Research Inventy: International Journal of Engineering And Science
Vol.13, Issue 6 (June 2023), PP 24-29
Issn (e): 2278-4721, Issn (p):2319-6483, www.researchinventy.com

Analysis Of The Impact From The Implementation Of The Program To Accelerate The Improvement Of Irrigation Water Utilization (P3-TGAI) In Increasing The Performance Of Tertiary Irrigation Systems In The Wuno Irrigation Area, Sigi, Central Sulawesi

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Abstract: *Implementation of the Program for Accelerating Improvement of Irrigation Water Utilization (P3-TGAI) is given to water-using farmers to be able to help maximize the performance of existing irrigation systems to be developed even better. The purpose of this study was to analyze the impact of the implementation of the P3-TGAI in the Wuno Irrigation Area on improving the performance of the irrigation system, and how the results of the evaluation of the irrigation system performance index on P3-TGAI implementers in the Wuno Irrigation Area. This type of research is a quantitative descriptive research that explains the relationship between variables by analyzing numerical data. The population in this study were P3A group administrators who carried out the P3-TGAI program in the Wuno Irrigation Area from 2020 – 2021. The data collection technique used in this research was direct field research which consisted of observations, questionnaires, interviews and documentation. From the results of the study it was found that the impact of the implementation of P3-TGAI on improving the performance of the existing tertiary irrigation system showed an average value of 88.55% with a very increased category, and out of a total of 10 P3A groups through the irrigation system performance survey, good performance was obtained. This shows that the implementation of P3-TGAI in the Wuno Irrigation Area has provided an increase in the performance of the tertiary irrigation system.*

Keywords: Analysis, P3-TGAI, Improvement, Performance, Tertiary

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Date of Submission: 22-05-2023 Date of Acceptance: 03-06-2023

I. INTRODUCTION

Agriculture in its management is supported by a number of infrastructures to increase farmer productivity in an irrigated area. One of the infrastructures that is most attached to the development of the agricultural sector in villages is irrigation networks, especially tertiary irrigation networks. Tertiary irrigation networks are irrigation networks that function as infrastructure for irrigation water services in tertiary plots consisting of tertiary canals, quarter canals and exhaust canals, tertiary boxes, quarter boxes, and their complementary buildings (PP No. 20 of 2006).

In the 2020-2024 national medium-term development plan (RPJMN), the government focuses on two things, namely strengthening economic resilience for quality growth and strengthening infrastructure to support economic development and basic services. Therefore, the government, through the Ministry of Public Works and Public Housing, is organizing the Program to Accelerate Improvement of Irrigation Water Use (P3-TGAI) as a cash-intensive program to support national food security and quality economic growth based on the participation of farming communities.

In SE Director General of Water Resources No. 4 of 2021 it is explained that P3-TGAI is carried out in a labour-intensive manner through empowering farming communities in the rehabilitation of tertiary irrigation networks, increasing tertiary irrigation networks, and/or building tertiary irrigation networks in a participatory, planned and systematic way to improve the performance of tertiary irrigation network management. The empowerment process starts from planning, implementing construction, supervising and managing irrigation networks by involving the participation of the community as executors of activities.

It is necessary to routinely evaluate the performance of tertiary irrigation systems in order to determine the performance conditions of existing irrigation systems. Therefore, the government through the Minister of Public Works and Public Housing issued PUPR Regulation No. 12/PRT/M/2015 which contains guidelines for evaluating the performance of irrigation systems.

Sigi Regency, especially the Wuno Irrigation Area, is one of the areas in Central Sulawesi Province which is the target of the P3-TGAI program and is the object of this research. As for the results of this study to determine the impact of the implementation of P3-TGAI and see the performance evaluation of existing tertiary irrigation systems in accordance with PUPR Ministerial Regulation No. 12/PRT/M/2015.

II. MATERIAL AND METHOD

2.1. Study Location

This research was conducted in the Wuno Irrigation Area (DI Wuno), Sigi Regency, Central Sulawesi. DI Wuno has a functional area of 867 Ha and is under the authority of the Regency Government. The choice of the Wuno Irrigation Area as the research location was due to the fact that it is the Irrigation Area with the most implementers of the P3-TGAI program since 2020, namely 10 P3A groups. 6 P3A groups are in Bora village, 2 P3A groups are in Soulove village, 1 P3A group is in Watunonju village, and 1 P3A group is in Oloboju village.

2.2. Data

The data used as material for analysis in this study are primary data and secondary data. Primary data was obtained by interview technique, submission of questionnaires and documentation to get an overview of the existing conditions of the study location. Structured interviews were conducted using an irrigation system performance appraisal form. Secondary data in this study are maps of the Wuno Irrigation Area, irrigation network schemes of the Wuno Irrigation Area and data on P3A groups receiving the P3-TGAI program in the Wuno Irrigation Area in 2020 and 2021.

2.3. Literature Review

2.3.1. Irrigation System

The irrigation system includes irrigation infrastructure, irrigation water, irrigation management, irrigation management institutions and human resources. In supporting farming productivity in the context of national food security and community welfare, this can be realized through the sustainability of irrigation systems. In PP No. 20 of 2006 explains that the sustainability of irrigation systems is determined by the reliability of irrigation water, the reliability of irrigation infrastructure and the increased income of farming communities from farming. The development and management of the irrigation system is carried out by involving all interested parties by prioritizing the interests and participation of the farming community in the entire decision-making process as well as implementing the development and management of irrigation systems. To carry out these activities, empowerment of groups of farmers using water and related district/city or provincial offices or agencies in the field of irrigation is carried out on an ongoing basis.

In order to achieve an integrated and sustainable level of irrigation function services for users of irrigation water and users of irrigation networks by financing the management of irrigation assets as efficiently as possible, it is necessary to carry out management of irrigation assets, namely a structured management process for planning the maintenance and funding of irrigation systems. Management of irrigation assets includes activities of inventorying, planning, implementing, evaluating irrigation assets, and updating the results of the inventory of irrigation assets.

2.3.2. Evaluation of Irrigation System Performance

Irrigation system performance index is a value that can be measured to determine the general condition of an irrigation system. The value of irrigation system performance can be influenced by various technical factors, namely those related to the operation and maintenance of irrigation canals as well as non-technical factors related to social, economic and cultural factors of farmers who use irrigation water and are members of the Association of Water-Using Farmers (P3A). (Nugroho et al, 2021). In PUPR Regulation No. 12/PRT/M/2015 explains that the evaluation of irrigation system performance is intended to determine the performance conditions of irrigation systems with an assessment weight that includes physical infrastructure (25%), agricultural productivity (15%), supporting facilities (20%), personnel organization (15 %), documentation (5%) and institutional conditions of P3A (20%).

Based on the results of the accumulated assessment of each indicator, the final score will be obtained as a result of the Tertiary Irrigation System Performance Index assessment. The final classification of irrigation system performance condition assessment is as follows:

1. 80-100 : very good performance
2. 70-79 : good performance

3. 55-69 : performance is lacking and needs attention
4. < 55 : poor performance and needs attention

2.4. Research Method

This research begins with making observations in the field and requesting the necessary data. After conducting field observations, questionnaires were run regarding the impact of the implementation of P3-TGAI activities on the performance of the existing tertiary irrigation system to the group administrators of the 10 existing P3As. The procedures for processing the questionnaire data are as follows:

1. Collect the results of interviews in the field (questionnaire).
2. Testing the validity of the questionnaire.
3. Testing the reliability of the questionnaire.
4. Doing data processing with descriptive statistical methods.
5. Classify the value of data processing into the grouping interval of the results of the questionnaire answers

After obtaining the results from the questionnaire assessment, a survey was conducted to evaluate the performance of the irrigation system based on Permen PUPR No.12/PRT/M/2015 to find out the current condition of the performance of the existing tertiary irrigation system after the implementation of P3-TGAI in 10 locations of the P3A group. The stages are as follows:

1. Assessment of the condition of physical infrastructure
2. Assessment of agricultural productivity conditions
3. Assessment of the condition of supporting facilities
4. Assessment of the state of the organization of personnel
5. Assessment of the condition of the documentation
6. And an assessment of the institutional condition of the P3A group

Through the existing irrigation system performance index assessment form based on the variables above, the results of the assessment category will be obtained as follows:

Table 1. Criteria and weight for assessing the performance of irrigation systems

No.	Value (%)	Category
1.	80 – 100	Excellent Performance
2.	70–79	Good Performance
3.	55 – 69	Less Performance
4.	<55	Poor Performance

Source: *PUPR Regulation No.12/PRT/M/2015*

III. RESULTS AND DISCUSSIONS

3.1. Wuno Irrigation Area

The Wuno Irrigation Area is directly adjacent to Sidera Village to the north, Waturalele Village to the west, Bora Village to the south and Watunonju Village to the east. The Wuno Irrigation Area has a functional area of 867 Ha, a standard land area of 1016 Ha, and a potential land area of 1016 Ha. in PUPR Ministerial Regulation No.14/PRT/M/2015 concerning Criteria and Determination of Irrigation Area Status. There are 10 P3A groups that are the object of this research, namely P3A Suka Maju, P3A Roa Uwe Wuno Sintuwu, P3A Wuno Singgani, P3A Harapan Kita, P3A Rajawali, P3A Bora Mekar Jaya, P3A Mapane Indah, P3A Kekerara, P3A Usaha Singgani and P3A Tunas Mekar.

3.2. Relative Rank Index (RRI) Value From Questionnaire Results

The Wuno Irrigation Area is directly adjacent to Sidera Village to the north, Waturalele Village to the west, Bora Village to the south and Watunonju Village to the east. The Wuno Irrigation Area has a functional area of 867 Ha, a standard land area of 1016 Ha, and a potential land area of 1016 Ha. in PUPR Ministerial Regulation No.14/PRT/M/2015 concerning Criteria and Determination of Irrigation Area Status. There are 10 P3A groups that are the object of this research, namely P3A Suka Maju, P3A Roa Uwe Wuno Sintuwu, P3A Wuno Singgani, P3A Harapan Kita, P3A Rajawali, P3A Bora Mekar Jaya, P3A Mapane Indah, P3A Kekerara, P3A Usaha Singgani and P3A Tunas Mekar.

Table 2. RRI value results from the questionnaire results

No.	Question	Percentage
1.	Channel carrier function with Good For fulfil irrigation water needs in a manner maximum	99.33%
2.	Building on channel carrier (box) works with Good And make performance channel carrier become increase	96.00%
3.	Channel waster function with Good so that reduce problem inundated floods	98.00%

No.	Question	Percentage
4.	The implementation of the P3-TGAI program is improving fulfillment water needs in door tapping	96.00%
5.	Implementation of the P3-TGAI program realization wide plant increase	95.33%
6.	The implementation of the P3-TGAI program is improving productivity paddy every the year	96.00%
7.	No exists again break / wild take from channel carrier	86.00%
8.	Distribution of water on small discharge time still distributed with Good	93.33%
9.	increasing management and cleaning channel tertiary done in a manner gotong cooperate	91.33%
10.	Availability equipment supporters operation and maintenance	67.33%
11.	There is OP officer (ulu-ulu or technical officer P3A)	98.67%
12.	Trained OP officers and capable coordinate things related operation and maintenance irrigation tertiary	99.33%
13.	The OP 's build good communication to farmer	99.33%
14.	Complete plot data book tertiary consisting from book administration organization , tertiary OP manual , schedule and pattern plant	64.00%
15.	Complete map And composed image from map region work, map plot tertiary, schema network tertiary, schema building, and after work picture	64.00%
16.	P3A have official law status	98.00%
17.	The implementation of the P3-TGAI program helped development condition P3A institutions (Complete administration and management)	90.67%
18.	P3A activities such as meeting together, OP officer, interpreter measure, etc	87.33%
19.	Routine carry out surveys and search network irrigation tertiary	84.00%
20.	Active participation from P3A in repair network and handling disaster natural environment network irrigation tertiary	78.67%
21.	Realized dues active P3A members for support operation and maintenance network irrigation tertiary	76.00%
22.	Formed coordination in planning system plant And water allocation	90.67%
23.	Active participation P3A in involvement on monitoring and evaluation routine	87.33%
Average		**88.55%**

With an average value of 88.55%, the results of the category have greatly increased based on the determination of the answer interval results. This shows that the implementation of P3-TGAI activities in the Wuno Irrigation Area has an impact on increasing the performance of the irrigation system which is very good for each P3A group that implements the activity.

3.3. Tertiary Irrigation System Performance Assessment

Irrigation System Performance Assessment was carried out for 10 P3A groups after the implementation of the P3-TGAI activities. Through this survey a value will be obtained which will show how far the performance level of the existing tertiary irrigation system is

Table 3. Results of Tertiary Irrigation System Performance Index values for 10 P3A groups

No.	Indicator	Condition Value
1.	**P3A Suka Maju**	
Physical Infrastructure		20.07%
Agricultural Productivity		11.37%
Supporting Facilities/ OP Conditions		13.60%
Personnel Organization		15.00%
Documentation		3.00%
Association of P3A		14.10%
Total		77.14% (Good)
2.	**P3A Roa Uwe Wuno Sintuwu**	
Physical Infrastructure		20.13%
Agricultural Productivity		11.94%
Supporting Facilities/ OP Conditions		14.10%
Personnel Organization		15.00%
Documentation		3.30%
Association of P3A		14.20%
Total		78.67% (Good)
3.	**P3A Tunas Mekar**	
Physical Infrastructure		19.14%
Agricultural Productivity		11.73%

Supporting Facilities/ OP Conditions	14.00%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.30%
Total	76.17% (Good)
4. P3A Usaha Singgani	
Physical Infrastructure	19.14%
Agricultural Productivity	11.59%
Supporting Facilities/ OP Conditions	14.30%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.60%
Total	76.63% (Good)
5. P3A Mapane Indah	
Physical Infrastructure	19.70%
Agricultural Productivity	12.90%
Supporting Facilities/ OP Conditions	13.40%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.60%
Total	77.90% (Good)
6. P3A Harapan Kita	
Physical Infrastructure	19.72%
Agricultural Productivity	12.00%
Supporting Facilities/ OP Conditions	14.60%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.30%
Total	77.62% (Good)
7. P3A Kekerara	
Physical Infrastructure	20.46%
Agricultural Productivity	12.20%
Supporting Facilities/ OP Conditions	15.80%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.60%
Total	80.06% (Very Good)
8. P3A Rajawali	
Physical Infrastructure	20.64%
Agricultural Productivity	12.20%
Supporting Facilities/ OP Conditions	14.20%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.60%
Total	78.64% (Good)
9. P3A Bora Mekar Jaya	
Physical Infrastructure	20.22%
Agricultural Productivity	11.86%
Supporting Facilities/ OP Conditions	14.20%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	13.30%
Total	77.58% (Good)
10. P3A Wuno Singgani	
Physical Infrastructure	19.82%
Agricultural Productivity	11.95%
Supporting Facilities/ OP Conditions	13.60%
Personnel Organization	15.00%
Documentation	3.00%
Association of P3A	14.10%
Total	77.47% (Good)

Based on the criteria and weights of the ratings in table 3, the results show that there are 9 groups of P3A that have good performance and 1 group of P3A that has very good performance. The following are some evaluations after the implementation of the P3-TGAI based on existing indicators from field surveys:

1. The conveying channel has a fairly large dimension and functions well in conveying water;

2. Inadequate exhaust ducts;
3. Adequate water needs which have made the realization of planting area and rice productivity increased in recent years;
4. There is a break without using a sluice to drain into the tertiary plots which makes it more difficult to regulate the distribution of water;
5. Tertiary channel cleaning is well done;
6. Ulu-ulu/ P3A technical officers do their job well in coordinating the distribution of water to existing plots, especially when there is a decrease in water discharge;
7. Tertiary network maps and schemes are still being archived by the village administration;
8. P3A institutional conditions are in a developing condition accompanied by the issuance of a Notary Deed;
9. Coordination meetings have started to be held, although not routinely evenly for all groups;
10. The activity of P3A management and members in carrying out operations and maintenance activities is quite good.

IV. CONCLUSION

1. The impact of the implementation of P3-TGAI activities in the Wuno Irrigation Area by 10 P3A groups as executors of the activities, shows that there has been a significant increase in the performance of the tertiary irrigation system in each group. This can be seen from the average percentage of the results of the questionnaires given to respondents, namely 88.55% with each variable which includes physical infrastructure (97.77%), agricultural productivity (95.77%), supporting facilities / operating and maintenance conditions (84.49%), personnel organization (99.11%), documentation (64%), and P3A institutional conditions (86.58%). This shows that P3-TGAI activities have had a large impact and benefit on agricultural activities, especially in the Wuno Irrigation Area.
2. Through a tertiary Irrigation System Performance Index assessment survey based on PUPR Ministerial Regulation No. 12/PRT/M/2015 to find out the current condition of the performance of the existing tertiary irrigation system after the implementation of P3-TGAI activities, the following results are obtained:
   a. P3A Suka Maju: 77.14% with good performance category;
   b. P3A Roa Uwe Wuno Sintuwu: 78.67% in the good performance category;
   c. P3A Tunas Mekar: 76.17% with good performance category;
   d. P3A Usaha Singgani: 76.63% with good performance category;
   e. P3A Mapane Indah: 77.90% with good performance category;
   f. P3A Harapan Kita: 77.62% with good performance category;
   g. P3A Kekerara: 80.06% with very good performance category;
   h. P3A Rajawali 78.64% with good performance category;
   i. P3A Bora Mekar Jaya: 77.58% with good performance category; And
   j. P3A Wuno Singgani: 77.47% in the good performance category.

   This Tertiary Irrigation System Performance Index Assessment is supported by an increase in agricultural productivity in each P3A group which shows an increase every year.

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Tutang M. Kamaludin, et. al. "Analysis Of The Impact From The Implementation Of The Program To Accelerate The Improvement Of Irrigation Water Utilization (P3-TGAI) In Increasing The Performance Of Tertiary Irrigation Systems In The Wuno Irrigation Area, Sigi, Central Sulawesi." *International Journal of Engineering and Science*, vol. 13, no. 6, 2023, pp. 24-29.