The Influence of Irrigation Facilities on Farmers' Satisfaction Level in Banyuwangi Regency

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Abstract:- The implementation of programs and activities for the development and management of irrigation networks is more emphasized on the construction/rehabilitation of tanks/removal of irrigation networks and normalization of rivers/irrigation channels. In this study using a multivariate determination of the minimum number of samples calculated based on the following formula (Ferdinand 2011): N = (25 x variables) = 100 samples. From these calculations, 100 respondents were determined as the research sample. This research uses quantitative research and the data analysis used is multiple regression analysis, t test to see the effect together. Based on the results of the study, that of the 3 irrigation facilities that became the research variables, among others (Irrigation Building, Irrigation Water, and Irrigation Management) were irrigation water and irrigation management which had an effect on farmer satisfaction while irrigation buildings had no effect. This happens because the water tends to be uneven in coastal areas that still lack water for rice fields. Meanwhile, simultaneously, irrigation facilities have an effect on farmer satisfaction in Banyuwangi regency.

Keywords:- Irrigation Building, Irrigation Water, Irrigation Management, and Farmer Satisfaction.

I. INTRODUCTION

One of the important sectors in economic development is the agricultural sector. This is because of its important function and role in providing energy and food for the population as well as a place of livelihood for the majority of the population in rural areas. The Agricultural Sector makes a significant contribution to the formation of Gross Domestic Product (GDP), increasing foreign exchange and increasing farmer welfare, so it can be said that agricultural development is the driving force and support for the national economy (Ministry of Agriculture, 2018).

Referring to the data from the Department of Agriculture of East Java Province, Banyuwangi Regency is one of the areas in East Java Province that has a very strategic agricultural role. The biggest potential for food crops in Banyuwangi Regency is the production of rice plants, in this case Banyuwangi Regency is included in the rice barn in East Java Province. The potential for food crops agriculture in Banyuwangi Regency is very large, but the development of this potential currently and in the future faces several challenges, those are the conversion of land into residential and industrial land, water availability, availability of fertilizers, land quality and farmer skills.

Referring to the data on the area of productive land from the Agriculture and Food Service of Banyuwangi Regency in 2021, the area of production land above shows that the area of agricultural production land is decreasing every year, due to the increasing conversion of land from agricultural land to industrial and residential land. So, to maintain the sustainability of the agricultural sector, one of the important factors that must be considered is maintaining and increasing the availability of water by strengthening infrastructure and management of water resources, especially in the irrigation sector. Water is the main need that must exist in the agricultural sector. In order for water needs to be met and distributed evenly, water must be managed properly through an integrated irrigation system. Integrated irrigation system is about managing water resources with the principle of "One River, One Plan, One Management" which means one river system/network, one planning, one management.

Regarding the river system which consists of 3 subsystems, collecting subsystem, transporting subsystem and dispersal subsystem, the direction of planning, implementation, operation, and maintenance must be carried out in a unified whole. Irrigation is an important supporting factor in increasing the production of agricultural products, especially food products as a form of agricultural intensification steps to reduce the impact of decreasing agricultural productive land area. History records that dams and irrigation networks invested by the government have been able to increase agricultural production (Booth, 1977, (Norton, 2004).

The benchmark for the irrigation system is adequate infrastructure, retention time, continuity and good water quality, and even distribution of water so that whenever farmers need water to irrigate their crops, they can be met. Apart from the infrastructure, the presence of irrigation officers is also something that needs to be considered, from an integrated irrigation system. It is hoped that with an integrated irrigation system, the intensity and productivity of agriculture will increase so that the welfare of farmers will increase. According to research from Sukayat et al. (2019) Farmers are satisfied with the services in the management of irrigation networks, which are meant here are irrigation buildings, irrigation water and irrigation management which are realized by increasing agricultural production.

One of the successes of this irrigation can be measured from the existing irrigation facilities on farmer satisfaction, and research is needed regarding farmer satisfaction with the current irrigation system in the Banyuwangi Regency area. The hopes of farmers need to be absorbed so that in the future the planning of buildings and irrigation management will be better and satisfy farmers as objects of agricultural sector development in Banyuwangi Regency so that irrigation development will be on target and sustainable.

II. LITERATURE REVIEW

Studies on irrigation management and its relationship to maximizing agricultural yields have been studied previously, both qualitatively and quantitatively. The view of research on irrigation system management in an area in a development effort that is expected to maximize land management and farmer satisfaction is reviewed not only from one aspect. At least there are social aspects such as culture in the surrounding area and economic aspects.

Research similar to the previous qualitative research design has been carried out by Arisanto (2019), The results of the research on the social aspect show that social culture, kinship and community institutional patterns in the Lebak and Pandeglang communities can encourage an increase in irrigated agricultural activities. The economic aspect shows that agriculture is still a place where the community depends, although the added value of agriculture continues to decline and the institutional aspect shows that there are still many weaknesses in the management of irrigated agriculture and institutional management that encourages agricultural productivity. Qualitative research was also conducted by Prasetyo (2010) The results of the study indicate that the successful empowerment of the Irrigation User Farmers Association organization must be in the form of a legal entity, the government as a facilitator, motivator, holding management cooperation, providing assistant staff, providing production facilities and facilitating the formation of a multi-business cooperative. While the relationship with farmer satisfaction, Sukayat et al. (2019) shows the results of irrigation management provide satisfaction of 83.11%.

Mustaniroh (2001) shows the findings in his qualitative study that the conditions in the research area are not entirely good but sufficient to increase water use. For the purpose of optimizing the rice production system, the project developer must control the irrigation system, so as to rehabilitate irrigation and drainage facilities. Listyawati and Suharsono (2012) argued that farmers considered the highest performance in irrigation management, namely the friendly attitude of the extension workers and easy-to-find extension workers and the attribute that had the lowest level of performance was the utilization of the facilities and infrastructure needed by farmers.

Puro (2020) developed the same research idea related to irrigation. The results of the study of the main buildings assessed amounted to 26 units showing: 17 buildings in good category or 65%, moderate category at 0% or none, and 9 buildings in damaged category or 35%, no satisfaction in the category of heavily damaged. The data shows that building, water, and management have a positive effect on farmer satisfaction.

Previous quantitative research has been carried out by Rahma (2013), using water and irrigation management variables, with SEM analysis, it can be seen that the relationship of all indicators to Farmer Satisfaction (inner model) and the relationship of all indicators to the latent variable (outer model) gives a significant value because the T-Statistic value is above 1.96 so that satisfaction Farmers are valid as second order constructs, the six latent variables are valid as first order constructs, and 33 first order parameters are valid as indicators. Putri (2019) from the results of the calculation of irrigation management performance, with regression analysis shows the need for efforts to improve irrigation management in an effort to increase farmer satisfaction.

Overall, the equations of previous researchers that are relevant to this research lie in the independent and dependent variables. The difference lies in the variables in each previous researcher. From irrigation facilities managed by the government focused on irrigation buildings, water discharge and quality, management in irrigation and how satisfaction with the facilities that have been provided.

In this study using multiple linear regression data analysis method. Where some previous research results use qualitative methods that are in direct contact with actors or do not even place a certain correlation on strategies in irrigation facilities.

III. DATA

The research data were taken from all sub-districts in Banyuwangi regency, with a research sample of 25 sub-districts. The data in this study are primary data taken directly from the research object using a questionnaire with the help of a Likert scale 1 to 5.

IV. METHODOLOGY

This research includes descriptive research by describing certain phenomena or populations to explain relevant aspects of the observed phenomena (Sudjana 2001). While the approach used is a quantitative approach. This approach is considered the most suitable because in this research, we want to measure the level of satisfaction of the farmer, where the satisfaction level is measured on a scale of 1-5. The independent variables in this study were irrigation buildings, irrigation water, and irrigation management. While the dependent variable is the level of farmer satisfaction.

The instrument tests carried out include validity and reliability tests to ensure that the data from the questionnaire in the form of respondents' answers are valid and reliable. Furthermore, the Classical Assumption test is carried out which includes the normality test, multicollinearity test, and heteroscedasticity test.

This study examines the effect between variables using multiple regression methods. Multiple regression model is a model in which the dependent variable depends on two or more independent variables. There are three hypothesis tests used in this study, namely the coefficient of determination test (R^2), the F test (simultaneous), and the t test (partial). The multiple regression analysis model in this study is to determine whether the influence of the independent variables, namely irrigation buildings (X1), irrigation water (X2), and irrigation management (X3) on farmer satisfaction (Y) in Banyuwangi regency, the multiple linear regression equation is as following:

$$Y = a + b_1X_{1} + b_2X_{2} + b_3X_{3} + e$$

Keterangan :

Y	= Farmer satisfaction	
X_1	= Irrigation Building	
X_2	= Irrigation Water	
X_3	= Irrigation Management	
a	= Constant	
$b_{1..}\ b_3$	= Regression coefficient X_1, X_2, X_3	
e	= Confounding variable	

V.   RESULT AND DISCUSSION

Respondents in this study are farmers who are indirectly found in the fields or research locations. A total of 100 respondents from 25 sub-districts in Banyuwangi regency.

The questionnaire uses a Likert scale from numbers 1 to 5 to represent answers from strongly disagree to strongly agree.

The validity of the data with the validity test shows that all items r analysis results are greater (>) than r table, in this case, the minimum requirement to be considered a valid instrument item is a valid index value is the validity index value > 0.3 (Sugiyono 2017), so all items are declared valid. The reliability test results obtained from the Cronbach's Alpha value of each variable are more than 0.60. From this study, the Cronbach's Alpha values of irrigation buildings, irrigation water, irrigation management, and farmer satisfaction were 0.784, 0.726, 0.771, 0.874. All results show numbers above 0.60 so it can be said that this research is reliable.

The normality test of the data as the first test of the classical assumption shows a significance value of 0.813 or above 0.05 as seen from the One-Sample Kolmogorov-Smirnov Test. Likewise with the results of other classical assumption tests, this study was free from the symptoms of multicollinearity and heteroscedasticity.

Multiple linear analysis test is used to determine the effect of two or more independent variables with one dependent variable. This test also looks at the amount of R square to find out how many percent (%) of variance in the independent variable simultaneously on the dependent variable and see whether or not the regression coefficient of each independent variable is significant.

Tabel 1   Multiple Linear Analysis Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.168	.214		2.613	.481
	Building	.215	.162	.101	0.053	.091
	Water	.815	.003	.521	3.215	.000
	Management	.742	.008	.341	2.028	.000
a dependent variable satisfaction						

Multiple linear regression equation formula
$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e$$
$$Y = 3,168 + 0,215X_1 + 0,815X_2 + 0,742X_3$$

a. The constant value is 3 which means that the satisfaction of farmers will increase by 3 if irrigation facilities include buildings (X_1), water (X_2), and management (X_3) equal to zero. This can be explained that farmer satisfaction will decrease if there are no good irrigation facilities.

b. Building variable (X_1) has a positive value of 0.215 which means that every increase in the building (X_1) by 1 percent, farmer satisfaction will increase by 0.215 assuming the other variables are constant.

c. Water variable (X_2) has a positive value of 0.815 which means that every increase in water (X_2) by 1 percent, farmer satisfaction will increase by 0.815 assuming the other variables are constant.

d. Management variable (X_3) has a positive value of 0.742 which means that every increase in management (X_3) by 1 percent, the satisfaction of farmers will increase by 0.742 with the assumption that the other variables are constant.

Tabel 2   T-test analysis results

Item	T-count	T-table	Significance	alpha	information
Building	0,053	1,66023	,091	0,05	No effect
Water	3,215	1,66023	,000	0,05	Take effect
Management	2,028	1,66023	,000	0,05	Take effect

The results of the test can be seen in the table of the results of the t-test analysis above, which means:

1. The results of the multiple regression analysis of the t-test, show the t-count value of the irrigation building variable is 0.053 and the t-table is 1.66023. This shows that t arithmetic is smaller than t table, so that the irrigation building variable does not partially affect farmer satisfaction.

2. The irrigation water variable in the t-test shows the t-count value of the irrigation building variable is 3.215 and the t-table is 1.66023. t count is greater than t table, so that the variable irrigation building has a partial effect on farmer satisfaction.

3. The results of the multiple regression analysis of the t-test on the irrigation building variable showed a value of 2.028 and a t-table of 1.66023. This shows that t count is greater than t table, so that the irrigation building variable has a partial effect on farmer satisfaction.

Tabel 3 F -test analysis results

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	44.563	3	15.511	23.597	,000[b]
	Residual	31.662	96	753		
	Total	76.185	99			

a. Dependent Variable: satisfaction

b. Predictors: (Constant), building, water, management

Based on the data in the table above, it can be seen that the calculated F value is 23,597 with the provision that a value of 5% is 2.46, then the calculated F is 23,597 greater than the F table which is 2.46 so that statistically it can be proven that all independent variables simultaneously affect the farmer satisfaction.

Tabel 4 Analysis Results of Determination Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,843	.711	.781	.4712

a. Predictors: (Constant), x1, x2, x3,

b. Dependent Variable: y

Based on table 4 shows the value of R squar or coefficient of determination (R2) of 0.711. this shows that the performance variable (Y) is influenced by 71.1% by variables (irrigation building (X1), irrigation water (X2), and irrigation management (X3)) while the remaining 28% is explained by other variables.

VI.   CONCLUSION

Based on several results of data analysis and discussion in this study, it can be concluded that;

1. The results of data analysis show that the irrigation building variable has no partial effect on farmer satisfaction in Banyuwangi Regency. This is reflected in the results of the farmer's questionnaire that saw the robustness of irrigation buildings which were damaged quickly than the normal maximum age of 5 years, as well as frequent leaks in each building.

2. The results of data analysis show that the irrigation water variable has a partial effect on farmer satisfaction in Banyuwangi Regency. This is reflected in the results of the farmer's questionnaire that the quality of the water that is flowed is good, from the sustainability of the water is regular even during the dry season, the water discharge tends to be stable during the rainy and dry seasons, and when the rainy season is flooded.

3. The results of data analysis show that irrigation management variables have a partial effect on farmer satisfaction in Banyuwangi Regency. This is reflected in the results of the farmer's questionnaire that they are satisfied with the distribution of available water, maintenance of irrigation buildings, more responsive when it rains so there is no flooding.

4. The results of data analysis show that irrigation facilities which include (irrigation building, irrigation water, and irrigation management) simultaneously have an effect on farmer satisfaction in Banyuwangi Regency. This is reflected in the results of the questionnaire being satisfied with the robustness of the building. established by the government, building capacity, equitable distribution of water, and more responsive management during the dry season and during the rainy season

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