sourced from dams Kalola and Bila to tertiary irrigation network consisting of five tertiary namely; Belawa, Maniangpajo, Tanasitolo, Duapitue and Pituriase. Irrigation water applied to the tertiary network is utilized and managed by farmers who join the 70 farmer water user associations (P3A) in rice farming activities.

### *3.2 Analysis Method*

The method used in this study is a survey method which is a method that takes a sample of the population using a questionnaire as the main data collection tool (Singarimbun, 1995). Research using the survey method aims to examine and test the theory empirically the existence of the relationship variables are formulated

The study population was 70 farmer water user associations (P3A) the number of members of a group of farmers at 2,906 people who had been utilizing and managing water for use in irrigation BK rice farming activities. Through the technique of determining the size of the sample, obtained 41 P3A sample size and sample size of 324 farmers are members of P3A then the magnitude of n (sample at each tertiary) is calculated based on the proportional allocation results can be seen in Table 2 with the formula;

$$n_i = \frac{N_i}{N} \text{ x } n$$

where :

$n_i$ = sample size in each sub-group
$N_i$ = population in each sub-group
N = total population
n = sample size

**Table 2.** Population and Sample Farmers Water User Association (P3A) and Farmers Members in Bila Kalola Irrigations.

| No. | Tertiary Plots | Population | | Samples | |
|---|---|---|---|---|---|
| | | P3A | Farmer | P3A | Farmer |
| 1 | Belawa | 14 | 581 | 8 | 65 |
| 2 | Maniangpajo | 19 | 789 | 11 | 88 |
| 3 | Tanasitolo | 15 | 623 | 9 | 69 |
| 4 | Duapitua | 10 | 415 | 6 | 46 |
| 5 | Pituriase | 12 | 498 | 7 | 56 |
| | Total | 70 | 2.906 | 41 | 324 |

Sources: Technical Data-Bila Kalola Irrigation, Wajo, 2009

*3.4. Data Collection and Analysis Procedures*

The linkage between the dependent variable and the independent variables were tested using simple regression analysis in which the independent variable (X) is the participation of farmers and the dependent variable (Y) is a measure of the performance of irrigation productivity rate (quintal ha). Therefore, the participation of farmers in each stage of activity is a measure of the attitude of the dimensions must be measured through indicators that make up the construct. According to Al-Rasyid (1994) no other measurement is a process of quantification in the form of numbers in an effort to include material that is not a number system to express the properties owned by the material in accordance with regulations based on those traits.

The measurement results farmer participation in the management of the organization which is the ordinal scale data, requires a transformation in order to scale into an interval scale by the method of successive intervals. Method of successive intervals is an attitude measurement scale transformation method to raise the level of ordinal measurements to interval (Sudradjad, 2002). Meanwhile, routine activity in organizations P3A as described in the operationalization of variables compiled for the information of the management organization in each grouped by stage of P3A management including planning, organizing, directing and monitoring the activities of construction, operation, maintenance and production of rice farming.

Simple regression analysis is used to see the extent of farmer participation (PP) as the independent variables affect the performance of irrigation (KI) is indicated by the level of productivity achieved as the dependent variable performed well between tertiary and between groups with the following formulation:

$$KI = a\, PP^{b}.\ e^{u}$$

where :

KI = irrigation performance
PP = farmer participation
a, b = estimated parameters (elasticity)
e = logaritma natural
u = error term (*disturbance term*)

Sign parameters expected: a, b > 0; *ceteris paribus.*

## 4. Results and Discussion

### *4.1 Irrigation Water Utilization in Rice Farming Production*

Bila Kalola Irrigation (BK) officially used since 1995 that irrigates five tertiary with total land area of 1,053 ha. Five of the tertiary namely; Tanasitolo tertiary and Pituriase located on the west, and Maniangpajo tertiary Duapitue located in the east and tertiary Belawa located in the southern area of irrigation BK. The increase of production is due to the increase of frequency the original planting which only once a year, but has now increased to two times a year. At the tertiary Belawa, Maniangpajo and Tanasitolo farmers use irrigation water availability to undertake intensive rice growing season twice. First growing season I) begins in April and ends in September and then continued for the second growing season (II) from October to March.

Rice farming activities, both at the first planting season and the second growing season generally consists of several phases of activities were carried out for approximately six months. At this early stage in the first month of the drainage water carried to each class at each irrigation tertiary and continued with the process of saturation for approximately four weeks. Drainage water to each plot turn or tertiary done continuously based on a comparison of actual discharge and channel capacity. If water is available, the first growing season (I) water jetting is done continuously and when the water supply is limited in the second growing season (II) water distribution is done in rotation.

If water has been divided evenly at each tertiary, in the first week of the next month planting and in the second week of the water is controlled by the setting of technical personnel who are in each organization P3A. After planting the fertilization activities carried out in the second to fourth months while controlling the use of water. The process of eradication of pests and diseases of plants is done in the second to fourth months are dependent on the level of insect pests. The fifth month of the water jetting process is stopped and the closure door while waiting for the harvest water which is generally carried out in the sixth.

### *4.2 Participation Farmer Water User Association (P3A) in Water Distribution Through Classification of Irrigation*

Farmer Water User Society (P3A) scattered five tertiary irrigation area, from 1996 to 1998 gradually began to be formed, defined by the location of a stretch of farm managed by each farmer. P3A group responsible for the use and management of irrigation BK, not from the new group, but the group that formed long before irrigation BK constructed and assigned the responsibility to utilize and manage irrigation to support their farming activities.

The water distribution network of tertiary irrigation BK, conducted by four groups in which the distribution of irrigation water based on the location and distance of each stretch of farming with the door making (intake) water in the tertiary network and an effective amount of rainfall each year. First classification in which a stretch of farm land or run is very close to the door making (intake) water tertiary network, otherwise the fourth classification or expanse of land where

farming is farthest away run with the doors making (intake) water tertiary network.

Through the participation of farmers in the management of the organization, according to Suratiyah (2009), farmers had the opportunity to define and realize their ideas or thoughts based on characteristics inherent in them. In addition to be able to establish communication intensive contacts with other farmers as members of P3A organization and also with the board's decision regarding the best organization in the utilization of irrigation water and the use of factors of production farm. The level of participation of farmers who generally are above 75 percent in each stage of the organization's management showed that the majority of farmers in each member P3A and tertiary irrigation groups have realized that their participation to contribute energy, ideas or thoughts on the matter even construction planning activities, operations, network maintenance and can have an impact on farm production resulting action plan in accordance with what they need for optimum desired results can be achieved.

**Table 3.** Number of P3A and Farmers Group Members Based on Classification of Irrigation

| No. | Irrigation Plots | P3A | Farmer |
|---|---|---|---|
| 1 | I | 11 | 87 |
| 2 | II | 12 | 97 |
| 3 | III | 10 | 78 |
| 4 | IV | 8 | 62 |
| | Jumlah | 41 | 324 |

Sources: Technical Data-Bila Kalola Irrigation, Wajo, 2009.

**Tabel 4**. Member Farmer Rate of Participation in Each Phase P3A Organizational Management Activity (%)

| No. | Location | Rate of Participation | | | | |
|---|---|---|---|---|---|---|
| | | Planning | Organizing | Directing | Monitoring | Total |
| 1 | Belawa | 76,5 | 78,0 | 75,4 | 71,8 | 301,7 |
| 2 | Maniangpajo | 78,1 | 78,8 | 74,6 | 75,0 | 306,5 |
| 3 | Tanasitolo | 77,9 | 76,9 | 75,9 | 76,4 | 307,1 |
| 4 | Duapitue | 77,7 | 83,9 | 74,5 | 73,8 | 309,9 |
| 5 | Pituriase | 78,6 | 83,3 | 75,0 | 76,2 | 313,1 |
| 6 | Golongan I | 82,1 | 80,6 | 75,4 | 72,8 | 310,9 |
| 7 | Golongan II | 78,7 | 80,2 | 73,9 | 74,6 | 307,4 |
| 8 | Golongan III | 77,4 | 80,6 | 76,1 | 76,2 | 310,3 |
| 9 | Golongan IV | 83,3 | 80,5 | 74,7 | 76,5 | 315,0 |

Sources: Primary Data, Processed, 2009.

**Table 5.** Productivity Peasant Rice Farming Members P3A (on average)

| No. | Location | Production (ku) | Land Area (ha) | Productivity (ku/ha) |
|---|---|---|---|---|
| 1 | Belawa | 61,28 | 1,36 | 46,25 |
| 2 | Maniangpajo | 69,17 | 1,46 | 47,17 |
| 3 | Tanasitolo | 70,22 | 1,47 | 47,42 |
| 4 | Duapitue | 69,38 | 1,56 | 45,56 |
| 5 | Pituriase | 69,74 | 1,53 | 44,94 |
| 6 | Golongan I | 70,98 | 1,57 | 45,92 |
| 7 | Golongan II | 66,81 | 1,45 | 46,31 |
| 8 | Golongan III | 61,65 | 1,33 | 46,55 |
| 9 | Golongan IV | 73,35 | 1,54 | 47,15 |

Sources: Primary Data, Processed, 2009.

*4.3. Effect of Farmer Participation in Organizational Management P3A Against Irrigation Performance*

How big is the performance of farmer-managed irrigation in generating maximum production, according Reijntjes *et al.* (1992) can be calculated from the achieved productivity per unit of land, labor, capital, even when other inputs (eg, cash, energy, water and nutrients). However, productivity is generally calculated from the amount of output achieved per unit of cultivated land, where productivity achieved by the farmer members of P3A and be sized to see how much the ability to provide water in irrigation farming activities can further be seen in Table 5.

Farmer productivity achieved P3A members as shown in Table 5 highest tertiary Tanasitolo (47.42) and the lowest tertiary Pituriase (44.94) and the productivity achieved the highest P3A member farmers in the irrigation group IV (47.15) and lowest in the irrigation group I (45.92).

Based on the results of the regression analysis, the value of the coefficient of determination ($R^2$) in tertiary Duapitue (0.825) is higher than the value of the coefficient of determination ($R^2$) in tertiary Belawa (0.583), tertiary Pituriase (0.553), tertiary Maniangpajo (0.501) and tertiary Tanasitolo (.422). This value indicates that the variation in the performance of tertiary irrigation Duapitue, Belawa, Pituriase, Maniangpajo and Tanasitolo can be explained by variations in farmers' participation in the management of their respective organizations at 82.50 percent; 58.30 percent; 55.30 percent; 50.10 percent and 42.40 percent, while the rest is explained by variations in other variables not included in the model.

Estimated value of the parameter (b) the participation of farmers can be interpreted as the average change in performance when the participation of farmers' irrigation increased 1 percent. Any increase farmer participation by 1 percent, then the performance of irrigation has experienced an increase in tertiary Belawa of 0.763 percent, tertiary Maniangpajo of 0.708 percent, tertiary Tanasitolo of 0.650 percent, tertiary Duapitue

**Tabel 6**. Regression Coefficients of Effect Farmer Participation in Management P3A Organisation Against Irrigation Performance

| Location | Intercept ($b_0$) | Sig. | The Estimated Parameters ($b_1$) | Sig. | $R^2$ | F count | Sig. |
|---|---|---|---|---|---|---|---|
| PT.Belawa | 3944,201 | 0,000 | 0,763 (9,377) | 0,000* | 0,583 | 87,933 | 0,000 |
| PT.Maniangpajo | 3900,832 | 0,000 | 0,708 (9,294) | 0,000* | 0,501 | 86,380 | 0,000 |
| PT.Tanasitolo | 4777,204 | 0,000 | 0,650 (7,001) | 0,000* | 0,422 | 49,009 | 0,000 |
| PT.Duapitue | 4498,212 | 0,000 | 0,908 (14,411) | 0,000* | 0,825 | 207,667 | 0,000 |
| PT.Pituriase | 4135,374 | 0,000 | 0,744 (8,175) | 0,000* | 0,553 | 66,823 | 0,000 |
| Golongan I | 4985,889 | 0,000 | 0,618 (7,211) | 0,000* | 0,382 | 52,005 | 0,000 |
| Golongan II | 4175,684 | 0,000 | 0,738 (10.705 | 0,000* | 0,544 | 114,594 | 0,000 |
| Golongan III | 4491,857 | 0,000 | 0,591 (6,381) | 0,000* | 0,349 | 40,720 | 0,000 |
| Golongan IV | 4245,157 | 0,000 | 0,641 (6,462) | 0,000* | 0,410 | 41,758 | 0,000 |

Description:
* = significant at α <1%
( ) = t count

of 0.908 percent and tertiary Pituriase of 0.744 percent.

Meanwhile, the coefficient of determination ($R^2$) in the class of Irrigation II (0,544) is higher than the value of the coefficient of determination ($R^2$) in the class of irrigation IV (0.410), in the class of irrigation I (0.384) and group irrigation III (0,349). This value indicates that the variation in the performance of irrigation in the irrigation group II, IV, I and III can be explained by variations in the participation of farmers amounted to 54.40 percent; 41.00 percent; 38.40 percent and 34.90 percent, while the rest is explained by variations in other variables not included in the model.

Based on the model of equation (III.1) the estimated value of the parameter (b) the participation of farmers can be interpreted as the average change in the performance of irrigation when the participation of farmers increased 1 percent. Each 1 percent increase in the participation of the farmers' irrigation performance also increased in the irrigation group I 0.618 percent, 0.738 percent class II irrigation, irrigation in group III at 0.591 percent and 0.641 percent class IV irrigation.

## 5. Conclusion

P3A members of farmer participation in management activities of the organization in each phase proved to be able to realize better performance in each irrigation and tertiary irrigation group. When farmers P3A members actively participate in the various activities of the organization, the management of irrigation can be done better that then affect the performance of irrigation and indicated by higher farm productivity. Based on a simple regression analysis, the influence of farmer participation on the performance of

irrigation showed a positive and significant at level α <1 percent of the estimated value of the parameter (b) is different in each class tertiary and irrigation. Therefore, irrigation management is affected by participation or the participation of farmers in the various activities of members of P3A management of the organization, on the future of tertiary irrigation network should be expanded in order to irrigate the rice fields other so that all farmers who are scattered around the area irrigated BK has a chance together to join the organization P3A. Strengthening the organization P3A as irrigation management organization is essential to do given the significant role not only as beneficiaries and irrigation management but as an economic entity in the farm community that has the potential to encourage farmers to increase production, productivity and income of farmers in the region irrigation.

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