Water user famers association (P3A) and their participation in managing Bantimurung irrigation system

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Abstract. Agricultural sector plays a very important and strategic part in national development, which one of them is to achieve food security. Farmer's need for irrigation water keeps growing, along with inclining demand on qualified agricultural products. Participation of water user farmers association (P3A) member in managing irrigation tertiary network will help boosting amount of produces product. This study aims to analyze the level of participation of P3A members in managing the Bantimurung irrigation system in Maros Regency. The result shows that: level of farmer's participation in managing irrigation system at P3A Karya Bersama (upstream), P3A Samaturu (middle stream), and P3A Sare Te'ne (downstream) categorized as moderate.

1. Introduction

Known for the agriculture-based country, the development of the agricultural sector in Indonesia plays an important role due to the nation's food serving and job-creating, supporting entrepreneurial chance, and also involve in nation's foreign exchange. Regarding the important role that it claims to be, is expected to also involved in sustainable economic development [1]. To achieve that, regulation in developing agriculture sector shall focus on infrastructural serving, which consists of facilitated transportation, access to information, irrigation and others. One of the supporting infrastructures that can boost the agricultural sector's involvement in economic development is to build an irrigation system. Irrigation system aims to: 1) increase food produces especially rice, 2) increase the efficiency and effectivity on using irrigation water, 3) increase planting intensity, 4) increase and empower people in the village to create an irrigation system in their place [2].

This aligns with Government Regulation Number 20 of 2006, Article 2 paragraph 1 about irrigation, stated that irrigation functioned to support farm business productivity due to increase the agricultural production in nation's food security framework and people's welfare, especially farmers which created by a sustainable irrigation system. Hence, developing and maintaining an irrigation system aims to actualize water use in the agricultural sector.

Irrigation is an effort to bring in water by making buildings and channels to irrigate the area of food crops. To preserve food self-sufficiency, irrigation development needs to be continued while continuing to improve the quality of existing networks. Implementing irrigation development is not easy because many problems are faced and need to be solved first because the construction of irrigation not only requires a lot of cost but also time that is not small [1].

An important issue or issue related to irrigation in Indonesia is the lack of participation and contribution of farmers and water users in the operation and management of irrigation channels. Previously, the government took too dominant a role in irrigation development and management. Irrigation was considered as a public service that must be provided by the government. This approach causes farmers and water users to be only positioned as users and uses. In part, the contribution and role of farmers and water users is very limited [3].

The establishment of P3A is expected to improve irrigation management which will increase agricultural production. However, in carrying out these functions can not be fully implemented properly. One of them is the conflict in the distribution of irrigation water to farmers' rice fields [4]. The lack of participation of water users in decision making, management and management of irrigation channels is the main reason for the low level of water efficiency in developing countries. Maros Regency is one of the rice storage areas in South Sulawesi Province.

Each year, this area becomes one of the rice producers for the region in its area, including Makassar. The area of irrigation in Maros Regency that has been built reaches 20,222 Ha, spread over 55 irrigation areas in Maros Regency, with the widest area in the Bantimurung irrigation area of 6,513 Ha. The Bantimurung watershed which is one of the irrigation development areas in Maros Regency has an irrigation channel consisting of terminal (main), secondary and tertiary channels. The source of water comes from nature, namely from the Bantimurung River. Most of these areas are not drained during the dry season, as well as during the rainy season due to insufficient water supply, and the unstable flow of river water. So for the sake of sustainable irrigation channels and performance it is very important the experience of the activities is determined by the involvement and participation of the beneficiaries [5].

2. Methodology

The study was conducted in the Bantimurung Irrigation Area, Mattoanging Village, Bantimurung District, Maros Regency, South Sulawesi Province. Determination of the location of the research carried out deliberately (purposive sampling) where P3A is determined namely P3A (Upstream), P3A Samaturu (Central) and P3A Sare Te'ne (Downstream) on the basis of the consideration that the area is a fairly large irrigation area and the majority the population works in the agricultural sector, and in that area quite a lot of Water User Farmers Association (P3A) has been formed, besides it is also supported by easy access to locations. This research was conducted from May to June 2018.

Data collected in this study are primary data and secondary data. While data collection techniques are carried out through; interviews, questionnaires and documentation. Furthermore, the population in this study were P3A members in the Bantimurung Irrigation Area located in Mattoanging Village with 364 people divided in P3A Karya Bersama (Upstream) of 140 people, P3A Samaturu (Middle stream) by 102 people and P3A Sare Te'ne (Downstream)) as many as 122 people. The determination of the sample in this study was carried out using the Proportional Random Sampling technique. In determining sample members, this study takes representatives from each group in the population that is adjusted to the number of members of each group [6]. The sampling method used in this study refers to the opinion of Arikunto (2010) which states that if the study population numbered more than 100 then the sample can be taken between 10-15% or 20-25% or more and can be seen in table 1 [7].

Table 1. Research sample proportion

Name of P3A	Ni	N	n	$ni = \frac{N}{Ni}\ x\ n$
P3A Karya Bersama	364	140	36	14
P3A Samaturu	364	102	36	10

P3A Sare Te'ne	364	122	36	12
Total	**364**			**36**

Source: Processed primary data, 2018.

Data analysis was performed qualitatively using descriptive analysis methods. This descriptive analysis was used to answer the research objective of identifying the level of participation of members of the Water User Farmers Association (P3A) in the management of irrigation channels. Analysis to identify the level of participation of members of the Water User Farmers Association (P3A) in the management of irrigation canals is measured by giving a score on the question item which states the level of participation of farmers in the management of irrigation channels, where the scoring uses a likert scale. According to Hadi Sutrisno (1991) [8], a likert scale is a scale containing five levels of answers regarding the respondent's agreement to the statement made through the options provided, namely:

- Score of 5: For a respondent whom very highly participate in
- Score of 4: For a respondent whom highly participate in
- Score of 3: For a respondent whom moderately participate in
- Score of 2: For a respondent whom less participate in
- Score of 1: For a respondent whom very least participate in

To determine the high or low of participation level, for each stage (planning, implementing, evaluating, and result utilization) in managing the irrigation system then the formula is:

$$I = \frac{dmax - dmin}{n} \quad (1)$$

Information :
dMax : maximum score
dMin : minimum score
n : amount of category

$$I = \frac{dmax - dmin}{n} = \frac{25-5}{3} = \frac{20}{3} = 6.67$$

- Considered low, if the score is < I + dMin
  = 6.67 + 5
  = 11.67
- Considered moderate, if the score is
  I + dMin < score < dMax - I
  = 6.67 + 5 < score < 25 - 6.67
  = 11.67 < score < 18.33
- Considdered high, if the score is
  > dMax - I
  = 25 - 6.67
  = 18.33

Based on the formula, each category has their own value to be refer on scoring the participation level in managing irrigation system, which is:
Low : score < 11.67

Moderate : 11.67 < score < 18.33
High : score > 18.33

In this study, the average score used to calculate the total score of respondents, the score can be used to draw conclusions about the level of participation of P3A members in agricultural management with low, medium and high criteria.

3. Results and Discussion

3.1. P3A Karya Bersama

P3A Karya Bersama is one of the P3A organizations located in Mattoanging Village, Bantimurung District, Maros Regency, South Sulawesi. The P3A Karya Bersama organization is one of the Water User Farmers' Association (P3A) groups located in Hulu. The value of the questionnaire results of respondents in the P3A Karya Bersama on the level of participation in the planning, implementation, evaluation and utilization of results in the management of irrigation channels can be seen in the following table:

Table 2. Level of P3A Karya Bersama member participation in managing irrigation system at Mattoanging Village, Bantimurung Sub-District, Maros Regency, 2018.

Activity	Range Score	Score	Participation level
Planning	5 – 25	16.42	Moderate
Implementing	5 – 25	17.85	Moderate
Evaluating	5 – 25	16.07	Moderate
Result utilization	5 – 25	18.92	High

Soure: Processed primary data, 2018.

Table 2 shows that at the planning stage the average level of participation of P3A Karya Bersama farmers is in the medium category (16.42) which means that farmers have enough awareness of themselves to be involved in planning activities in irrigation channel management which will have an impact on the desired outcome achieved, although the presence of farmers has not been maximized because these farmers have activities in other places at the same time as irrigation canal management activities. Whereas farmers who show high participation mean that they have realized that their involvement in the planning stage will have an impact on achieving the desired results so that they are maximizing attendance to participate in activities by attending meetings and also giving opinions or input in preparing activity plans.

At the implementation stage, the average level of participation of P3A Karya Bersama farmers is in the medium category (17.85) which shows that the farmers are actively involved and ready to accept and carry out all activities that have been planned before in accordance with established procedures. Whereas farmers who show a high level of participation in the implementation stage of irrigation canal management are based on their own awareness and a high sense of solidarity and form of responsibility towards the goals to be achieved together.

At the evaluation stage, the average level of participation of P3A Karya Bersama farmers was in the medium category (16.07). It is known that 1 person out of a total of 14 respondent farmers has a high level of participation who is the leader of the P3A group who is aware of their roles and responsibilities as a leader to be a role model for their members and 13 out of a total of 14 respondent farmers have a moderate level of participation which indicates that most Farmers are already quite involved in the evaluation of irrigation channel management activities, although not yet maximally, because farmers assume that the review activities of the implementation of irrigation channel management are not part of their duties and are submitted to the head of the P3A group.

At the yield utilization stage, the average level of participation of P3A Karya Bersama farmers is in the high category (18.92) which shows that farmers agree that the irrigation canal management

activities have a better impact than before where the utilization of the results of the irrigation canal management activities including delivery of irrigation water to farmland fairly and equitably, delivery of irrigation water to farmland in the right amount and time, productivity increases and irrigation management programs do not harm farmers financially and irrigation management programs have been carried out transparently and accountably.

3.2. P3A Samaturu

P3A Samaturu is a P3A organization located in Mattoanging Village, Bantimurung District, Maros Regency, South Sulawesi. The Samaturu P3A organization is one of the Water User Farmers' Association (P3A) groups located in the Middle.

The value of the questionnaire results of the respondent farmers in P3A Samaturu on the level of participation at the planning, implementation, evaluation and utilization of results in the management of irrigation canals can be seen in the following table:

Table 3. Level of P3A Samaturu member participation in managing irrigation system at Mattoanging Village, Bantimurung Sub-District, Maros Regency, 2018.

Activity	Range Score	Score	Participation level
Planning	5 – 25	16.10	Moderate
Implementing	5 – 25	16.80	Moderate
Evaluating	5 – 25	14.20	Moderate
Result utilization	5 – 25	18.90	High

Soure: Processed primary data, 2018.

Table 3 shows that at the planning stage the average level of participation of P3A Samaturu farmers was in the medium category (16.10). It is known that 1 person out of a total of 10 respondent farmers has a high level of participation who is the head of the Samaturu P3A group who is aware of their obligations and roles and responsibilities as a leader who is a role model to their members and 9 out of 10 respondents have a moderate level of participation. means that the farmers already have enough awareness to be involved in planning activities in irrigation channel management that will have an impact on the results to be achieved by attending the meeting and also contributing energy and thoughts in preparing the activity plan, even though their presence is not optimal due to several reasons so it does not can participate, among others, disrupted health conditions and activities in other places at the same time as the irrigation channel management activities.

At the implementation stage, the average level of participation of P3A Samaturu farmers was in the moderate category (16.80) which showed that the farmers had started to be quite actively involved and were ready to accept and carry out all activities that had been planned before in accordance with established procedures, although not yet done to the maximum. Whereas farmers who show a high level of participation in the implementation stage of irrigation channel management are based on their own awareness and sense of responsibility considering the activity through the procedure at the previous planning stage, therefore farmers feel that their participation should also be contributed at the implementation stage so that the goals to be achieved previously can be realized.

At the evaluation stage, the average level of participation of P3A Samaturu farmers was in the medium category (14.20). It is known that 1 farmer who has high participation is the head of P3A who is always active in activities to review the extent of the development of irrigation canal management activities at the implementation stage that has been carried out and some farmers who are participating have several reasons for not being able to participate, one of them being the agenda of activities at the same time as the activities of irrigation channel management and farmers with low participation do not yet have the awareness to be involved in the evaluation stage of irrigation channel management and assume that involvement in planning and implementation activities is sufficient to represent their participation in irrigation channel management activities.

In terms of yield utilization, the average level of participation of P3A Samaturu farmers is in the high category (18.90) which indicates that farmers agree on the benefits generated from irrigation channel management activities. Farmers feel the good impact of irrigation channel management including the delivery of water to farmland that is fair and equitable, productivity increases after irrigation canal management activities are carried out, financially farmers agree not to suffer losses in irrigation management because the clarity of the funds used has been done transparently and accountably, so that farmers are free to obtain information about irrigation channel management activities.

3.3. P3A Sare Te'ne

P3A Sare Te'ne is one of the P3A organizations located in Mattoanging Village, Bantimurung District, Maros Regency, South Sulawesi. The Sare Te'ne P3A organization is one of the Water User Farmers' Association (P3A) groups located in the Lower Hilir.

The value of the questionnaire results of respondents in the P3A Sare Te'ne respondent to the level of participation in the planning, implementation, evaluation and utilization of results in the management of irrigation channels can be seen in the following table:

Table 4. Level of P3A Sara Te'ne member participation in managing irrigation system at Mattoanging Village, Bantimurung Sub-District, Maros Regency, 2018.

Activity	Range Score	Score	Participation level
Planning	5 – 25	9.16	Moderate
Implementing	5 – 25	13.25	Moderate
Evaluating	5 – 25	9.33	Moderate
Result utilization	5 – 25	18.41	High

Soure: Processed primary data, 2018.

Table 3 shows that at the planning stage the average participation level of P3A members of Sare Te'ne was in the low category (9.16). 1 person out of a total of 12 farmers who have high participation is the P3A chairman who is always active in activities because he is aware of his role and responsibility as the chairman and some farmers who have participation are having several reasons for not being able to participate, one of them being the agenda of activities at the same time , as well as farmers with low participation have given full trust and handed over to the head of P3A, members will accept all the decisions that have been set by the chairman and think that is the best.

At the implementation stage, the average level of participation of P3A members Sare Te'ne is in the medium category (13.25) which means that farmers are ready to accept and carry out all activities that have been planned in accordance with procedures set by the head of P3A. The involvement of farmers in the implementation stage of irrigation canal management is based on the form of responsibility to the P3A chair who has prepared prior plans for the objectives to be achieved.

At the evaluation stage, the average level of participation of P3A members Sare Te'ne was in the low category (9.33). It is known that 1 person from a total of 12 respondent farmers has a high level of participation who is the head of P3A who has full responsibility for irrigation canal management activities, bearing in mind that he plays a large role in preparing and determining the planning of irrigation canal management activities previously, and 11 out of a total of 12 respondent farmers who have a low level of participation assume that evaluation activities are not their responsibility. All P3A members hand over the evaluation activities fully to the P3A chairperson because they assume that the evaluation activities are an obligation and responsibility of the P3A chairperson.

At the yield utilization stage, the average level of participation of P3A members Sare Te'ne is in the high category (18.41) which means farmers agree that the activities of irrigation canal management have a good impact. Where productivity increases after irrigation canal management activities are carried out, financially farmers do not feel disadvantaged by irrigation canal management activities

and water delivery that has been carried out fairly and equally. However, the delivery of water to farmland has not been done in an exact amount and time, because the water delivery activities are carried out by the PPA (Water Gate Guard) in coordination with the P3A Chair and the P3A location downstream causing the water rotation system to be carried out for a longer time. compared to those in the upstream and middle. However, farmers cannot demand much because they realize that their involvement in the planning stage is in the low category and which will have an impact on the final results of irrigation canal management.

The value of the questionnaire results of the respondent farmers in P3A Karya Bersama, P3A Samaturu and P3A Sare Te'ne on the level of participation in irrigation canal management can be seen in the following table:

Table 5. Level of P3A Karya Bersama, P3A Samaturu, and P3A Sara Te'ne member participation in managing irrigation system at Mattoanging Village, Bantimurung Sub-District, Maros Regency, 2018.

P3A	Activity	Ranging score	Score	Participation level
Karya Bersama	Planning, implementing, evaluating, and result utilization	20 – 100	69.26	Moderate
Samaturu	Planning, implementing, evaluating, and result utilization	20 – 100	66.00	Moderate
Sare Te'ne	Planning, implementing, evaluating, and result utilization	20 – 100	50.16	Moderate

Source: Processed primary data, 2018.

Table 5 shows that in Mattoanging Village, Bantimurung District, Maros Regency, the level of participation of farmers in P3A Karya Bersama was higher (69.26) compared to P3A Samaturu (66.00) and P3A Sare Te'ne (50.16). In general, the average level of participation of P3A Karya Bersama, P3A Samaturu and P3A Sare Te'ne farmers in the management of irrigation channels is in the medium category, indicating that each P3A member is well aware of the roles and responsibilities to participate in utilizing and managing the canal. irrigation which will have an impact on the results of farming. P3A members have started to realize that their role to contribute energy, ideas or thoughts can influence the ultimate goal to be achieved from irrigation channel management.

In P3A Karya Bersama, the average level of farmers is moderate (69.26) where P3A are well aware of their roles and responsibilities for managing irrigation canals and maintaining irrigation sustainability so that they can continue to function according to their function, where the average level of participation shows that the role P3A Karya Bersama members are in the highest category compared to P3A Samaturu and P3A Sare Te'ne. Members of the P3A Karya Bersama group have a higher awareness of their participation in the management of irrigation canals which will have an impact on the ultimate goal that they want to achieve together.

In P3A Samaturu the average level of participation of farmers is moderate (66.00) where farmers are also well aware of their roles and responsibilities to participate in contributing their energy, ideas and thoughts to manage irrigation channels although there are still some farmers who are still not sufficiently involved in irrigation channel management activities for various reasons one of which is the existence of an agenda that coincides with the activities of irrigation channel management.

In P3A Sare Te'ne, the average level of participation of members is also still moderate (50.16), although the level of participation in P3A Sare Te'ne is the lowest compared to P3A by Karya Bersama and P3A Samaturu. Most of the P3A members of Sare Te'ne gave full trust to the P3A chairperson to arrange plans, carry out implementation and evaluation activities in irrigation canal management activities and they accepted all the decisions made by the P3A chairperson, resulting in low participation of members of the Sare P3A group Te'ne in irrigation channel management

activities. According to Karsyno in A.N. Tenriawaru (2010) active participation of farmers is due to the support of the ability of human resources involved in organizations with various characteristics of each one of them [2].

4. Conclusion

Participation level on P3A Karya Bersama members is higher than the other two, which has scored value of 69.26 and P3A Samaturu (66.00) and P3A Sare Te'ne (50.16). Farmers participation in average to manage the irrigation system categorizes moderate which show that each member of P3A has quite participated and aware to feel responsible in managing, utilizes, and maintaining the irrigation system that will impact their farm business. The P3A members are starting to fully aware of their role in supporting energy, ideas, or thoughts that will affect the goals the irrigation system wants to achieve.

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